Clean Air Engineering

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REPORT ON HYDROCARBON AND VOLATILE ORGANIC COMPOUND TESTING

Performed for:

SOLVAY MINERALS, INC.
EP 5 CALCINER STACK: AQD #48
EP 1&2 CALCINER STACK: AQD #17
TRONA CRUSHER BAGHOUSE STACK
GREEN RIVER, WYOMING

Client Reference No: C02009
CAE Project No: 7356-2
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To the best of our knowledge, the data presented in this report are accurate and complete.

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CONTENTS

1 PROJECT OVERVIEW 1-1
Table 1-1: Source Identification Information - EP-5 1-3
Table 1-2: Source Identification Information - EP-1 & 2 1-3
Table 1-3: Summary of Detectable Test Results 1-4

2 RESULTS 2-1
Table 2-1: EP 5 Calciner Stack - Carbon Monoxide, Ethane, Methane, Total Hydrocarbons 2-1
Table 2-2: EP 5 Calciner Stack - Volatile Organic Compounds by M18 2-2
Table 2-3: EP 5 Calciner Stack - Volatile Organic Compounds by M0030 2-3
Table 2-4: EP 5 Calciner Stack - Carbon Monoxide, Ethane, Methane, Total Hydrocarbons 2-7
Table 2-5: EP 5 Calciner Stack - Volatile Organic Compounds by M18 2-8
Table 2-6: EP 1&2 Calciner Stack - CO, Ethane, Methane, Total Hydrocarbons 2-9
Table 2-7: EP 1&2 Calciner Stack - Volatile Organic Compounds by M18 2-10
Table 2-8: EP 1&2 Calciner Stack - Volatile Organic Compounds by M0030 2-11
Table 2-9: Trona Crusher Baghouse Stack - Ethane, Methane, Total Hydrocarbons 2-15

3 DESCRIPTION OF INSTALLATION 3-1

4 METHODOLOGY 4-1
Table 4-1: Summary of Sampling Procedures 4-1
SAMPLING POINT DETERMINATION 4-2
Table 4-2: Sampling Points 4-2
Figure 4-1: EP 5 Calciner Stack Velocity Sampling Point Determination (EPA Method 1) 4-3
Figure 4-2: EP 1&2 Calciner Stack Velocity Sampling Point Determination (EPA Method 1) 4-4
Figure 4-3: Trona Crusher Baghouse Stack Sampling Point Determination (EPA Method 1) 4-5
VELOCITY AND VOLUMETRIC FLOW RATE - EPA METHOD 2 4-6
Figure 4-4: Velocity and Volumetric Flow Rate Sampling Apparatus (EPA Method 2) 4-6
GAS COMPOSITION AND MOLECULAR WEIGHT - EPA METHOD 3 4-6
MOISTURE CONTENT - EPA METHOD 4 4-7
Figure 4-5: Gas Composition and Moisture Content Sampling Apparatus (EPA Mthds 3 & 4) 4-7
MOISTURE CONTENT - WET BULB/DRY BULB METHOD 4-8
CARBON MONOXIDE - EPA METHOD 10B 4-8
VOLATILE EMISSIONS TESTING - EPA METHOD 18 4-9
Figure 4-6: Calciner Stack Sampling Apparatus (EPA Method 18) 4-10
TOTAL HYDROCARBONS - EPA METHOD 25A 4-11
Figure 4-7: THC Monitoring System Schematic 4-12
VOLATILE ORGANIC COMPOUNDS - SW-846 METHOD 0030 4-13
Figure 4-8: Volatile Organic Compound Sampling Apparatus (SW-846 Method 0030) 4-14

5 APPENDIX 5-1
SAMPLE CALCULATIONS ..... A
PARAMETERS ..... B
CALIBRATION DATA C
FIELD DATA ..... D
FIELD DATA PRINTOUTS ..... E
LABORATORY DATA ..... F
CHAIN OF CUSTODY ..... G
OPERATING DATA ..... H

SOLVAY2016_6_000005

PROJECT OVERVIEW

Solvay Minerals, Inc. contracted Clean Air Engineering to perform emissions testing at their facility located west of Green River, Wyoming. The facility processes "trona" into soda ash, which is used in a variety of manufacturing processes.

The testing was performed to determine if volatile organic hazardous air pollutants (HAPs) are present in the exhaust gas of the gas fired calciner, EP 5, and the coal fired calciners, EP 1&2. SW846 Method 0030 (VOST) was performed to quantify any volatile organic compounds found on the Clean Air Act Compounds List that might be present. To further quantify specific volatile organic compounds, which were expected to be found in significant concentrations, EPA Method 18 sampling utilizing charcoal tubes was performed simultaneously with the SW846 0030 sampling. Additional Method 18 sampling was conducted on EP 5 to determine if emissions were related to process rates.

Total hydrocarbons were determined by Method 25A and methane and ethane emissions were determined by Method 18 at the two calciner stacks listed above and the Trona Crusher Baghouse Stack. Because methane and ethane are not photochemically reactive, they are not regulated and are subtracted from the total hydrocarbon emissions.

Specific testing included the determination of:

- gas velocity and volumetric flow rate;
- gas moisture content;
- gas molecular weight;
- carbon dioxide (CO_2);
- carbon monoxide (CO);
- oxygen (O_2);
- ethane and methane (EP 5, EP 1&2, and Trona Crusher Baghouse) - M18;
- volatile organic compounds (EP 5 and EP 1&2) - M18;
- volatile organic compounds (EP 5 at production rate of 162 tph and EP 1&2) - M0030;
- total hydrocarbons (EP 5, EP 1&2, and Trona Crusher Baghouse) - M25A.

The testing took place on the EP 5 Calciner Stack on January 11 and 12, 1995 and at the EP 1&2 Calciner Stack and the Trona Crusher Baghouse Stack on January 17, 1995. The EP 5 Calciner Stack testing was conducted at both the design rate of 147 tph and at the normal operating rate of 162 tph. The average process rate for both coal fired calciners during the testing on the combined EP 1&2 Stack was 244 tph. The Trona Crusher Baghouse testing was conducted at an average process rate of 154 tph.

PROJECT OVERVIEW

Coordinating the field testing were:

D. Potter - Solvay Minerals, Inc.
S. Ferguson - Clean Air Engineering

The Method 18 volatile organic compound (VOC) testing used impingers upstream of the charcoal tubes to prevent condensation. The condensate was analyzed to verify that all VOCs passed through the water. At the conclusion of the first run, CAE personnel noted impinger condensate was less than expected and the run was repeated. Analysis indicates the VOC results were not affected by the amount of impinger condensate; therefore, all four runs were included in the data.

Post-test leak checks were not performed at the conclusion of the Method 18 test runs. The vacuum during a leak check could volatilize organic compounds with low boiling points.

Results for the Method 18 train for 1-3 butadiene were inconsistent. During sample analysis the 1-3 butadiene had a retention time of 0.61 minutes. For runs where 1-3 butadiene was not detected (no peak at 0.61 minutes), a peak did appear at 0.47 minutes. For all runs either one or the other peak appeared but never both. Experiments were conducted by analyzing 1-3 butadiene samples under various conditions to determine if the 1-3 butadiene retention time could be shifted. No instances where the shift occured were found. Analysis of the samples on a second column under different conditions indicated different peak retention times as well. This evidence indicates the peaks were caused by different compounds. For runs which had a peak at 0.47 minutes but not at 0.61 minutes retention time, 1-3 butadiene was reported as below the detection limit (BDL). Analysis of butene showed that it had a retention time of about 0.47 minutes. No mass spectrometry analysis could be conducted to confirm the peak identity since the charcoal tubes were desorbed in carbon disulfide, which has a very short shelf life.

The Method 18 VOC samples for determining methane, ethane, and carbon monoxide were collected in tedlar bags and shipped to CAE's Palatine, Illinois lab for analysis. The tedlar sample bags for Runs 3, 4, 5, and 6 of the EP 5 Calciner were partially deflated when they arrived at the Clean Air Engineering Laboratory for analysis, indicating that they may have leaked. Analytical results confirm that the bags did leak. These results are reported in Appendix Section B, but were not included in location averages. Non-methane and non-ethane average results are calculated from tedlar bag which did not leak.

PROJECT OVERVIEW

A summary of identifying information for each of the sources is presented in the following tables:

Table 1-1:
Source Identification Information - EP-5

Unit Identification Number	AQD #48, EP-5
Process	Calciner
Fuel	Natural Gas
Heat Content	1080 Btu/ft^3
Stack Height	180.5 feet
Stack Diameter	125.5 inches
Diameters to Upstream Disturbance	Approximately 5.5
Diameters to Downstream Disturbance	Approximately 9.0
Primary Control Equipment	ABB Flakt Model FAAGX ESP

Table 1-2:
Source Identification Information - EP-1 & 2

Unit Identification Number	AQD #17, EP-1 & 2
Process	Calciner
Fuel	Coal
Heat Content	10084 Btu/lb
Stack Height	180.5 feet
Stack Diameter	144 inches
Diameters to Upstream Disturbance	Approximately 3.6
Diameters to Downstream Disturbance	Approximately 4.4
Primary Control Equipment	2 BA1.1x501, 4334-4.T ESPs

A summary of the test program results is presented Table 1-3 on page 1-4. The data presented is for those compounds which were detected by the methods used. When one or two runs were below the detection limit (BDL), zero was used in the average calculation.

SOLVAY2016_6_000009

PROJECT OVERVIEW

Table 1-3:
Summary of Detectable Test Results

Source, Trona Processing Rate Constituent (units)	Average CO & HC Emissions (10B, 25A)	Average VOC Emission (M18)	Average VOC Emission (M0030)
EP 5 Calciner Stack, 162 tons/hr			
Total hydrocarbons (THC) (lb/hr)	145		
Methane and ethane (lb/hr)		59.8	
Total non-methane, non-ethane HC (lb/hr)	85.5		
Carbon monoxide (lb/hr)	549		
1,3 Butadiene (lb/hr) [1]		0.557[1]	2.82
Acrylonitrile (lb/hr)			0.101
Benzene (lb/hr)		3.12	1.07
Ethyl benzene (lb/hr)		0.211	0.113
Hexane (lb/hr)		0.324	0.132
Methylene chloride (lb/hr)		0.282	0.0500
Styrene (lb/hr)		0.198	0.190
Toluene (lb/hr)		0.766	0.790
Xylene (lb/hr)		0.741	0.469
Chlorobenzene (lb/hr)			0.000521
Cumene (lb/hr)			0.00229
Bromomethane (lb/lhr)			0.00149
2-Butanone (lb/hr)			0.0640
EP 5 Calciner Stack, 147 tons/lhr			
Total hydrocarbons (THC) (lb/hr)	133		
Methane and ethane (lb/hr)		62.8	
Total non-methane, non-ethane HC (lb/hr)	70.3		
Carbon monoxide (lb/hr)	671		
1,3 Butadiene (lb/hr)		4.67	
Benzene (lb/hr)		3.33	
Ethyl benzene (lb/hr)		0.368	
Hexane (lb/hr)		0.367	
Methylene chloride (lb/hr)		0.896	
Styrene (lb/hr)		0.304	
Toluene (lb/hr)		1.34	
Xylene (lb/hr)		0.924	

[1] See comments on 1, 3 butadiene results by Method 18 in Project Overview.

PROJECT OVERVIEW

Table 1-1 :
Summary of Detectable Test Results (continued)

Source, Trona Processing Rate Constituent (units)	Average CO & HC Emissions (10B, 25A)	Average VOC Emission (M18)	Average VOC Emission (M0030)
EP 1&2 Calciner Stack, 244 tons/hr			
Total hydrocarbons (THC) (lb/hr)	65.7		
Methane and ethane (lb/hr)		3.67	
Total non-methane, non-ethane HC (lb/hr)	62.0		
Carbon monoxide (lb/hr)	153		
1,3 Butadiene (lb/hr) [1]		1.52[1]	4.66
Acrylonitrile (lb/hr)			0.381
Benzene (lb/hr)		1.23	1.48
Ethylbenzene (lb/hr)			0.117
Hexane (lb/hr)		0.510	0.22
Methylene chloride (lb/hr)		1.56	0.0796
Styrene (lb/hr)			0.139
Toluene (lb/hr)		1.33	1.19
Xylene (lb/hr)		1.83	0.984
Carbon disulfide (lb/hr)			0.040
Cumene (lb/hr)			0.00564
Bromomethane (lb/lhr)			0.00811
Chloromethane (lb/hr)			0.0215
2-Butanone (lb/hr)			0.389
Trona Crusher Baghouse stack, 154 tons/hr			
Total hydrocarbons (THC) (lb/hr)	0.796		
Methane and ethane (lb/hr)		0.493	
Total non-methane, non-ethane HC (lb/hr)	0.303		

[1]See comments on 1, 3 butadiene results by Method 18 in Project Overview.

The test conditions and results of analysis are presented in Table 2-1 through Table 2-9 on pages 2-1 through 2-15.

Results

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RESULTS

Table 2-1:
EP 5 Calciner Stack - Carbon Monoxide, Ethane, Methane, Total Hydrocarbons

Run No.		1	2	3[1]	4[1]	Average
Date (1995)		January 11	January 11	January 11	January 11	
Start Time (approx.)		10:46	12:51	14:26	15:52	
Stop Time (approx.)		11:45	13:50	15:25	16:51	
Operating Data						
	Trona processing rate (tons/hr)	162	162	162	162	**162**
Gas Conditions						
T_s	Temperature (°F)	345	349	344	346	**346**
Volumetric Flow Rate						
Q_a	Volumetric flow rate, actual (acfm)	150,300	142,700	143,700	153,500	**147,550**
Q_{std}	Volumetric flow rate, standard (dscfm)	49,440	47,240	48,050	50,990	**48,930**
Carbon Monoxide						
C	Concentration (ppmdv)	2,563	2,644	1	1	**2,600**
E	Emission rate (lb/hr)	552.7	544.7	1	1	**549**
E	Emission rate (lb/tons of trona)	3.41	3.36	1	1	**3.39**
Ethane						
C	Concentration (ppmdv)	BDL	BDL	1	1	**BDL**
Methane						
C	Concentration (ppmdv)	493.0	498.0	1	1	**496**
E	Emission rate (lb/hr)	60.88	58.76	1	1	**59.8**
E	Emission rate (lb/tons of trona)	0.376	0.363	1	1	**0.369**
Total Hydrocarbons						
C	Concentration (ppmdv)	413.3	465.4	454.1	400.0	**433**
E	Emission rate (lb/hr)	140.3	151.0	149.8	140.0	**145**
E	Emission rate (lb/tons of trona)	0.866	0.932	0.925	0.864	**0.897**
Non-methane, non-ethane hydrocarbons [2]						
E	Emission rate (lb/hr)	79.42	92.20	90.00	80.23	**85.5**
E	Emission rate (lb/tons of trona)	0.490	0.569	0.556	0.495	**0.528**

[1] Analytical results indicate that the Tedlar sample bags leaked. These runs are not included in the averages.
[2] The average methane result was used to calculate the non-methane, non-ethane hydrocarbons for Runs 3 and 4.
BDL: Indicates that the value was below the detection limit.

RESULTS

Table 2-2:
EP 5 Calciner Stack - Volatile Organic Compounds by M18

Run No.		1	2	3	4	Average
Date (1995)		January 11	January 11	January 11	January 11	
Start Time (approx.)		10:55	12:52	14:30	15:56	
Stop Time (approx.)		11:55	13:52	15:30	16:56	
Operating Data						
	Trona processing rate (tons/hr)	162	162	162	162	**162**
Gas Conditions						
T_s	Temperature (°F)	345	349	344	346	**346**
Volumetric Flow Rate						
Q_a	Volumetric flow rate, actual (acfm)	150,300	142,700	143,700	153,500	**147,550**
Q_{std}	Volumetric flow rate, standard (dscfm)	49,440	47,240	48,050	50,990	**48,930**
1, 3 Butadiene [1]						
C	Concentration (mg/dscm)	12.02	BDL	BDL	BDL	**3.00**
C	Concentration (ppmdv)	5.346	BDL	BDL	BDL	**1.34**
E	Emission rate (lb/hr)	2.226	BDL	BDL	BDL	**0.557**
E	Emission rate (lb/tons of trona)	0.0137	BDL	BDL	BDL	**0.00344**
1-1-1 Trichloroethane						
C	Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
Acrylonitrile						
C	Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
Benzene						
C	Concentration (mg/dscm)	19.51	18.46	23.87	6.926	**17.2**
C	Concentration (ppmdv)	6.007	5.684	7.351	2.133	**5.29**
E	Emission rate (lb/hr)	3.613	3.266	4.297	1.323	**3.12**
E	Emission rate (lb/tons of trona)	0.0223	0.0202	0.0265	0.00817	**0.0193**
Ethylbenzene						
C	Concentration (mg/dscm)	BDL	1.738	1.916	1.005	**1.16**
C	Concentration (ppmdv)	BDL	0.3939	0.4341	0.2277	**0.264**
E	Emission rate (lb/hr)	BDL	0.3076	0.3449	0.1919	**0.211**
E	Emission rate (lb/tons of trona)	BDL	0.00190	0.00213	0.00118	**0.00130**
Hexane						
C	Concentration (mg/dscm)	2.138	2.421	2.609	BDL	**1.79**
C	Concentration (ppmdv)	0.5969	0.6758	0.7283	BDL	**0.500**
E	Emission rate (lb/hr)	0.3960	0.4285	0.4696	BDL	**0.324**
E	Emission rate (lb/tons of trona)	0.00244	0.00264	0.00290	BDL	**0.00266**
Methylene Chloride						
C	Concentration (mg/dscm)	BDL	2.752	1.908	1.558	**1.55**
C	Concentration (ppmdv)	BDL	0.7795	0.5403	0.4414	**0.440**
E	Emission rate (lb/hr)	BDL	0.4870	0.3434	0.2977	**0.282**
E	Emission rate (lb/tons of trona)	BDL	0.00301	0.00212	0.00184	**0.00232**
Styrene						
C	Concentration (mg/dscm)	BDL	1.621	2.087	0.6679	**1.09**
C	Concentration (ppmdv)	BDL	0.4591	0.5912	0.1892	**0.310**
E	Emission rate (lb/hr)	BDL	0.2869	0.3757	0.1276	**0.198**
E	Emission rate (lb/tons of trona)	BDL	0.00177	0.00232	0.000788	**0.00163**
Toluene						
C	Concentration (mg/dscm)	4.076	4.366	5.862	2.515	**4.20**
C	Concentration (ppmdv)	1.064	1.140	1.530	0.657	**1.10**
E	Emission rate (lb/hr)	0.7549	0.7727	1.055	0.480	**0.766**
E	Emission rate (lb/tons of trona)	0.00466	0.00477	0.00651	0.00297	**0.00473**
Xylene						
C	Concentration (mg/dscm)	2.470	4.780	6.319	2.738	**4.08**
C	Concentration (ppmdv)	0.5598	1.083	1.432	0.6204	**0.924**
E	Emission rate (lb/hr)	0.4575	0.8459	1.137	0.5230	**0.741**
E	Emission rate (lb/tons of trona)	0.00282	0.00522	0.00702	0.00323	**0.00457**

[1] See comments on 1, 3 Butadiene results by Method 18 in the Project Overview.
BDL: Indicates that the value was below the detection limit.

RESULTS

Table 2-3:
EP 5 Calciner Stack - Volatile Organic Compounds by M0030

Run No.		1	2	3	4	Average
Date (1995)		January 11	January 11	January 11	January 11	
Start Time (approx.)		10:55	12:52	14:30	15:56	
Stop Time (approx.)		11:15	13:12	14:50	16:16	
Operating Data						
	Trona processing rate (tons/hr)	162	162	162	162	**162**
Volumetric Flow Rate						
Q_a	Actual conditions (acfm)	150,300	142,700	143,700	153,500	**147,600**
Q_{std}	Standard conditions (dscfm)	49,440	47,240	48,050	50,990	**48,930**
Acrylonitrile						
C	Concentration (mg/dscm)	0.9320	0.7796	0.3281	0.1874	**0.557**
C	Concentration (ppm)	0.4226	0.3535	0.1487	0.08497	**0.252**
E	Emission rate (lb/hr)	0.1726	0.1380	0.05905	0.03580	**0.101**
E	Emission rate (lb/tons of trona)	0.00107	0.000852	0.000365	0.000221	**0.000626**
Allyl chloride						
C	Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
Benzene						
C	Concentration (mg/dscm)	6.585	6.946	6.019	3.844	**5.85**
C	Concentration (ppm)	2.028	2.139	1.854	1.184	**1.80**
E	Emission rate (lb/hr)	1.220	1.229	1.084	0.7343	**1.07**
E	Emission rate (lb/tons of trona)	0.00753	0.00759	0.00669	0.00453	**0.00658**
Bromoform						
C	Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
1,3-Butadiene						
C	Concentration (mg/dscm)	9.330	25.45	21.26	6.463	**15.6**
C	Concentration (ppm)	4.150	11.32	9.453	2.874	**6.95**
E	Emission rate (lb/hr)	1.728	4.504	3.826	1.235	**2.82**
E	Emission rate (lb/tons of trona)	0.0107	0.0278	0.0236	0.00762	**0.0174**
Carbon disulfide						
C	Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
Carbon tetrachloride						
C	Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
Chlorobenzene						
C	Concentration (mg/dscm)	0.0112	BDL	BDL	BDL	**0.00281**
C	Concentration (ppm)	0.0024	BDL	BDL	BDL	**0.000601**
E	Emission rate (lb/hr)	0.0021	BDL	BDL	BDL	**0.000521**
E	Emission rate (lb/tons of trona)	1.29E-05	BDL	BDL	BDL	**3.21E-06**
Chloroform						
C	Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
Cumene (isopropylbenzene)						
C	Concentration (mg/dscm)	0.01499	0.01760	0.01144	0.006247	**0.0126**
C	Concentration (ppm)	0.003001	0.003524	0.002291	0.001250	**0.00252**
E	Emission rate (lb/hr)	0.002777	0.003115	0.002060	0.001193	**0.00229**
E	Emisison rate (lb/tons of trona)	1.71E-05	1.92E-05	1.27E-05	7.37E-06	**1.41E-05**
cis-1,3-Dichloropropene						
C	Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**

BDL: Indicates the value was below detection limits.

SOLVAY2016_6_000015

RESULTS

Table 2-3:
EP 5 Calciner Stack - Volatile Organic Compounds by M0030 (Continued)

Run No.	1	2	3	4	Average
Date (1995)	January 11	January 11	January 11	January 11	
Start Time (approx.)	10:55	12:52	14:30	15:56	
Stop Time (approx.)	11:15	13:12	14:50	16:16	
Operating Data					
Trona processing rate (tons/hr)	162	162	162	162	**162**
Volumetric Flow Rate					
Q_a Actual conditions (acfm)	150,300	142,700	143,700	153,500	**147,600**
Q_{std} Standard conditions (dscfm)	49,440	47,240	48,050	50,990	**48,930**
trans-1,3-Dichloropropene					
C Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
Ethyl acrylate					
C Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
Ethylbenzene					
C Concentration (mg/dscm)	0.5422	1.107	0.5875	0.2536	**0.622**
C Concentration (ppm)	0.1229	0.2508	0.1331	0.05747	**0.141**
E Emission rate (lb/hr)	0.1004	0.1958	0.1057	0.04845	**0.113**
E Emisison rate (lb/tons of trona)	0.000620	0.00121	0.000653	0.000299	**0.000695**
1,2-Epoxybutane					
C Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
Dibromomethane					
C Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
1,2-Dichlrorethane					
C Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
1,1-Dichloroehtane					
C Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
n-Hexane					
C Concentration (mg/dscm)	0.8570	1.117	0.6625	0.2799	**0.729**
C Concentration (ppm)	0.2393	0.3117	0.1849	0.07813	**0.204**
E Emission rate (lb/hr)	0.1587	0.1976	0.1192	0.05346	**0.132**
E Emisison rate (lb/tons of trona)	0.0010	0.0012	0.0007	0.0003	**0.001**
Bromomethane					
C Concentration (mg/dscm)	BDL	0.01383	0.01017	0.008746	**0.00819**
C Concentration (ppm)	BDL	0.003505	0.002577	0.002216	**0.00207**
E Emission rate (lb/hr)	BDL	0.002448	0.001831	0.001671	**0.00149**
E Emission rate (lb/tons of trona)	BDL	1.51E-05	1.13E-05	1.03E-05	**9.18E-06**
Chloromethane					
C Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
1,1,1-Trichloroethane					
C Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**

BDL: Indicates the value was below detection limits.

RESULTS

Table 2-3:
EP 5 Calciner Stack - Volatile Organic Compounds by M0030 (Continued)

Run No.		1	2	3	4	Average
Date (1995)		January 11	January 11	January 11	January 11	
Start Time (approx.)		10:55	12:52	14:30	15:56	
Stop Time (approx.)		11:15	13:12	14:50	16:16	
Operating Data						
	Trona processing rate (tons/hr)	162	162	162	162	**162**
Volumetric Flow Rate						
Q_a	Actual conditions (acfm)	150,300	142,700	143,700	153,500	**147,600**
Q_{std}	Standard conditions (dscfm)	49,440	47,240	48,050	50,990	**48,930**
2-Butanone						
C	Concentration (mg/dscm)	0.3623	0.7583	0.1628	0.1337	**0.354**
C	Concentration (ppm)	0.1209	0.2530	0.05430	0.04460	**0.118**
E	Emission rate (lb/hr)	0.06710	0.1342	0.02930	0.02554	**0.0640**
E	Emission rate (lb/tons of trona)	0.000414	0.000828	0.000181	0.000158	**0.000395**
Idomethane						
C	Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
4-Methyl-2-pentanone						
C	Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
Tert-butyl methyl ether						
C	Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
Methylene chloride						
C	Concentration (mg/dscm)	BDL	BDL	1.076	0.03373	**0.277**
C	Concentration (ppm)	BDL	BDL	0.3047	0.009554	**0.0786**
E	Emission rate (lb/hr)	BDL	BDL	0.1936	0.006444	**0.0500**
E	Emission rate (lb/tons of trona)	BDL	BDL	0.00120	3.98E-05	**0.000309**
Methyl methacrylate						
C	Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
1,2-Dichloropropane						
C	Concentration (mg/dscm)	BDL	BDL	BDL	BDL	BDL
Styrene						
C	Concentration (mg/dscm)	0.8533	1.854	1.019	0.4660	**1.05**
C	Concentration (ppm)	0.1971	0.4282	0.2353	0.1077	**0.242**
E	Emission rate (lb/hr)	0.1580	0.3280	0.1833	0.08902	**0.190**
E	Emission rate (lb/tons of trona)	0.000976	0.00202	0.00113	0.000549	**0.00117**
1,1,2,2-Tetrachloroethane						
C	Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
Tetrachloroethene						
C	Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**

BDL: Indicates the value was below detection limits.

RESULTS

Table 2-3:
EP 5 Calciner Stack - Volatile Organic Compounds by M0030 (Continued)

Run No.	1	2	3	4	Average
Date (1995)	January 11	January 11	January 11	January 11	
Start Time (approx.)	10:55	12:52	14:30	15:56	
Stop Time (approx.)	11:15	13:12	14:50	16:16	
Operating Data					
Trona processing rate (tons/hr)	162	162	162	162	**162**
Volumetric Flow Rate					
Q_a Actual conditions (acfm)	150,300	142,700	143,700	153,500	**147,600**
Q_{stc} Standard conditions (dscfm)	49,440	47,240	48,050	50,990	**48,930**
Toluene					
C Concentration (mg/dscm)	2.650	6.880	5.742	2.194	**4.37**
C Concentration (ppm)	0.6919	1.796	1.499	0.5729	**1.14**
E Emission rate (lb/hr)	0.4908	1.217	1.034	0.4191	**0.790**
E Emission rate (lb/tons of trona)	0.00303	0.00752	0.00638	0.00259	**0.00488**
1,1,2-Trichloroethane					
C Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
Trichloroethene					
C Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
Isocatane					
C Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
Vinyl acetate					
C Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
Vinyl bromide					
C Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
Vinyl chloride					
C Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
1,1-Dichloroethene					
C Concentration (mg/dscm)	BDL	BDL	BDL	BDL	**BDL**
o-Xylene					
C Concentration (mg/dscm)	0.2424	0.4804	0.2556	0.1162	**0.274**
C Concentration (ppm)	0.05492	0.1089	0.05792	0.02633	**0.0620**
E Emission rate (lb/hr)	0.04489	0.08501	0.04601	0.02219	**0.0495**
E Emission rate (lb/tons of trona)	0.000277	0.000525	0.000284	0.000137	**0.000306**
m-/p-Xylene					
C Concentration (mg/dscm)	1.851	4.417	2.083	0.918	**2.32**
C Concentration (ppm)	0.4196	1.001	0.4720	0.2081	**0.525**
E Emission rate (lb/hr)	0.3429	0.7818	0.3749	0.1754	**0.419**
E Emission rate (lb/hr)	0.00212	0.00483	0.00231	0.00108	**0.00258**

BDL: Indicates the value was below detection limits.

RESULTS

Table 2-4:
EP 5 Calciner Stack - Carbon Monoxide, Ethane, Methane, Total Hydrocarbons

Run No.		5[1]	6[1]	7	Average
Date (1995)		January 12	January 12	January 12	
Start Time (approx.)		09:16	10:47	12:10	
Stop Time (approx.)		10:15	11:46	13:09	
Operating Data					
	Trona processing rate (tons/hr)	147	147	147	**147**
Gas Conditions					
T_s	Temperature (°F)	337	331	316	**328**
Volumetric Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	135,300	134,200	135,700	**135,067**
Q_{std}	Volumetric flow rate, standard (dscfm)	45,640	45,510	47,280	**46,143**
Carbon Monoxide					
C	Concentration (ppmdv)	1	1	3,255	**3,260**
E	Emission rate (lb/hr)	1	1	671.3	**671**
E	Emission rate (lb/tons of trona)	1	1	4.57	**4.57**
Ethane					
C	Concentration (ppmdv)	1	1	BDL	**BDL**
Methane					
C	Concentration (ppmdv)	1	1	532.0	**532**
E	Emission rate (lb/hr)	1	1	62.83	**62.8**
E	Emission rate (lb/tons of trona)	1	1	0.427	**0.427**
Total Hydrocarbons					
C	Concentration (ppmdv)	415.0	402.3	442.1	**420**
E	Emission rate (lb/hr)	130.0	125.7	143.5	**133**
E	Emission rate (lb/tons of trona)	0.885	0.855	0.976	**0.905**
Non-methane, non-ethane hydrocarbons [2]					
E	Emission rate (lb/hr)	67.22	62.90	80.70	**70.3**
E	Emission rate (lb/tons of trona)	0.457	0.428	0.549	**0.478**

[1] Analytical results indicate that the Tedlar sample bags leaked. These runs are not included in averages.
[2] The average methane result was used to calculate non-methane, non-ethane hydrocarbons for Runs 5 and 6.
BDL: Indicates that value was below detection limits.

SOLVAY2016_6_000019

RESULTS

Table 2-5:
EP 5 Calciner Stack - Volatile Organic Compounds by M18

Run No.		5	6	7	Average
Date (1995)		January 12	January 12	January 12	
Start Time (approx.)		09:22	10:50	12:10	
Stop Time (approx.)		10:22	11:50	13:10	
Operating Data					
	Trona processing rate (tons/hr)	147	147	147	**147**
Gas Conditions					
T_s	Temperature (°F)	337	331	316	**328**
Volumetric Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	135,300	134,200	135,700	**135,067**
Q_{std}	Volumetric flow rate, standard (dscfm)	45,640	45,510	47,280	**46,143**
1, 3 Butadiene [1]					
C	Concentration (mg/dscm)	21.23	23.31	36.21	**26.9**
C	Concentration (ppmdv)	9.441	10.37	16.10	**12.0**
E	Emission rate (lb/hr)	3.629	3.974	6.413	**4.67**
E	Emission rate (lb/tons of trona)	0.0247	0.0270	0.0436	**0.0318**
1-1-1 Trichloroethane					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Acrylonitrile					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Benzene					
C	Concentration (mg/dscm)	18.57	15.38	23.73	**19.2**
C	Concentration (ppmdv)	5.719	4.738	7.306	**5.92**
E	Emission rate (lb/hr)	3.175	2.623	4.202	**3.33**
E	Emission rate (lb/tons of trona)	0.0216	0.0178	0.0286	**0.0227**
Ethylbenzene					
C	Concentration (mg/dscm)	1.486	1.894	2.976	**2.12**
C	Concentration (ppmdv)	0.3366	0.4291	0.6743	**0.480**
E	Emission rate (lb/hr)	0.2540	0.3229	0.5271	**0.368**
E	Emission rate (lb/tons of trona)	0.00173	0.00220	0.00359	**0.00250**
Hexane					
C	Concentration (mg/dscm)	1.878	1.755	2.709	**2.11**
C	Concentration (ppmdv)	0.5243	0.4899	0.7563	**0.590**
E	Emission rate (lb/hr)	0.3211	0.2992	0.4799	**0.367**
E	Emission rate (lb/tons of trona)	0.00218	0.00204	0.00326	**0.00249**
Methylene Chloride					
C	Concentration (mg/dscm)	5.340	3.605	6.544	**5.16**
C	Concentration (ppmdv)	1.512	1.021	1.853	**1.46**
E	Emission rate (lb/hr)	0.9130	0.6146	1.159	**0.896**
E	Emission rate (lb/tons of trona)	0.00621	0.00418	0.00788	**0.00609**
Styrene					
C	Concentration (mg/dscm)	1.275	1.448	2.530	**1.75**
C	Concentration (ppmdv)	0.3613	0.4101	0.7166	**0.496**
E	Emission rate (lb/hr)	0.2181	0.2468	0.4481	**0.304**
E	Emission rate (lb/tons of trona)	0.00148	0.00168	0.00305	**0.00207**
Toluene					
C	Concentration (mg/dscm)	7.281	5.623	10.25	**7.72**
C	Concentration (ppmdv)	1.901	1.468	2.676	**2.02**
E	Emission rate (lb/hr)	1.245	0.9587	1.816	**1.34**
E	Emission rate (lb/tons of trona)	0.00847	0.00652	0.0124	**0.00911**
Xylene					
C	Concentration (mg/dscm)	4.156	4.614	7.190	**5.32**
C	Concentration (ppmdv)	0.9417	1.046	1.629	**1.21**
E	Emission rate (lb/hr)	0.7105	0.7866	1.273	**0.924**
E	Emission rate (lb/tons of trona)	0.00483	0.00535	0.00866	**0.00628**

[1] See comments on 1, 3 Butadiene results by Method 18 in Project Overview.
BDL: Indicates that value was below detection limits.

SOLVAY2016_6_000020

RESULTS

Table 2-6:
EP 1&2 Calciner Stack - CO, Ethane, Methane, Total Hydrocarbons

Run No.	1	2	3	Average
Date (1995)	January 17	January 17	January 17	
Start Time (approx.)	08:54	10:54	12:21	
Stop Time (approx.)	09:53	11:53	13:20	
Operating Data				
Trona processing rate (tons/hour)	244	244	244	**244**
Gas Conditions				
T_s Temperature (°F)	456	458	457	**457**
Volumetric Flow Rate				
Q_a Volumetric flow rate, actual (acfm)	618,300	614,200	612,000	**614,833**
Q_{std} Volumetric flow rate, standard (dscfm)	235,700	233,300	234,000	**234,333**
Carbon Monoxide				
C Concentration (ppmdv)	340.90	62.40	45.00	**149**
E Emission rate (lb/hr)	350.47	63.50	45.93	**153**
E Emission rate (lb/tons of trona)	1.44	0.260	0.188	**0.628**
Ethane				
C Concentration (ppmdv)	BDL	BDL	BDL	**BDL**
Methane				
C Concentration (ppmdv)	6.86	8.23	3.74	**6.28**
E Emission rate (lb/hr)	4.04	4.80	2.19	**3.67**
E Emission rate (lb/tons of trona)	0.0166	0.0197	0.00896	**0.0151**
Total Hycrocarbons				
C Concentration (ppmdv)	34.96	49.70	37.86	**40.8**
E Emission rate (lb/hr)	56.58	79.63	60.83	**65.7**
E Emission rate (lb/tons of trona)	0.232	0.326	0.249	**0.269**
Non-methane, non-ethane hydrocarbons				
E Emission rate (lb/hr)	52.54	74.83	58.64	**62.0**
E Emission rate (lb/tons of trona)	0.215	0.307	0.240	**0.254**

BDL: indicates that value was below detection limits.

SOLVAY2016_6_000021

RESULTS

Table 2-7:
EP 1&2 Calciner Stack - Volatile Organic Compounds by M18

Run No.	1	2	3	Average
Date (1995)	January 17	January 17	January 17	
Start Time (approx.)	08:55	11:00	12:25	
Stop Time (approx.)	09:55	12:00	13:25	
Operating Data				
Trona processing rate (tons/hour)	244	244	244	**244**
Gas Conditions				
T_s Temperature (°F)	456	458	457	**457**
Volumetric Flow Rate				
Q_a Volumetric flow rate, actual (acfm)	618,300	614,200	612,000	**614,833**
Q_{std} Volumetric flow rate, standard (dscfm)	235,700	233,300	234,000	**234,333**
1, 3 Butadiene [1]				
C Concentration (mg/dscm)	3.833	BDL	1.369	**1.73**
C Concentration (ppmdv)	1.695	BDL	0.6052	**0.767**
E Emission rate (lb/hr)	3.365	BDL	1.193	**1.52**
E Emission rate (lb/tons of trona)	0.0138	BDL	0.00489	**0.00623**
1-1-1 Trichloroethane				
C Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Acrylonitrile				
C Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Benzene				
C Concentration (mg/dscm)	1.231	1.696	1.282	**1.40**
C Concentration (ppmdv)	0.3790	0.5222	0.3949	**0.432**
E Emission rate (lb/hr)	1.087	1.482	1.124	**1.23**
E Emission rate (lb/tons of trona)	0.00445	0.00607	0.00461	**0.00504**
Ethylbenzene				
C Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Hexane				
C Concentration (mg/dscm)	0.4698	0.7169	0.5557	**0.581**
C Concentration (ppmdv)	0.1311	0.2001	0.1551	**0.162**
E Emission rate (lb/hr)	0.4148	0.6265	0.4872	**0.510**
E Emission rate (lb/tons of trona)	0.00170	0.00257	0.00200	**0.00209**
Methylene Chloride				
C Concentration (mg/dscm)	1.509	1.944	1.895	**1.78**
C Concentration (ppmdv)	0.4273	0.5505	0.5367	**0.505**
E Emission rate (lb/hr)	1.332	1.699	1.661	**1.56**
E Emission rate (lb/tons of trona)	0.00546	0.00696	0.00681	**0.00641**
Styrene				
C Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Toluene				
C Concentration (mg/dscm)	1.125	1.992	1.425	**1.51**
C Concentration (ppmdv)	0.2937	0.5200	0.3720	**0.395**
E Emission rate (lb/hr)	0.9932	1.741	1.249	**1.33**
E Emission rate (lb/tons of trona)	0.00407	0.00714	0.00512	**0.00544**
Xylene				
C Concentration (mg/dscm)	1.674	2.592	1.981	**2.08**
C Concentration (ppmdv)	0.3794	0.5873	0.4488	**0.472**
E Emission rate (lb/hr)	1.478	2.265	1.736	**1.83**
E Emission rate (lb/tons of trona)	0.00606	0.00928	0.00712	**0.00749**

[1] See comments on 1, 3 Butadiene results by Method 18 in Project Overview.
BDL: indicates that value was below detection limits.

SOLVAY2016_6_000022

RESULTS

Table 2-8:
EP 1&2 Calciner Stack - Volatile Organic Compounds by M0030

Run No.		1	2	3	Average
Date (1995)		January 17	January 17	January 17	
Start Time (approx.)		08:55	11:00	12:25	
Stop Time (approx.)		09:15	11:20	12:45	
Operating Data					
	Trona processing rate (tons/hr)	244	244	244	**244**
Volumetric Flow Rate					
Q_a	Actual conditions (acfm)	618,300	614,200	612,000	**614,800**
Q_{std}	Standard conditions (dscfm)	235,700	233,300	234,000	**234,300**
Acrylonitrile					
C	Concentration (mg/dscm)	0.4199	0.5131	0.3698	**0.434**
C	Concentration (ppm)	0.1904	0.2326	0.1677	**0.197**
E	Emission rate (lb/hr)	0.3708	0.4484	0.3242	**0.381**
E	Emission rate (lb/tons of trona)	0.00152	0.00184	0.00133	**0.00156**
Allyl chloride					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Benzene					
C	Concentration (mg/dscm)	1.667	2.001	1.409	**1.69**
C	Concentration (ppm)	0.5133	0.6162	0.4338	**0.521**
E	Emission rate (lb/hr)	1.472	1.748	1.235	**1.48**
E	Emission rate (lb/tons of trona)	0.00603	0.00717	0.00506	**0.00609**
Bromoform					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
1,3-Butadiene					
C	Concentration (mg/dscm)	4.761	6.478	4.699	**5.31**
C	Concentration (ppm)	2.117	2.881	2.090	**2.36**
E	Emission rate (lb/hr)	4.203	5.661	4.119	**4.66**
E	Emission rate (lb/tons of trona)	0.0172	0.0232	0.0169	**0.0191**
Carbon disulfide					
C	Concentration (mg/dscm)	0.05145	0.05420	0.03163	**0.0458**
C	Concentration (ppm)	0.004896	0.005158	0.003010	**0.00435**
E	Emission rate (lb/hr)	0.04543	0.04737	0.02773	**0.040**
E	Emission rate (lb/tons of trona)	0.000186	0.000194	0.000114	**0.000165**
Carbon tetrachloride					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Chlorobenzene					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Chloroform					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Cumene (isopropylbenzene)					
C	Concentration (mg/dscm)	0.005982	0.007227	0.006082	**0.00643**
C	Concentration (ppm)	0.001197	0.001446	0.001217	**0.00129**
E	Emission rate (lb/hr)	0.005282	0.006316	0.005332	**0.00564**
E	Emission rate (lb/tons of trona)	2.16E-05	2.59E-05	2.19E-05	**2.31E-05**
cis-1,3-Dichloropropene					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**

BDL: Indicates below the detection limit.

SOLVAY 2016 6 000023

RESULTS

Table 2-8:
EP 1&2 Calciner Stack - Volatile Organic Compounds by M0030 (Continued)

Run No.	1	2	3	Average
Date (1995)	January 17	January 17	January 17	
Start Time (approx.)	08:55	11:00	12:25	
Stop Time (approx.)	09:15	11:20	12:45	
Operating Data				
Trona processing rate (tons/hr)	244	244	244	**244**
Volumetric Flow Rate				
Q_a Actual conditions (acfm)	618,300	614,200	612,000	**614,800**
Q_{std} Standard conditions (dscfm)	235,700	233,300	234,000	**234,300**
trans-1,3-Dichloropropene				
C Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Ethyl acrylate				
C Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Ethylbenzene				
C Concentration (mg/dscm)	0.1065	0.1674	0.1277	**0.134**
C Concentration (ppm)	0.02413	0.03794	0.02894	**0.0303**
E Emission rate (lb/hr)	0.09402	0.1463	0.1120	**0.117**
E Emission rate (lb/tons of trona)	0.000385	0.000600	0.000459	**0.000481**
1,2-Epoxybutane				
C Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Dibromomethane				
C Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
1,2-Dichlrorethane				
C Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
1,1-Dichloroehtane				
C Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
n-Hexane				
C Concentration (mg/dscm)	0.2321	0.3240	0.1800	**0.245**
C Concentration (ppm)	0.06480	0.09045	0.05026	**0.0685**
E Emission rate (lb/hr)	0.2049	0.2832	0.1578	**0.22**
E Emission rate (lb/tons of trona)	0.000840	0.00116	0.000647	**0.000882**
Bromomethane				
C Concentration (mg/dscm)	0.01077	0.00964	0.007299	**0.00923**
C Concentration (ppm)	0.002728	0.002441	0.001849	**0.00234**
E Emission rate (lb/hr)	0.009508	0.008421	0.006398	**0.00811**
E Emission rate (lb/tons of trona)	3.90E-05	3.45E-05	2.62E-05	**3.32E-05**
Chloromethane				
C Concentration (mg/dscm)	0.03470	0.01927	0.01946	**0.0245**
C Concentration (ppm)	0.01653	0.009182	0.009274	**0.0117**
E Emission rate (lb/hr)	0.03064	0.01684	0.01706	**0.0215**
E Emission rate (lb/tons of trona)	0.000126	6.90E-05	6.99E-05	**8.82E-05**
1,1,1-Trichloroethane				
C Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**

BDL: Indicates below the detection limit.

RESULTS

Table 2-8:
EP 1&2 Calciner Stack - Volatile Organic Compounds by M0030 (Continued)

Run No.		1	2	3	Average
Date (1995)		January 17	January 17	January 17	
Start Time (approx.)		08:55	11:00	12:25	
Stop Time (approx.)		09:15	11:20	12:45	
Operating Data					
	Trona processing rate (tons/hr)	244	244	244	**244**
Volumetric Flow Rate					
Q_a	Actual conditions (acfm)	618,300	614,200	612,000	**614,800**
Q_{std}	Standard conditions (dscfm)	235,700	233,300	234,000	**234,300**
2-Butanone					
C	Concentration (mg/dscm)	0.4427	0.5324	0.3552	**0.443**
C	Concentration (ppm)	0.1477	0.1776	0.1185	**0.148**
E	Emission rate (lb/hr)	0.3909	0.4653	0.3114	**0.389**
E	Emission rate (lb/tons of trona)	0.00160	0.00191	0.00128	**0.00159**
Idomethane					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
4-Methyl-2-pentanone					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Tert-butyl methyl ether					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Methylene chloride					
C	Concentration (mg/dscm)	0.1256	0.1120	0.03406	**0.0906**
C	Concentration (ppm)	0.03558	0.03172	0.009647	**0.0257**
E	Emission rate (lb/hr)	0.1109	0.09790	0.02986	**0.0796**
E	Emission rate (lb/tons of trona)	0.000455	0.000401	0.000122	**0.000326**
Methyl methacrylate					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
1,2-Dichloropropane					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Styrene					
C	Concentration (mg/dscm)	0.1340	0.1927	0.1472	**0.158**
C	Concentration (ppm)	0.03095	0.04452	0.03400	**0.0365**
E	Emission rate (lb/hr)	0.1183	0.1684	0.1290	**0.139**
E	Emission rate (lb/tons of trona)	0.000485	0.000690	0.000529	**0.000568**
1,1,2,2-Tetrachloroethane					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Tetrachloroethene					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**

BDL: Indicates below the detection limit.

SOLVAY2016_6_000025

RESULTS

Table 2-8:
EP 1&2 Calciner Stack - Volatile Organic Compounds by M0030 (Continued)

Run No.		1	2	3	Average
Date (1995)		January 17	January 17	January 17	
Start Time (approx.)		08:55	11:00	12:25	
Stop Time (approx.)		09:15	11:20	12:45	
Operating Data					
	Trona processing rate (tons/hr)	244	244	244	**244**
Volumetric Flow Rate					
Q_a	Actual conditions (acfm)	618,300	614,200	612,000	**614,800**
Q_{std}	Standard conditions (dscfm)	235,700	233,300	234,000	**234,300**
Toluene					
C	Concentration (mg/dscm)	1.065	1.783	1.207	**1.35**
C	Concentration (ppm)	0.2780	0.4655	0.3151	**0.353**
E	Emission rate (lb/hr)	0.9402	1.558	1.058	**1.19**
E	Emission rate (lb/tons of trona)	0.0039	0.0064	0.0043	**0.0049**
1,1,2-Trichloroethane					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Trichloroethene					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Isocatane					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Vinyl acetate					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Vinyl bromide					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
Vinyl chloride					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
1,1-Dichloroethene					
C	Concentration (mg/dscm)	BDL	BDL	BDL	**BDL**
o-Xylene					
C	Concentration (mg/dscm)	0.05145	0.07468	0.05839	**0.0615**
C	Concentration (ppm)	0.01166	0.01692	0.01323	**0.0139**
E	Emission rate (lb/hr)	0.04543	0.06527	0.05119	**0.0540**
E	Emission rate (lb/tons of trona)	0.000186	0.000267	0.000210	**0.000221**
m-/p-Xylene					
C	Concentration (mg/dscm)	0.8471	1.372	0.9634	**1.06**
C	Concentration (ppm)	0.1920	0.3109	0.2183	**0.240**
E	Emission rate (lb/hr)	0.7479	1.199	0.8446	**0.930**
E	Emission rate (lb/tons of trona)	0.00307	0.00491	0.00346	**0.00381**

BDL: Indicates below the detection limit.

Description of Installation

SOLVAY2016_6_000027

DESCRIPTION OF INSTALLATION

Solvay Minerals, Inc. located near Green River, Wyoming, is a mining, refining, and chemical manufacturing facility with corporate offices in Houston, Texas. Soda ash operations at the Green River, Wyoming facility began initial production in May of 1982. On May 27, 1992, Solvay S.A. of Belgium purchased the Green River facilities from Tenneco, Inc. and changed the name to Solvay Minerals, Inc.

The primary raw material for the Green River facilities is sodium sesquicarbonate, which is commonly referred to as "trona." The trona is mined at the plant site from an ore bed located 1,500 feet below the surface. The mined trona is transferred via shuttle cars and conveyor belts into an underground storage bin. The trona is hoisted from the storage bin to the surface. Once on the surface, the trona is crushed and fed to one of three soda ash calciners or to the trona products packaging area.

The caustic/sulfite system is fed unfiltered saturated sodium carbonate solution from the soda ash process. Insolubles are separated by settling and filtration. At this point the caustic carbonate liquor is reacted with lime, forming caustic soda. The remaining sodium carbonate liquor is reacted with sulfur dioxide, forming sodium sulfite. At the completion of the refining processes, the caustic soda and the sodium sulfite are stored pending shipment.

The trona that is fed to the soda ash calciners is heated, resulting in thermal calcination of the sodium sesquicarbonate, forming a crude soda ash. The crude soda ash is dissolved in water and the insolubles are separated from the solution by settling and filtration. The insolubles are disposed of in the mine void. The solution is then treated to remove organic materials and fine insolubles. This series of processing steps yields a high-purity saturated solution of sodium carbonate. The solution is then fed to crystallizers where a large amount of water is removed and a slurry of sodium carbonate mono-hydrate crystals is formed. This slurry is then further de-watered and washed by a series of cyclones and centrifuges . The resulting monohydrate crystals are fed through dryers, forming high quality soda ash, which is then ready for storage and shipment.

The coal fired calciners (EP1&2) are equipped with two separate model BA1.1 x 50I, 4334-4.T electrostatic precipitators to control emissions. The gas fired calciner (EP5) is controlled with an ABB Flakt Model FAAGX x 37.5 - 120-110-520-CL-026 electrostatic precipitator.

Testing reported in this document was conducted at the EP 1&2 Calciner Stack, the EP 5 Calciner Stack, and the Trona Crusher Baghouse Stack.

Process operating data was recorded by Solvay Minerals, Inc. personnel, and can be found in Appendix H.

Methodology

METHODOLOGY

The sampling followed procedures as detailed in U.S. Environmental Protection Agency (EPA) Methods 1, 2, 3, 4, 10B, 18, 25A, and SW-846 0030. The following table summarizes the methods and their respective sources.

Table 4-1:
Summary of Sampling Procedures

Title 40 CFR Part 60 Appendix A	
Method 1	"Sample and Velocity Traverses for Stationary Sources"
Method 2	"Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)"
Method 3	"Gas Analysis for the Determination of Dry Molecular Weight"
Method 4	"Determination of Moisture Content in Stack Gases"
Method 10B	"Determination of Carbon Monoxide Emissions from Stationary Sources"
Method 18	"Measurement of Gaseous Organic Compound Emissions by Gas Chromatography"
Method 25A	"Determination of Total Gaseous Organic Concentrations using a Flame Ionization Analyzer (FIA)"
SW-846	
Method 0030	"Volatile Organic Sampling Train"

These methods appear in detail in Title 40 of the Code of Federal Regulations (CFR) and in EPA SW-846, "Test Methods for Evaluating Solid Waste, Volume II: Field Manual Physical/Chemical Methods."

These sampling, recovery and analytical procedures are summarized on pages 4-2 through 4-14.

All equipment was calibrated at the Clean Air Engineering laboratory prior to shipment to the job site. A post calibration was performed at the conclusion of testing to verify that calibration was maintained throughout the test program. Calibration sheets can be found in Appendix Section C.

SOLVAY2016_6_000030

METHODOLOGY

SAMPLING POINT DETERMINATION

Sampling point locations were determined according to EPA Method 1.

Table 4-2 outlines the sampling point configurations. Figure 4-1 through Figure 4-3 illustrate the sampling points and orientation of sampling ports for each of the sources tested in the program.

Table 4-2:
Sampling Points

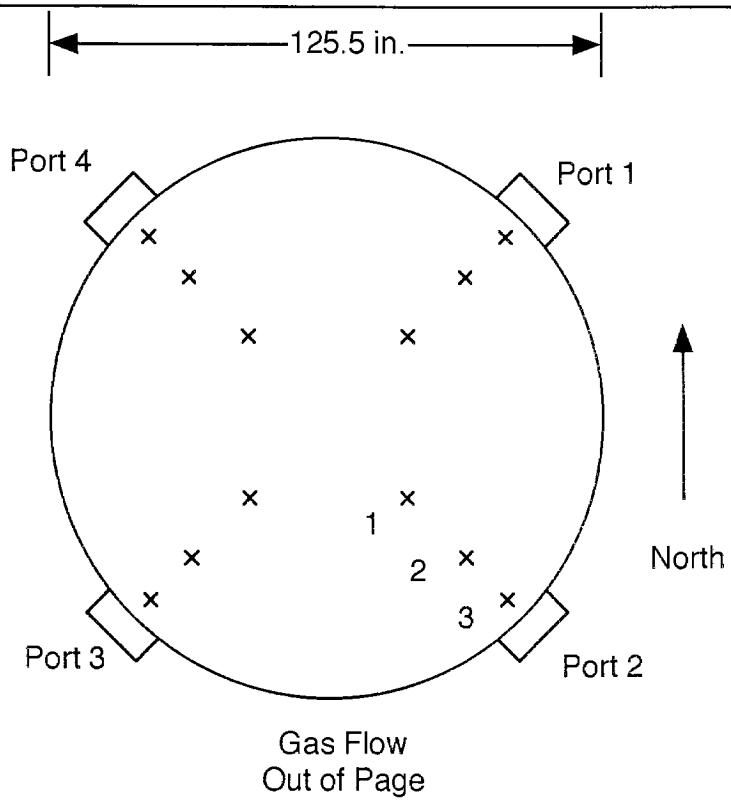
Stack Location	Constituent	Method	Run No.	Ports	Points per Port	Minutes per Point	Total Minutes	Figure
EP 5 Calciner	Velocity,	2	1-7	4	3			4-1
	CO2, O2	3	1-7		1[1]		40/45	
	Moisture	4	1-7		1[1]		40/45	
	CO, VOC	10B, 18	1-7		1[1]		60	
	VOC	25A	1-7		1[1]		60	
	VOC	0030	1-7		1[1]		20	
EP 1&2 Calciner	Velocity	2	1-3	4	6			4-2
	CO2, O2	3	1-3		1[1]		45	
	Moisture	4	1-3		1[1]		45	
	CO, VOC	10B, 18	1-3		1[1]		60	
	VOC	25A	1-3		1[1]		60	
	VOC	0030	1-3		1[1]		20	
Trona Crusher	Velocity	2	1-3	2	6			4-3
	CO2, O2	3	1-3		1[1]			
	Moisture	wet/dry bulb	1-3		1[1]			
	CO, VOC	10B, 18	1-3		1[1]		60	
	VOC	25A	1-3		1[1]		60	

[1] Samples were taken from a single point located near center of duct. Readings were taken every five minutes.

SOLVAY2016_6_000031

METHODOLOGY

SAMPLING POINT DETERMINATION (CONTINUED)



Sampling Point	Port to Point Distance (in.)
1	37.1
2	18.3
3	5.5

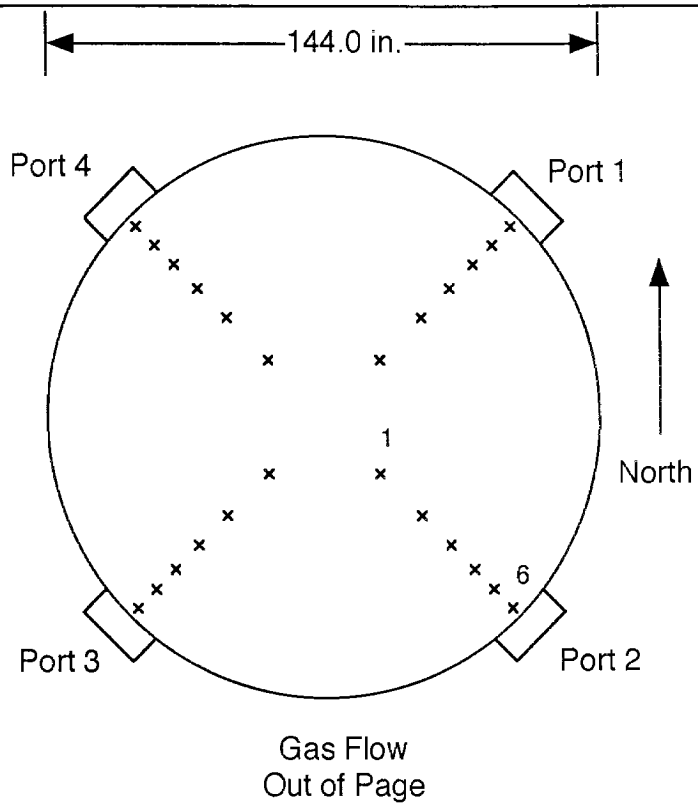
Diameters to upstream disturbance: ~5.5 Limit: 2
Diameters to downstream disturbance: ~9.0 Limit: 0.5

Figure 4-1: EP 5 Calciner Stack Velocity Sampling Point Determination (EPA Method 1)

SOLVAY2016_6_000032

METHODOLOGY

SAMPLING POINT DETERMINATION (CONTINUED)



Sampling Point	Port to Point Distance (in.)
1	51.3
2	36.0
3	25.5
4	17.0
5	9.6
6	3.0

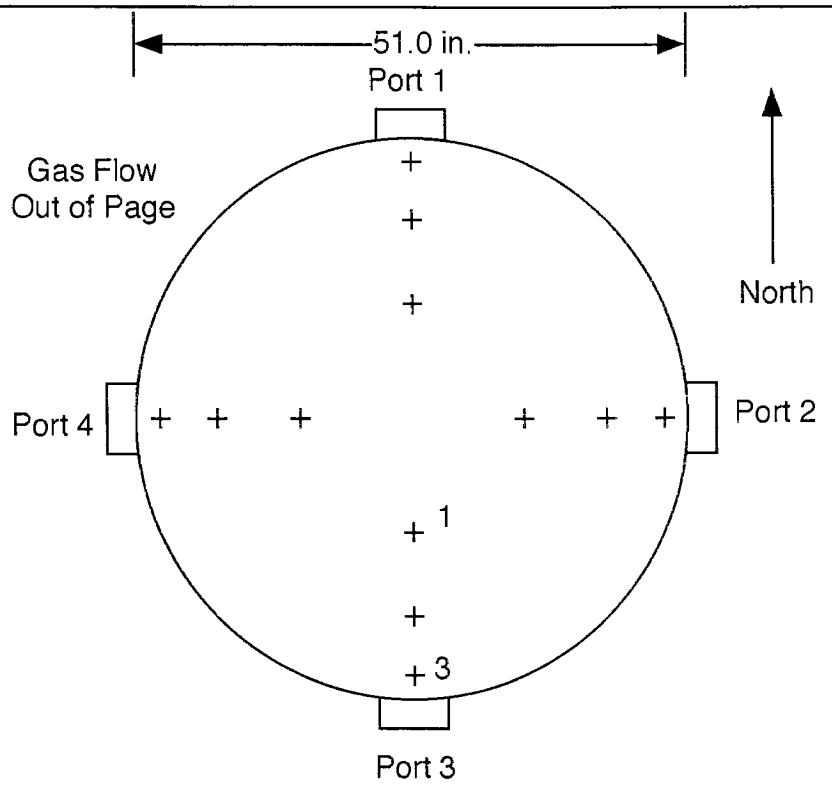
Diameters to upstream disturbance: ~4.4 Limit: 2
Diameters to downstream disturbance: ~3.6 Limit: 0.5

Figure 4-2: EP 1&2 Calciner Stack Velocity Sampling Point Determination (EPA Method 1)

SOLVAY2016_5_000033

METHODOLOGY

SAMPLING POINT DETERMINATION (CONTINUED)



Sampling Point	Port to Point Distance (in.)
1	48.8
2	43.5
3	35.9
4	15.1
5	7.5
6	2.2

Diameters to upstream disturbance: 10 Limit: 2
Diameters to downstream disturbance: 10 Limit: 0.5

Figure 4-3: Trona Crusher Baghouse Stack Sampling Point Determination (EPA Method 1)

SOLVAY2016_6_000034

METHODOLOGY

VELOCITY AND VOLUMETRIC FLOW RATE - EPA METHOD 2

EPA Method 2 was used at all three test locations to determine the gas velocity and flow rate. Figure 4-4 illustrates the components of the EPA Method 2 sampling apparatus.

Each set of velocity determinations included the measurement of gas velocity pressure and gas temperature at each of the EPA Method 1 traverse points. The velocity pressures were measured with a Type S pitot tube. Gas temperature measurements were made using a Type K thermocouple and digital pyrometer.

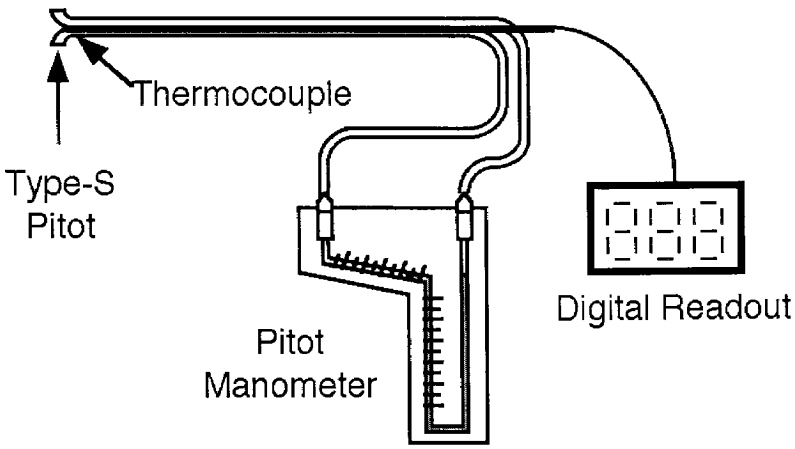


Figure 4-4: Velocity and Volumetric Flow Rate Sampling Apparatus (EPA Method 2)

GAS COMPOSITION AND MOLECULAR WEIGHT - EPA METHOD 3

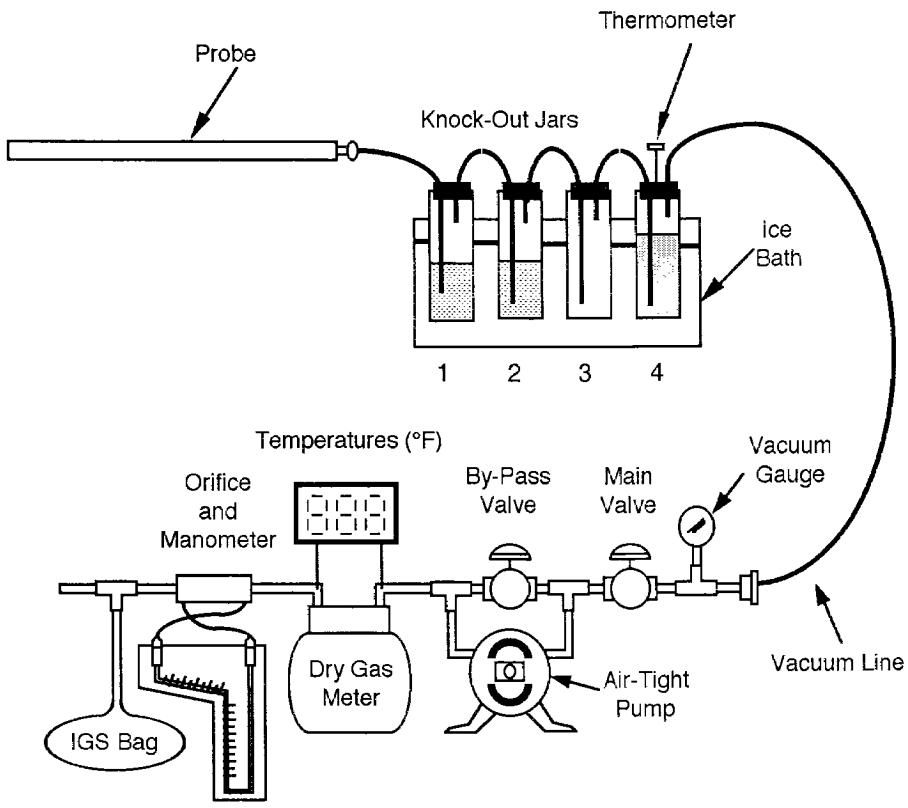
In order to determine the oxygen (O_2) concentration, carbon dioxide (CO_2) concentration and gas molecular weight, a time-integrated sample of the gas was obtained and analyzed in accordance with EPA Method 3. The gas sample was collected into a vinyl sample bag from the moisture content testing (EPA Method 4). Figure 4-5 on page 4-7 includes the componenets of the EPA Method 3 sampling apparatus. The contents of the bag were analyzed for O_2 and CO_2 concentrations using an Orsat gas analyzer.

SOLVAY2016_6_000035

METHODOLOGY

MOISTURE CONTENT - EPA METHOD 4

The flue gas moisture content at the two calciner stack locations was determined in accordance with EPA Method 4. Figure 4-5 illustrates the components of the EPA Method 4 sampling apparatus. The gas moisture was determined by quantitatively condensing the water in chilled knock-out jars. The amount of moisture condensed was determined volumetrically and gravimetrically. A dry gas meter was used to measure the volume of gas sampled. The amount of water condensed and the volume of gas sampled were used to calculate the gas moisture content in accordance with EPA Method 4.



Knock out Jar	Contents
1	100 ml water
2	100 ml water
3	empty
4	100 g silica gel

Figure 4-5: Gas Composition and Moisture Content Sampling Apparatus (EPA Methods 3 and 4)

SOLVAY2016_6_000036

METHODOLOGY

MOISTURE CONTENT - WET BULB/DRY BULB METHOD

The flue gas moisture content at the Trona Cusher Baghouse Stack was determined with wet bulb temperature, dry bulb temperature, and a psychometric chart. The dry bulb temperature was taken during the velocity traverse. The wet bulb temperature was taken by putting a wet sock over the thermocouple, placing it into the airstream, and recording a temperature when the equilibrium temperature was reached. Humidity values were obtained from a psychometric chart. Moisture was calculated as shown in the sample calculations, found in Appendix A.

CARBON MONOXIDE - EPA METHOD 10B

Carbon monoxide samples were collected in tedlar bags as described in EPA Method 18. After a portion of the gas was used for the Method 18 analysis, the sample was analyzed for carbon monoxide following procedures listed in EPA Method 10B.

Carbon monoxide was separated from organic compounds and carbon dioxide by four stripper columns and catalytically reduced to methane. The methane was analyzed by a flame ionization detector (FID).

METHODOLOGY

VOLATILE EMISSIONS TESTING - EPA METHOD 18

EPA Method 18 was used to measure concentrations of volatile organic compounds. This method specifies the use of a variety of sampling techniques with analysis by Gas Chromatography (GC). Charcoal tubes were used to collect samples to quantify specific VOCs expected to be found in high concentrations. Tedlar bags were used to determine the methane and ethane concentrations.

As illustrated in Figure 4-6, the sampling train consisted of a stainless steel probe, Teflon sample lines, midget impingers, charcoal tubes, a Teflon pump, meter, and tedlar bag, all connected in series. The sample train at the Trona Crusher Baghouse Stack did not include the midget impingers or the charcoal tubes.

The purpose of the midget impingers was to remove the moisture prior to the charcoal tubes. VOCs passed through the impingers, which was confirmed by analyzing the condensate, and were trapped in the charcoal tubes. Neither ethane nor methane are adsorbed in water or charcoal; therefore, they were collected in the tedlar bags.

The sample was drawn from the center of the duct, or approximately one meter from the stack wall at a rate of 0.3 liters per minute. Once sampling was completed, both the charcoal tubes and the tedlar bags were sealed and shipped to CAE Analytical Laboratories located in Palatine, Illinois.

Charcoal tubes were desorbed with 2 ml of carbon disulfide. The organic compounds of interest were separated by gas chromatography and individually quantified using a Flame Ionization Detector (FID). An HP 5890 gas was used for analysis of all the samples. An initial calibration consisting of five different concentration levels was performed prior to sample analysis. Standard concentrations were prepared in carbon disulfide and air and bracketed the sample concentrations.

Data from the chromatograms were reduced by identifying peaks and matching their retention times with those of the known standards. Peak areas of samples were calculated using computer integration and were mathematically compared to the area of the standards using an average response factor. Results were calculated in milligrams of analyte.

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METHODOLOGY

VOLATILE EMISSIONS TESTING - CONTINUED

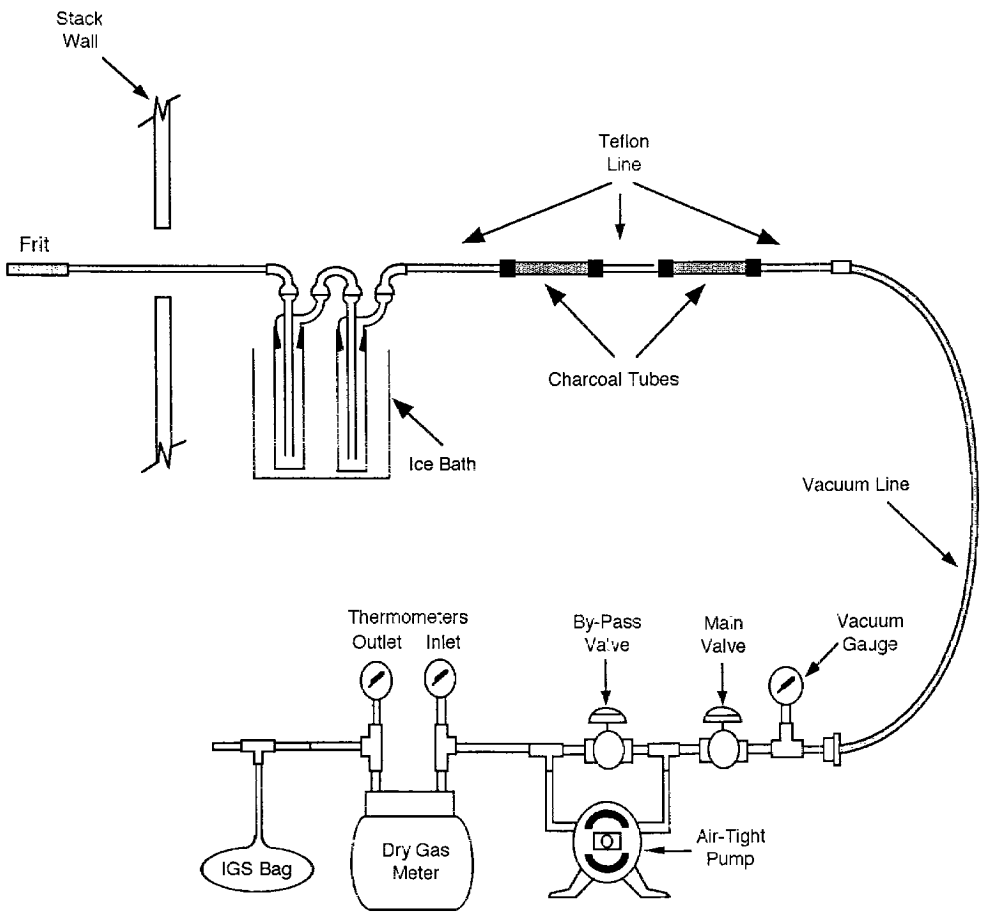


Figure 4-6: Calciner Stack Sampling Apparatus (EPA Method 18)

SOLVAY2016_6_000039

METHODOLOGY

TOTAL HYDROCARBONS - EPA METHOD 25A

Gaseous monitoring of total hydrocarbon (THC) emissions at all three locations was performed using EPA Method 25A. A gas sample was continuously extracted from the stack and delivered to a Flame Ionization Analyzer (FIA) which measured the THC concentration in the gas on a wet volumetric basis. The analyzer was calibrated on-site using certified mixtures of calibration gases.

Figure 4-7 contains a general schematic of the THC monitoring system. The system utilized a heated stainless steel probe for gas withdrawal. The entire system was heated to maintain the gas temperature above 250°F to prevent condensation of the stack gas moisture. A stainless steel probe, equiped with a sintered stainless steel filter in the stack and a heated glass fiber filter at the probe exit was used for gas withdrawl. A three-way stainless steel valve was located between the glass filter and probe to facilitate system calibrations. A teflon line delivered the gas to J.U.M. Engineering Model VE-7 Flame Ionization Analyzer with the pump located in the heated area of the analyzer.

The analyzer was calibrated according to the reference method procedures using EPA Protocol No. 1 certified gas mixtures of propane in nitrogen. Before testing, the analyzer was calibrated by introducing zero and high-level (80-90% of span) gases into the sampling line at the exit of the heated probe and making any appropriate analyzer adjustments based on the analyzer response. Then, the calibration error of the system was determined by introducing low-level (25-35% of span) and mid-level (45-55% of span) gases into the analyzer system and recording the response without any adjustments made to the analyzer. The calibration errors for the low-level and mid-level gases were demonstrated to be less than 5% of the respective gas cylinder values.

Immediately following each of the three test runs, the zero gas and one up-scale gas were introduced into the sampling system to check for calibration drift. In order for a test run to be considered valid, the calibration drift between the pre-test and post-test calibrations were required to be demonstrated to be less than 3% of the analyzer span. The results of the pre-test and post-test drift checks were used to correct the average flue gas concentration measured during each test run for analyzer drift during that period.

METHODOLOGY

TOTAL HYDROCARBONS (CONTINUED)

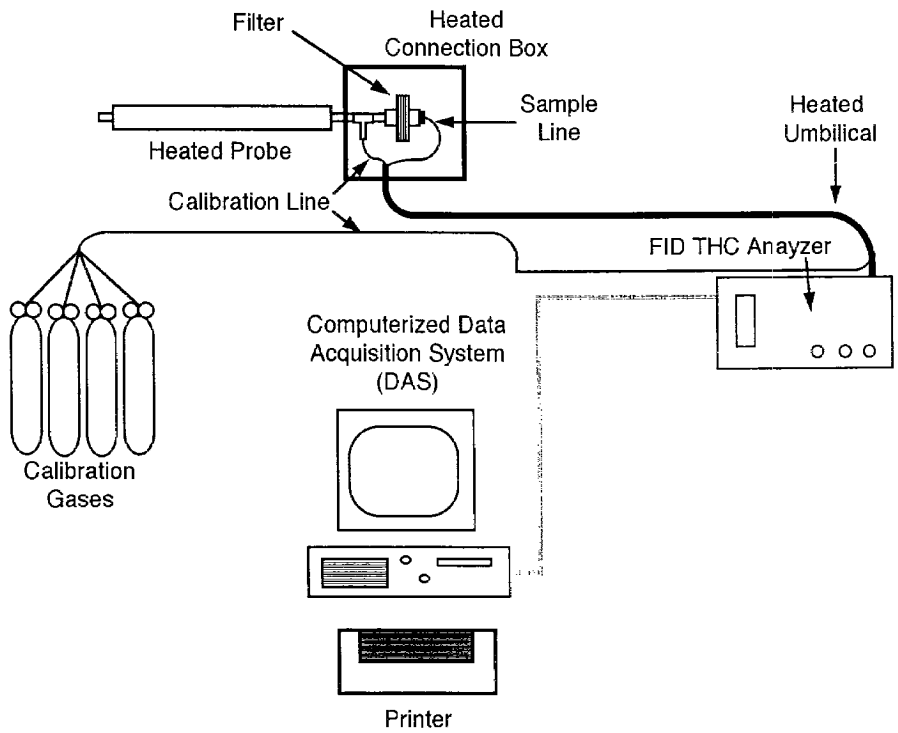


Figure 4-7: THC Monitoring System Schematic

The non-methane hydrocarbon emission rates were determined indirectly by subtracting the methane emission rates (Method 18) from the total hydrocarbon emission rates (Method 25A). Total hydrocarbon concentrations were measured using propane as a calibration gas.

SOLVAY2016_6_000041

METHODOLOGY

VOLATILE ORGANIC COMPOUNDS - SW-846 METHOD 0030

Sampling for volatile organic compounds (VOC) was performed at the EP 5 and EP 1&2 Calciner Stacks in accordance with SW-846 Method 0030. This sampling train is commonly referred to as the volatile organic sampling train (VOST). A schematic of the sampling train is shown in Figure 4-8.

Each run consisted of one 20 minute sample of approximately 1 liter. Testing was conducted from the approximate center of the duct, or at least 1 meter from the stack wall.

The VOST system consisted of a heated sampling probe, a volatile collection system, and a gas metering system. The sampling probe was made of stainless steel with a borosilicate glass liner. The volatile collection system consisted of condensers to cool the gas stream to 68°F prior to passage through a set of two sorbent cartridges. The sorbent cartridges were of the inside/inside configuration. The first cartridge contained Tenax and the second cartridge contained a layer of Tenax followed by a layer of charcoal.

All glassware was cleaned prior to testing. The glassware was first washed with HPLC water. The glassware was stored in a dessicator with activated charcoal before testing. The glass probe liner and glass nozzle were also cleaned by rinsing with HPLC water. The sorbent cartridges were cleaned and prepared as per SW-846 Method 0030.

The samples were analyzed for VOC's in accordance with SW-846 Methods 8240 and 5040. All of the organic analytical work was subcontracted to Triangle Laboratories located in Durham, North Carolina. All components of the recovered sampling train, including the impinger condensate and rinse, were extracted and combined for one analysis. The internal standards were added in the amount of 0.25 µg to each VOST tube or to 0.005 Liters (L) of condensate immediately prior to analysis by gas chromatography and mass spectrometry (GC/MS). A summary report for the analysis is included in Appendix Section F.

METHODOLOGY

VOLATILE ORGANIC COMPOUNDS (CONTINUED)

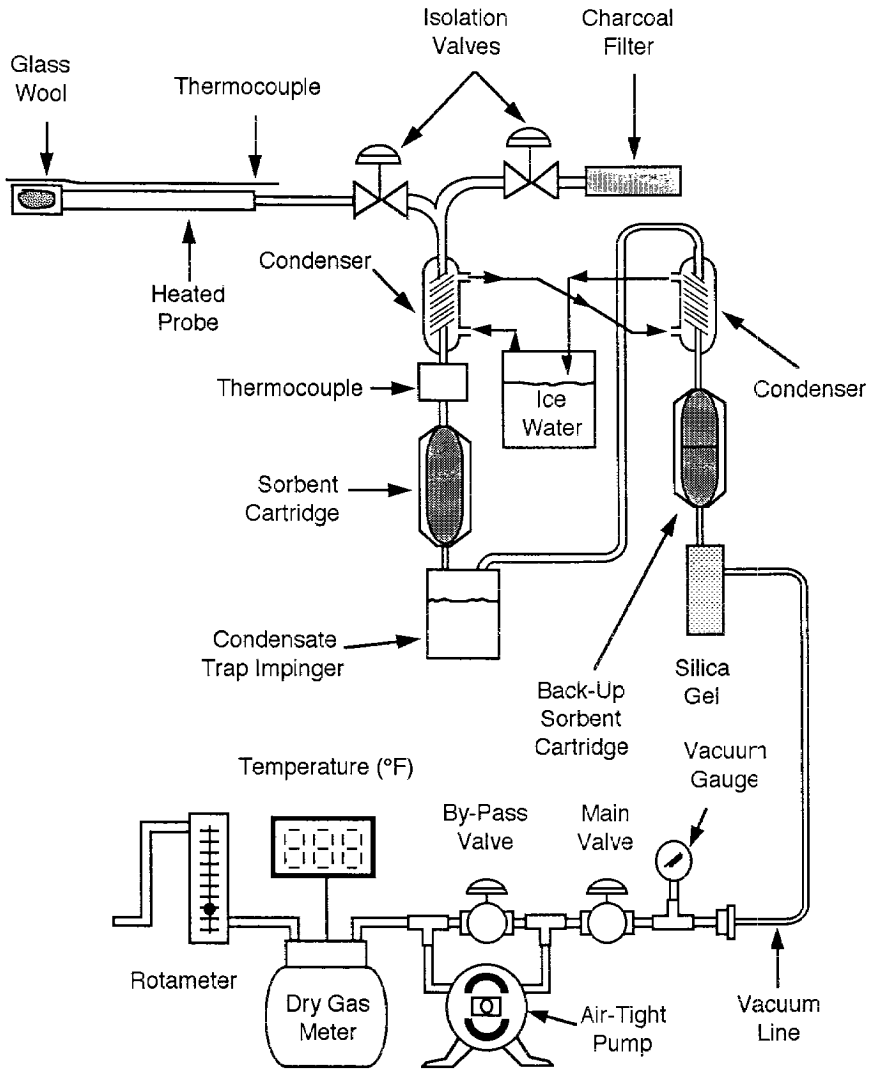


Figure 4-8: Volatile Organic Compound Sampling Apparatus (SW-846 Method 0030)

SOLVAY2015_6_000043

Appendix

APPENDIX

SAMPLE CALCULATIONS ..... A
PARAMETERS ..... B
CALIBRATION DATA C
FIELD DATA ..... D
FIELD DATA PRINTOUTS ..... E
LABORATORY DATA ..... F
CHAIN OF CUSTODY ..... G
OPERATING DATA ..... H

A

SAMPLE CALCULATIONS

A

SAMPLE CALCULATIONS
EP 1&2 CALCINER STACK - RUN 1

(Note: results are taken from computer analysis)

1. Volume of water collected (in wscf)

$$V_{wstd} = (0.04707)(V_{lc})$$
$$= (0.04707)(94.5)$$
$$= 4.45 \text{ wscf}$$

Where:

V_{lc}	total volume of liquid collected in impingers and silica gel (ml)
V_{wstd}	volume of water collected at standard conditions (ft^3)
0.04707	conversion factor (ft^3/ml)

2. Volume of gas metered, standard conditions (in dscf)

$$V_{mstd} = \frac{(17.64)(V_m)\left(P_{bar} + \frac{\Delta H}{13.6}\right)(Y_d)}{(460 + T_m)}$$
$$= \frac{(17.64)(26.95)\left(23.81 + \frac{0.95}{13.6}\right)(0.9853)}{(460 + 44)}$$
$$= 22.20 \text{ dscf}$$

Where:

P_{bar}	barometric pressure (in. Hg)
T_m	average dry gas meter temperature (°F)
V_m	volume of gas sample through the dry gas meter at meter conditions (ft^3)
V_{mstd}	volume of gas sample through the dry gas meter at standard conditions (ft^3)
Y_d	gas meter correction factor (dimensionless)
ΔH	average pressure drop across meter box orifice (in. H_2O)
17.64	conversion factor (°R/in. Hg)
13.6	conversion factor (in. H_2O/in. Hg)
460	°F to °R conversion constant

SAMPLE CALCULATIONS (CONTINUED)

3. Sample gas pressure (in in. Hg)

$$P_s = P_{bar} + \left(\frac{P_g}{13.6}\right)$$

$$= 23.81 + \left(\frac{-0.8}{13.6}\right)$$

$$= 23.75 \text{ in. Hg}$$

Where:

P_{bar}	barometric pressure (in. Hg)
P_g	sample gas static pressure (in. H_2O)
P_s	absolute sample gas pressure (in. Hg)
13.6	conversion factor (in. H_2O/in. Hg)

4. Actual vapor pressure (in in. Hg)

$$P_v = P_s$$

$$= 23.75 \text{ in. Hg}$$

Where:

P_v	vapor pressure, actual (in. Hg)
P_s	absolute sample gas pressure (in. Hg)

5. Moisture content (in %)

$$B_{wo} = \left(\frac{V_{wstd}}{V_{mstd} + V_{wstd}}\right)(100)$$

$$= \left(\frac{4.45}{22.20 + 4.45}\right)(100)$$

$$= (0.1670)(100)$$

$$= 16.70\ \%$$

Where:

B_{wo}	proportion of water vapor in the gas stream by volume (%)
V_{mstd}	volume of gas sample through the dry gas meter at standard conditions (ft^3)
V_{wstd}	volume of water collected at standard conditions (ft^3)

SAMPLE CALCULATIONS (CONTINUED)

6. Saturated moisture content (in %)

$$B_{ws} = \frac{(P_v)}{(P_s)}(100)$$

$$= \frac{(23.75)}{(23.75)}(100)$$

$$= (1.00)(100)$$

$$= 100\ \%$$

Where:

B_{ws}	proportion of water vapor in the gas stream by volume at saturated conditions (%)
P_s	absolute sample gas pressure (in. Hg)
P_v	vapor pressure, actual (in. Hg)

Whichever moisture value is smaller is used for B_{wo} in the following calculations.

7. Molecular weight of dry gas stream (in lb/lb·mole)

$$M_d = M_{CO_2}\frac{(CO_2)}{(100)} + M_{O_2}\frac{(O_2)}{(100)} + M_{CO+N_2}\frac{(CO+N_2)}{(100)}$$

$$= 44.0\frac{(8.2)}{(100)} + 32.0\frac{(14.7)}{(100)} + 28.0\frac{(77.1)}{(100)}$$

$$= 29.90\ \frac{lb}{lb \cdot mole}$$

Where:

Md	dry molecular weight of sample gas (lb/lb·mole)
M_{CO_2}	molecular weight of carbon dioxide (lb/lb·mole)
M_{O_2}	molecular weight of oxygen (lb/lb·mole)
$M_{CO}+N_2$	molecular weight of carbon monoxide and nitrogen (lb/lb·mole)
CO_2	proportion of carbon dioxide in the gas stream by volume (%)
O_2	proportion of oxygen in the gas stream by volume (%)
$CO+N_2$	proportion of carbon monoxide and nitrogen in the gas stream by volume (%)
100	conversion factor (%)

SAMPLE CALCULATIONS (CONTINUED)

8. Molecular weight of sample gas (in lb/lb·mole)

$$M_s = (M_d)(1 - B_{wo}) + (M_{H_2O})(B_{wo})$$

$$= (29.90)(1 - 0.1670) + (18.0)(0.1670)$$

$$= 27.91 \frac{\text{lb}}{\text{lb} \cdot \text{mole}}$$

Where:

B_{wo}	proportion of water vapor in the gas stream by volume
M_d	dry molecular weight of sample gas (lb/lb·mole)
M_{H_2O}	molecular weight of water (lb/lb·mole)
M_s	molecular weight of sample gas, wet basis (lb/lb·mole)

9. Velocity of sample gas (in ft/sec)

$$V_s = (K_p)(C_P)\left(\sqrt{\Delta P}\right)\left(\sqrt{\frac{(\overline{T_s} + 460)}{(M_s)(P_s)}}\right)$$

$$= (85.49)(0.84)(1.080)\left(\sqrt{\frac{(456 + 460)}{(27.91)(23.75)}}\right)$$

$$= 91.1 \frac{\text{ft}}{\text{sec}}$$

Where:

C_p	velocity pressure coefficient (dimensionless)
K_p	pitot tube constant
M_s	molecular weight of sample gas, wet basis (lb/lb·mole)
P_s	absolute sample gas pressure (in. Hg)
T_s	average sample gas temperature (°F)
V_s	sample gas velocity (ft/sec)
$\sqrt{\Delta P}$	average square roots of velocity heads of sample gas (in. H_2O)
460	°F to °R conversion constant

SAMPLE CALCULATIONS (CONTINUED)

10. Total flow of sample gas (in acfm)

$$Q_a = (60)(A_s)(V_s)$$
$$= (60)(113.10)(91.1)$$
$$= 618,300 \text{ acfm}$$

Where:

A_s	cross sectional area of sampling location (ft_2)
Q_a	volumetric flow rate at actual conditions (acfm)
V_s	sample gas velocity (ft/sec)
60	conversion factor (sec/min)

11. Total flow of sample gas (in dscfm)

$$Q_{std} = \frac{(Q_a)(P_s)(17.64)(1 - B_{wo})}{(\overline{T_s} + 460)}$$
$$= \frac{(618,300)(23.75)(17.64)(1 - 0.1670)}{(456 + 460)}$$
$$= 235,700 \text{ dscfm}$$

Where:

B_{wo}	proportion of water vapor in the gas stream by volume
P_s	absolute sample gas pressure (in. Hg)
Q_a	volumetric flow rate at actual conditions (acfm)
Q_{std}	volumetric flow rate at standard conditions, dry basis (dscfm)
T_s	average sample gas temperature (°F)
17.64	conversion factor (°R/in. Hg)
460	°F to °R conversion constant

SAMPLE CALCULATIONS (CONTINUED)

12. Methane emission rate (in lb/hr) [1]

$$E_{lb/hr} = \frac{(C_{ppm})(M_{CH_4})(Q_{std})(60)}{(385.3)(10^6)}$$

$$= \frac{(6.86)(16.04)(235,700)(60)}{(385.3)(10^6)}$$

$$= 4.04 \frac{lb}{hr}$$

Where:

C	measured concentration in the gas stream (ppmdv)
$E_{lb/hr}$	emission rate (lb/hr)
Q_{std}	volumetric flow rate at standard conditions, dry basis (dscfm)
M_{CH_4}	molecular weight of methane
10^6	conversion factor (ppm)
385.3	conversion factor (ft^3/lb·mole)
60	conversion factor (min/hr)

13. Benzene concentration (in ppmdv)[2]

$$C_{ppm} = \frac{(385.3)(10^6)(m)}{(M_{benzene})(V_{mstd})(453,590)}$$

$$= \frac{(385.3)(10^6)(0.0186)}{(78.11)(0.53)(453,590)}$$

$$= 0.38 \text{ ppmdv}$$

Where:

m	mass of benzene in sample (mg)
C_{ppm}	measured concen altration in the gas stream (ppmdv)
$M_{benzene}$	molecular weight of benzene
V_{mstd}	volume of gas sample through the dry gas meter at standard conditions (ft^3)
453,590	conversion factor (mg/lb)
385.3	conversion factor (ft^3/lb·mole)
10^6	conversion factor (ppm)

[1] Calculations for carbon monoxide are performed in a similar manner. The molecular weight of carbon monoxide is 28.01.
[2] The calculations for the other volatile organic compounds are performed in a similar manner.

SAMPLE CALCULATIONS (CONTINUED)

14. Benzene concentration (in mg/dscm)[1]

$$C_{mg/dscm} = \frac{(m)}{(V_{mstd})}(35.31)$$

$$= \frac{(0.0186)}{(0.53)}(35.31)$$

$$= 1.23 \frac{mg}{dscm}$$

Where:

$C_{mg/dscm}$	concentration (mg/dscm)
$m_{fraction}$	mass of benzene in sample (mg)
V_{mstd}	volume of gas sample through the dry gas meter at standard conditions (ft^3)
35.31	conversion factor (ft^3/m^3)

15. Benzene emission rate (in lb/hr)[2]

$$E_{lb/hr} = \frac{(m)(Q_{std})(60)}{(V_{mstd})(1,000)(453.59)}$$

$$= \frac{(0.0186)(235,700)(60)}{(0.53)(1,000)(453.59)}$$

$$= 1.09 \frac{lb}{hr}$$

Where:

m	mass of benzene in sample (mg)
V_{mstd}	volume of gas sample through the dry gas meter at standard conditions (L)
453.59	conversion factor (lb/g)
1,000	conversion factor (mg/g)
Q_{std}	volumetric flow rate at standard conditions, dry basis (dscfm)
$E_{lb/hr}$	emission rate (lb/hr)
60	conversion factor (min/hr)

[1] The calculations for the other volatile organic compounds are performed in a similar manner.
[2] The calculations for the other volatile organic compounds are performed in a similar manner.

SAMPLE CALCULATIONS (CONTINUED)

16. Continuous emissions monitoring for total hydrocarbons (drift corrected in ppmwv)

$$C_{ppmwv} = (C_{avg} - C_0)\frac{(C_{ma})}{(C_m - C_0)}$$

$$= (30.2 - 0.65)\frac{53.80}{(55.25 - 0.65)}$$

$$= 29.1 \text{ ppmwv}$$

Where:

C_{ppmwv}	concentration corrected for drift (ppmwv)
C_{avg}	measured concentration in the gas stream (ppmwv)
C_{ma}	actual concentration of the upscale calibration gas (ppmv)
C_m	average of initial and final system calibration bias check response for the upscale calibration gas (ppmv)
C_o	average of initial and final system calibration bias check response for the zero gas (ppmv)

17. Continuous emissions monitoring for total hydrocarbons (moisture corrected to ppmdv)

$$C_{ppmdv} = \frac{(C_{ppmwv})}{(1 - B_{wo})}$$

$$= \frac{(29.1)}{(1 - 0.1670)}$$

$$= 35.0 \text{ ppmdv}$$

Where:

B_{wo}	proportion of water vapor in the gas stream by volume
C_{ppmdv}	concentration calibrated for drift (ppmdv)
C_{ppmwv}	concentration calibrated for drift (ppmwv)

SAMPLE CALCULATIONS (CONTINUED)

18. Continuous emissions monitoring for total hydrocarbons (in lb/hr)

$$E_{lb/hr} = \frac{(C_{ppm})(M_{THC})(Q_{std})(60)}{(385.3)(10^6)}$$

$$= \frac{(35.0)(44.10)(235,700)(60)}{(385.3)(10^6)}$$

$$= 56.6 \frac{lb}{hr}$$

Where:

C	measured concentration in the gas stream (ppmdv)
$E_{lb/hr}$	emission rate (lb/hr)
Q_{std}	volumetric flow rate at standard conditions, dry basis (dscfm)
M_{THC}	molecular weight of total hydrocarbons
10^6	conversion factor (ppm)
385.3	conversion factor (ft^3/lb·mole)
60	conversion factor (min/hr)

19. Emission rate of analyte per process rate (lb/tons of trona)

$$E_{lb/tons,trona} = \frac{(E_{lb/hr})}{(TPR)}$$

$$= \frac{(56.6)}{(244)}$$

$$= 0.23 \frac{lb}{tons, trona}$$

Where:

$E_{lb/tons\ of\ trona}$	emission rate of analyte per process rate (lb/tons of trona)
$E_{lb/hr}$	emission rate (lb/hr)
TPR	trona processing rate (tons/hr)

B

PARAMETERS

B

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

VELOCITY AND MOISTURE PARAMETERS

Run No.		1	2	3	4	
Date (1995)		January 11	January 11	January 11	January 11	
Start Time (approx.)		11:08	12:52	14:26	15:51	
Stop Time (approx.)		11:48	13:32	15:06	16:36	
Operating Data						
	Trona processing rate (tons/hr)	162	162	162	162	
Sampling Conditions						
Y_d	Dry gas meter correction factor	0.9853	0.9853	0.9853	0.9853	
C_p	Pitot tube coefficient	0.84	0.84	0.84	0.84	
P_g	Static pressure (in. H_2O)	-0.2	-0.2	-0.2	-0.2	
A_s	Sample location area (ft^2)	85.90	85.90	85.90	85.90	
P_{bar}	Barometric pressure (in. Hg)	23.78	23.78	23.78	23.78	
O_2	Oxygen (dry volume %)	10.4	8.9	8.9	8.6	
CO_2	Carbon dioxide (dry volume %)	12.2	13.8	14.0	14.2	
V_{lc}	Liquid collected (ml)	298.5	247.5	241.0	272.5	
V_m	Volume metered, meter conditions (ft^3)	30.23	26.21	26.00	28.75	
T_m	Dry gas meter temperature (°F)	62	67	73	65	
T_s	Sample temperature (°F)	345	349	344	346	
ΔH	Meter box orifice pressure drop (in. H_2O)	1.51	1.15	1.14	1.11	
Flow Results						
V_{wstd}	Volume of water collected (ft^3)	14.05	11.65	11.34	12.83	
V_{mstd}	Volume metered, standard (ft^3)	24.04	20.62	20.25	22.70	
P_s	Sample gas pressure, absolute (in. Hg)	23.77	23.77	23.77	23.77	
P_v	Vapor pressure, actual (in. Hg)	23.77	23.77	23.77	23.77	
B_{wo}	Moisture in sample (% by volume)	36.89	36.10	35.90	36.10	36.25
B_{ws}	Saturated moisture (% by volume)	100.00	100.00	100.00	100.00	
$\sqrt{\Delta P}$	Velocity head ($\sqrt{in.}$ H_2O)	0.355	0.337	0.341	0.363	
M_d	MW of sample gas, dry (lb/lb-mole)	30.37	30.56	30.60	30.62	
M_s	MW of sample gas, wet (lb/lb-mole)	25.81	26.03	26.07	26.06	
V_s	Velocity of sample (ft/sec)	29.2	27.7	27.9	29.8	
Q_a	Volumetric flow rate, actual (acfm)	150,300	142,700	143,700	153,500	
Q_{std}	Volumetric flow rate, standard (dscfm)	49,440	47,240	48,050	50,990	

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

TOTAL HYDROCARBONS PARAMETERS
Method 25A by Monitors

Run No.		1	2	3	4
Date (1995)		January 11	January 11	January 11	January 11
Start Time (approx.)		10:46	12:51	14:26	15:52
Stop Time (approx.)		11:45	13:50	15:25	16:51
Operating Data					
	Trona processing rate (tons/hr)	162	162	162	162
Gas Conditions					
O_2	Oxygen (dry volume %)	10.4	8.9	8.9	8.6
CO_2	Carbon Dioxide (dry volume %)	12.2	13.8	14.0	14.2
B_{wo}	Moisture in sample (% by volume)	36.9	36.1	35.9	36.1
Q_{std}	Volumetric flow rate, standard (dscfm)	49,440	47,240	48,050	50,990
Data Acquisition					
C	Effluent gas concentration (ppmwv)	260.9	298.3	294.3	257.1
Calibration Gases					
C_{oi}	Calibration bias check, initial zero gas	0.7	-0.5	0.1	0.0
C_{mi}	Calibration bias check, initial upscale gas	546.5	548.5	550.5	556.8
C_{of}	Calibration bias check, final zero gas	-0.5	0.1	0.0	-1.9
C_{mf}	Calibration bias check, final upscale gas	548.5	550.5	556.8	546.9
C_{ma}	Actual concentration of upscale gas	547.5	547.5	547.5	547.5
Calculated Results					
C_{gas}	Concentration drift corrected (ppmwv)	260.8	297.4	291.0	255.6
C_{gas}	Concentration moisture corrected (ppmdv)	413.3	465.4	454.1	400.0
E	Emission rate (lb/hr)	140.3	151.0	149.8	140.0
E	Emission rate (lb/ton of trona)	0.866	0.932	0.925	0.864

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

CARBON MONOXIDE AND VOLATILE ORGANICS PARAMETERS
Samples Collected in Tedlar Bags

Run No.		1	2	3[1]	4[1]
Date (1995)		January 11	January 11	January 11	January 11
Start Time (approx.)		10:55	12:52	14:30	15:56
Stop Time (approx.)		11:55	13:52	15:30	16:56
Operating Data					
	Trona processing data (tons/hr)	162	162	162	162
Sampling Locations					
P_{bar}	Barometric pressure (in. Hg)	23.78	23.78	23.78	23.78
V_m	Volume metered, meter conditions (liter)	17.44	17.57	14.68	19.83
V_m	Volume metered, meter conditions (ft^3)	0.62	0.62	0.52	0.70
ΔH	Meter box orifice pressure drop (in. H_2O)	1.00	1.00	1.00	1.00
Y_d	Dry gas meter correction factor	1.0145	1.0145	1.0145	1.0145
T_m	Dry gas meter temperature (°F)	55	57	51	49
Calculated Results					
V_{mstd}	Volume metered, standard (ft^3)	0.51	0.51	0.43	0.59
Flow Results					
Q_a	Volumetric flow rate, actual (acfm)	150,300	142,700	143,700	153,500
Q_{std}	Volumetric flow rate, standard (dscfm)	49,440	47,240	48,050	50,990
Carbon Monoxide (MW = 28.01)					
C	Concentration (ppmdv)	2,563.10	2,643.70	5.00	1,220.50
E	Emission rate (lb/hr)	552.73	544.74	1.05	271.45
E	Emission rate (lb/tons of trona)	3.412	3.363	0.006	1.676
Ethane (MW = 30.07)					
C	Concentration (ppmdv)	BDL	BDL	BDL	BDL
Methane (MW = 16.04)					
C	Concentration (ppmdv)	493.00	498.00	12.50	241.00
E	Emission rate (lb/hr)	60.88	58.76	1.50	30.69
E	Emission rate (lb/tons of trona)	0.376	0.363	0.009	0.189

[1] Analytical results indicate that the Tedlar bags leaked.
BDL: Indicates the value was below the detection limit.

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

VOLATILE ORGANICS PARAMETERS
Method 18 Collected in Charcoal Tubes

Run No.		1	2	3	4
Date (1995)		January 11	January 11	January 11	January 11
Start Time (approx.)		10:55	12:52	14:30	15:56
Stop Time (approx.)		11:55	13:52	15:30	16:56
Operating Data					
	Trona processing rate (tons/hr)	162	162	162	162
Sampling Locations					
P_{bar}	Barometric pressure (in. Hg)	23.78	23.78	23.78	23.78
V_m	Volume metered, meter conditions (liter)	17.44	17.57	14.68	19.83
V_m	Volume metered, meter conditions (ft^3)	0.62	0.62	0.52	0.70
ΔH	Meter box orifice pressure drop (in. H_2O)	1.00	1.00	1.00	1.00
Y_d	Dry gas meter correction factor	1.0145	1.0145	1.0145	1.0145
T_m	Dry gas meter temperature (°F)	55	57	51	49
Calculated Results					
V_{mstd}	Volume metered, standard (ft^3)	0.51	0.51	0.43	0.59
Flow Results					
Q_a	Volumetric flow rate, actual (acfm)	150,300	142,700	143,700	153,500
Q_{std}	Volumetric flow rate, standard (dscfm)	49,440	47,240	48,050	50,990
1, 3 Butadiene (MW = 54.09)					
m	Matter collected (mg)	0.1737	BDL	BDL	BDL
C	Concentration (mg/dscm)	12.02	BDL	BDL	BDL
C	Concentration (ppmdv)	5.35	BDL	BDL	BDL
E	Emission rate (lb/hr)	2.23	BDL	BDL	BDL
E	Emission rate (lb/tons of trona)	0.014	BDL	BDL	BDL
1-1-1 Trichloroethane (MW = 133.42)					
m	Matter collected (mg)	BDL	BDL	BDL	BDL
Acrylonitrile (MW = 53.06)					
m	Matter collected (mg)	BDL	BDL	BDL	BDL
Benzene (MW = 78.12)					
m	Matter collected (mg)	0.2819	0.2676	0.2928	0.1151
C	Concentration (mg/dscm)	19.51	18.46	23.87	6.93
C	Concentration (ppmdv)	6.01	5.68	7.35	2.13
E	Emission rate (lb/hr)	3.61	3.27	4.30	1.32
E	Emission rate (lb/tons of trona)	0.022	0.020	0.027	0.008

BDL: Indicates the value was below the detection limit.

Revision 0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

VOLATILE ORGANICS PARAMETERS
Method 18 Collected in Charcoal Tubes

Run No.		1	2	3	4
Date (1995)		January 11	January 11	January 11	January 11
Start Time (approx.)		10:55	12:52	14:30	15:56
Stop Time (approx.)		11:55	13:52	15:30	16:56
Operating Data					
	Trona processing rate (tons/hr)	162	162	162	162
Sampling Locations					
P_{bar}	Barometric pressure (in. Hg)	23.78	23.78	23.78	23.78
V_m	Volume metered, meter conditions (liter)	17.44	17.57	14.68	19.83
V_m	Volume metered, meter conditions (ft^3)	0.62	0.62	0.52	0.70
ΔH	Meter box orifice pressure drop (in. H_2O)	1.00	1.00	1.00	1.00
Y_d	Dry gas meter correction factor	1.0145	1.0145	1.0145	1.0145
T_m	Dry gas meter temperature (°F)	55	57	51	49
Calculated Results					
V_{mst}	Volume metered, standard (ft^3)	0.51	0.51	0.43	0.59
Flow Results					
Q_a	Volumetric flow rate, actual (acfm)	150,300	142,700	143,700	153,500
Q_{std}	Volumetric flow rate, standard (dscfm)	49,440	47,240	48,050	50,990
Ethylbenzene (MW = 106.17)					
m	Matter collected (mg)	BDL	0.0252	0.0235	0.0167
C	Concentration (mg/dscm)	BDL	1.74	1.92	1.00
C	Concentration (ppmdv)	BDL	0.39	0.43	0.23
E	Emission rate (lb/hr)	BDL	0.31	0.34	0.19
E	Emission rate (lb/tons of trona)	BDL	0.002	0.002	0.001
Hexane (MW = 86.18)					
m	Matter collected (mg)	0.0309	0.0351	0.0320	BDL
C	Concentration (mg/dscm)	2.14	2.42	2.61	BDL
C	Concentration (ppmdv)	0.60	0.68	0.73	BDL
E	Emission rate (lb/hr)	0.40	0.43	0.47	BDL
E	Emission rate (lb/tons of trona)	0.002	0.003	0.003	BDL
Methylene Chloride (MW = 84.94)					
m	Matter collected (mg)	BDL	0.0399	0.0234	0.0259
C	Concentration (mg/dscm)	BDL	2.75	1.91	1.56
C	Concentration (ppmdv)	BDL	0.78	0.54	0.44
E	Emission rate (lb/hr)	BDL	0.49	0.34	0.30
E	Emission rate (lb/tons of trona)	BDL	0.003	0.002	0.002

BDL: Indicates the value was below the detection limit.

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

VOLATILE ORGANICS PARAMETERS
Method 18 Collected in Charcoal Tubes

Run No.		1	2	3	4
Date (1995)		January 11	January 11	January 11	January 11
Start Time (approx.)		10:55	12:52	14:30	15:56
Stop Time (approx.)		11:55	13:52	15:30	16:56
Operating Data					
	Trona processing rate (tons/hr)	162	162	162	162
Sampling Locations					
P_{bar}	Barometric pressure (in. Hg)	23.78	23.78	23.78	23.78
V_m	Volume metered, meter conditions (liter)	17.44	17.57	14.68	19.83
V_m	Volume metered, meter conditions (ft^3)	0.62	0.62	0.52	0.70
ΔH	Meter box orifice pressure drop (in. H_2O)	1.00	1.00	1.00	1.00
Y_d	Dry gas meter correction factor	1.0145	1.0145	1.0145	1.0145
T_m	Dry gas meter temperature (°F)	55	57	51	49
Calculated Results					
V_{mstd}	Volume metered, standard (ft^3)	0.51	0.51	0.43	0.59
Flow Results					
Q_a	Volumetric flow rate, actual (acfm)	150,300	142,700	143,700	153,500
Q_{std}	Volumetric flow rate, standard (dscfm)	49,440	47,240	48,050	50,990
Styrene (MW = 84.93)					
m	Matter collected (mg)	BDL	0.0235	0.0256	0.0111
C	Concentration (mg/dscm)	BDL	1.62	2.09	0.67
C	Concentration (ppmdv)	BDL	0.46	0.59	0.19
E	Emission rate (lb/hr)	BDL	0.29	0.38	0.13
E	Emission rate (lb/tons of trona)	BDL	0.002	0.002	0.001
Toluene (MW = 92.15)					
m	Matter collected (mg)	0.0589	0.0633	0.0719	0.0418
C	Concentration (mg/dscm)	4.08	4.37	5.86	2.52
C	Concentration (ppmdv)	1.06	1.14	1.53	0.66
E	Emission rate (lb/hr)	0.75	0.77	1.06	0.48
E	Emission rate (lb/tons of trona)	0.005	0.005	0.007	0.003
Xylene (MW = 106.16)					
m	Matter collected (mg)	0.0357	0.0693	0.0775	0.0455
C	Concentration (mg/dscm)	2.47	4.78	6.32	2.74
C	Concentration (ppmdv)	0.56	1.08	1.43	0.62
E	Emission rate (lb/hr)	0.46	0.85	1.14	0.52
E	Emission rate (lb/tons of trona)	0.003	0.005	0.007	0.003

BDL: Indicates the value was below the detection limit.

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

VOLATILE ORGANIC COMPOUNDS PARAMETERS
Method 0030 collected in Sorbent Cartridges

Run No.		1	2	3	4
Date (1995)		January 11	January 11	January 11	January 11
Start Time (approx.)		10:55	12:52	14:30	15:56
Stop Time (approx.)		11:15	13:12	14:50	16:16
Operating Data					
	Trona processing rate (tons/hr)	162	162	162	162
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.984	0.984	0.984	0.984
P_b	Barometric pressure (in. Hg)	23.78	23.78	23.78	23.78
V_m	Volume metered, meter conditions (liters)	1.01	1.00	1.00	1.01
V_m	Volume metered, meter conditions (ft^3)	0.0357	0.0353	0.0353	0.0357
T_m	Dry gas meter temperature (°F)	61	61	66	62
ΔH	Meter box orifice pressure drop (in. H_2O)	0.35	1.00	0.80	0.80
Calculated Results					
V_{msld}	Volume metered, standard (ft^3)	0.028	0.028	0.028	0.028
Flow Results					
Q_a	Volumetric flow rate, actual (acfm)	150,300	142,700	143,700	153,500
Q_{std}	Volumetric flow rate, standard (dscfm)	49,440	47,240	48,050	50,990
Acrylonitrile (MW=53.06)					
m	Matter collected (μg)	0.746	0.620	0.258	0.150
C	Concentration (lb/dscf)	5.82E-08	4.87E-08	2.05E-08	1.17E-08
C	Concentration (gr/dscf)	4.07E-04	3.41E-04	1.43E-04	8.19E-05
C	Concentration (mg/dscm)	0.93	0.78	0.33	0.19
C	Concentration (ppm)	0.42	0.35	0.15	0.08
E	Emission rate (lb/hr)	0.17	0.14	0.06	0.04
E	Emission rate (lb/tons of trona)	0.001	0.001	0.0004	0.0002
Allyl chloride (MW=76.53)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
Benzene (MW=78.11)					
m	Matter collected (μg)	5.271	5.524	4.734	3.077
C	Concentration (lb/dscf)	4.11E-07	4.34E-07	3.76E-07	2.40E-07
C	Concentration (gr/dscf)	0.0029	0.0030	0.0026	0.0017
C	Concentration (mg/dscm)	6.59	6.95	6.02	3.84
C	Concentration (ppm)	2.03	2.14	1.85	1.18
E	Emission rate (lb/hr)	1.22	1.23	1.08	0.73
E	Emission rate (lb/tons of trona)	0.008	0.008	0.007	0.005
Bromoform (MW=252.77)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL

BDL: indicates value was below detection limits.

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

VOLATILE ORGANIC COMPOUNDS PARAMETERS
Method 0030 collected in Sorbent Cartridges

Run No.		1	2	3	4
Date (1995)		January 11	January 11	January 11	January 11
Start Time (approx.)		10:55	12:52	14:30	15:56
Stop Time (approx.)		11:15	13:12	14:50	16:16
Operating Data					
	Trona processing rate (tons/hr)	162	162	162	162
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.984	0.984	0.984	0.984
P_b	Barometric pressure (in. Hg)	23.78	23.78	23.78	23.78
V_m	Volume metered, meter conditions (liters)	1.01	1.00	1.00	1.01
V_m	Volume metered, meter conditions (ft^3)	0.0357	0.0353	0.0353	0.0357
T_m	Dry gas meter temperature (°F)	61	61	66	62
ΔH	Meter box orifice pressure drop (in. H_2O)	0.35	1.00	0.80	0.80
Calculated Results					
V_{mstd}	Volume metered, standard (ft^3)	0.028	0.028	0.028	0.028
Flow Results					
Q_a	Volumetric flow rate, actual (acfm)	150,300	142,700	143,700	153,500
Q_{std}	Volumetric flow rate, standard (dscfm)	49,440	47,240	48,050	50,990
1,3-Butadiene (MW=54.09)					
m	Matter collected (μg)	7.468	20.241	16.716	5.173
C	Concentration (lb/dscf)	5.83E-07	1.59E-06	1.33E-06	4.04E-07
C	Concentration (gr/dscf)	0.0041	0.0111	0.0093	0.0028
C	Concentration (mg/dscm)	9.33	25.45	21.26	6.46
C	Concentration (ppm)	4.15	11.32	9.45	2.87
E	Emission rate (lb/hr)	1.73	4.50	3.83	1.23
E	Emission rate (lb/tons of trona)	0.01	0.03	0.02	0.01
Carbon disulfide (MW=76.14)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
Carbon tetrachloride (MW=153.84)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
Chlorobenzene (MW=112.56)					
m	Matter collected (μg)	0.009	BDL	BDL	BDL
C	Concentration (lb/dscf)	7.02E-10	BDL	BDL	BDL
C	Concentration (gr/dscf)	4.91E-06	BDL	BDL	BDL
C	Concentration (mg/dscm)	0.011	BDL	BDL	BDL
C	Concentration (ppm)	0.0024	BDL	BDL	BDL
E	Emission rate (lb/hr)	0.0021	BDL	BDL	BDL
E	Emission rate (lb/tons of trona)	0.00001	BDL	BDL	BDL
Chloroform (MW=119.39)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL

BDL: indicates value was below detection limits.

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

VOLATILE ORGANIC COMPOUNDS PARAMETERS
Method 0030 collected in Sorbent Cartridges

Run No.		1	2	3	4
Date (1995)		January 11	January 11	January 11	January 11
Start Time (approx.)		10:55	12:52	14:30	15:56
Stop Time (approx.)		11:15	13:12	14:50	16:16
Operating Data					
	Trona processing rate (tons/hr)	162	162	162	162
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.984	0.984	0.984	0.984
P_b	Barometric pressure (in. Hg)	23.78	23.78	23.78	23.78
V_m	Volume metered, meter conditions (liters)	1.01	1.00	1.00	1.01
V_m	Volume metered, meter conditions (ft^3)	0.0357	0.0353	0.0353	0.0357
T_m	Dry gas meter temperature (°F)	61	61	66	62
ΔH	Meter box orifice pressure drop (in. H_2O)	0.35	1.00	0.80	0.80
Calculated Results					
V_{mstd}	Volume metered, standard (ft^3)	0.028	0.028	0.028	0.028
Flow Results					
Q_a	Volumetric flow rate, actual (acfm)	150,300	142,700	143,700	153,500
Q_{std}	Volumetric flow rate, standard (dscfm)	49,440	47,240	48,050	50,990
Cumene (isopropylbenzene) (MW=120.19)					
m	Matter collected (μg)	0.012	0.014	0.009	0.005
C	Concentration (lb/dscf)	9.36E-10	1.10E-09	7.15E-10	3.90E-10
C	Concentration (gr/dscf)	6.55E-06	7.69E-06	5.00E-06	2.73E-06
C	Concentration (mg/dscm)	0.015	0.018	0.011	0.006
C	Concentration (ppm)	0.0030	0.0035	0.0023	0.0013
E	Emission rate (lb/hr)	0.0028	0.0031	0.0021	0.0012
E	Emission rate (lb/tons of trona)	0.00002	0.00002	0.00001	0.00001
cis-1,3-Dichloropropene (MW=110.98)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
trans-1,3-Dichloropropene (MW=110.98)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
Ethyl acrylate (MW=100.11)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
Ethylbenzene (MW=106.16)					
m	Matter collected (μg)	0.434	0.880	0.462	0.203
C	Concentration (lb/dscf)	3.39E-08	6.91E-08	3.67E-08	1.58E-08
C	Concentration (gr/dscf)	2.37E-04	4.84E-04	2.57E-04	1.11E-04
C	Concentration (mg/dscm)	0.54	1.11	0.59	0.25
C	Concentration (ppm)	0.12	0.25	0.13	0.057
E	Emission rate (lb/hr)	0.10	0.20	0.11	0.048
E	Emission rate (lb/tons of trona)	0.0006	0.0012	0.0007	0.0003

BDL: indicates value was below detection limits.

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

VOLATILE ORGANIC COMPOUNDS PARAMETERS
Method 0030 collected in Sorbent Cartridges

Run No.		1	2	3	4
Date (1995)		January 11	January 11	January 11	January 11
Start Time (approx.)		10:55	12:52	14:30	15:56
Stop Time (approx.)		11:15	13:12	14:50	16:16
Operating Data					
	Trona processing rate (tons/hr)	162	162	162	162
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.984	0.984	0.984	0.984
P_b	Barometric pressure (in. Hg)	23.78	23.78	23.78	23.78
V_m	Volume metered, meter conditions (liters)	1.01	1.00	1.00	1.01
V_m	Volume metered, meter conditions (ft^3)	0.0357	0.0353	0.0353	0.0357
T_m	Dry gas meter temperature (°F)	61	61	66	62
ΔH	Meter box orifice pressure drop (in. H_2O)	0.35	1.00	0.80	0.80
Calculated Results					
V_{mstd}	Volume metered, standard (ft^3)	0.028	0.028	0.028	0.028
Flow Results					
Q_a	Volumetric flow rate, actual (acfm)	150,300	142,700	143,700	153,500
Q_{std}	Volumetric flow rate, standard (dscfm)	49,440	47,240	48,050	50,990
1,2-Epoxybutane (MW=72.11)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
Dibromoethane (MW=187.88)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
1,2-Dichloroethane (MW=98.97)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
1,1-Dichloroethane (MW=98.97)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
n-Hexane (MW=86.17)					
m	Matter collected (μg)	0.686	0.888	0.521	0.224
C	Concentration (lb/dscf)	5.35E-08	6.97E-08	4.14E-08	1.75E-08
C	Concentration (gr/dscf)	3.75E-04	4.88E-04	2.90E-04	1.22E-04
C	Concentration (mg/dscm)	0.86	1.12	0.66	0.28
C	Concentration (ppm)	0.24	0.31	0.18	0.078
E	Emission rate (lb/hr)	0.16	0.20	0.12	0.053
E	Emission rate (lb/tons of trona)	0.0010	0.0012	0.0007	0.0003
Bromomethane (MW=94.95)					
m	Matter collected (μg)	BDL	0.011	0.008	0.007
C	Concentration (lb/dscf)	BDL	8.64E-10	6.35E-10	5.46E-10
C	Concentration (gr/dscf)	BDL	6.05E-06	4.45E-06	3.82E-06
C	Concentration (mg/dscm)	BDL	0.0138	0.0102	0.0087
C	Concentration (ppm)	BDL	0.0035	0.0026	0.0022
E	Emission rate (lb/hr)	BDL	0.0024	0.0018	0.0017
E	Emission rate (lb/tons of trona)	BDL	0.000015	0.000011	0.000010

BDL: indicates value was below detection limits.

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

VOLATILE ORGANIC COMPOUNDS PARAMETERS
Method 0030 collected in Sorbent Cartridges

Run No.		1	2	3	4
Date (1995)		January 11	January 11	January 11	January 11
Start Time (approx.)		10:55	12:52	14:30	15:56
Stop Time (approx.)		11:15	13:12	14:50	16:16
Operating Data					
	Trona processing rate (tons/hr)	162	162	162	162
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.984	0.984	0.984	0.984
P_b	Barometric pressure (in. Hg)	23.78	23.78	23.78	23.78
V_m	Volume metered, meter conditions (liters)	1.01	1.00	1.00	1.01
V_m	Volume metered, meter conditions (ft^3)	0.0357	0.0353	0.0353	0.0357
T_m	Dry gas meter temperature (°F)	61	61	66	62
ΔH	Meter box orifice pressure drop (in. H_2O)	0.35	1.00	0.80	0.80
Calculated Results					
V_{mstd}	Volume metered, standard (ft^3)	0.028	0.028	0.028	0.028
Flow Results					
Q_a	Volumetric flow rate, actual (acfm)	150,300	142,700	143,700	153,500
Q_{std}	Volumetric flow rate, standard (dscfm)	49,440	47,240	48,050	50,990
Chloromethane (MW=50.49)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane (MW=133.42)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
2-Butanone (MW=72.11)					
m	Matter collected (μg)	0.290	0.603	0.128	0.107
C	Concentration (lb/dscf)	2.26E-08	4.73E-08	1.02E-08	8.35E-09
C	Concentration (gr/dscf)	1.58E-04	3.31E-04	7.11E-05	5.84E-05
C	Concentration (mg/dscm)	0.36	0.76	0.16	0.13
C	Concentration (ppm)	0.12	0.25	0.054	0.045
E	Emission rate (lb/hr)	0.067	0.13	0.029	0.026
E	Emission rate (lb/tons of trona)	0.0004	0.0008	0.0002	0.0002
Idomethane (MW=141.95)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
4-Methyl-2-pentanone (MW=100.16)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
Tert-butyl methyl ether (MW=88.15)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL

BDL: indicates value was below detection limits.

Revision 0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

VOLATILE ORGANIC COMPOUNDS PARAMETERS
Method 0030 collected in Sorbent Cartridges

Run No.		1	2	3	4
Date (1995)		January 11	January 11	January 11	January 11
Start Time (approx.)		10:55	12:52	14:30	15:56
Stop Time (approx.)		11:15	13:12	14:50	16:16
Operating Data					
	Trona processing rate (tons/hr)	162	162	162	162
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.984	0.984	0.984	0.984
P_b	Barometric pressure (in. Hg)	23.78	23.78	23.78	23.78
V_m	Volume metered, meter conditions (liters)	1.01	1.00	1.00	1.01
V_m	Volume metered, meter conditions (ft^3)	0.0357	0.0353	0.0353	0.0357
T_m	Dry gas meter temperature (°F)	61	61	66	62
ΔH	Meter box orifice pressure drop (in. H_2O)	0.35	1.00	0.80	0.80
Calculated Results					
V_{mstd}	Volume metered, standard (ft^3)	0.028	0.028	0.028	0.028
Flow Results					
Q_a	Volumetric flow rate, actual (acfm)	150,300	142,700	143,700	153,500
Q_{std}	Volumetric flow rate, standard (dscfm)	49,440	47,240	48,050	50,990
Methylene chloride (MW=84.94)					
m	Matter collected (μg)	BDL	BDL	0.846	0.027
C	Concentration (lb/dscf)	BDL	BDL	6.72E-08	2.11E-09
C	Concentration (gr/dscf)	BDL	BDL	4.70E-04	1.47E-05
C	Concentration (mg/dscm)	BDL	BDL	1.08	0.034
C	Concentration (ppm)	BDL	BDL	0.30	0.010
E	Emission rate (lb/hr)	BDL	BDL	0.19	0.0064
E	Emission rate (lb/tons of trona)	BDL	BDL	0.0012	0.00004
Methyl methacrylate (MW=100.11)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
1,2-Dichloropropane (MW=112.99)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
Styrene (MW=104.14)					
m	Matter collected (μg)	0.683	1.474	0.801	0.373
C	Concentration (lb/dscf)	5.33E-08	1.16E-07	6.36E-08	2.91E-08
C	Concentration (gr/dscf)	3.73E-04	8.10E-04	4.45E-04	2.04E-04
C	Concentration (mg/dscm)	0.85	1.85	1.02	0.47
C	Concentration (ppm)	0.20	0.43	0.24	0.11
E	Emission rate (lb/hr)	0.16	0.33	0.18	0.089
E	Emission rate (lb/tons of trona)	0.0010	0.0020	0.0011	0.0005

BDL: indicates value was below detection limits.

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

VOLATILE ORGANIC COMPOUNDS PARAMETERS
Method 0030 collected in Sorbent Cartridges

Run No.		1	2	3	4
Date (1995)		January 11	January 11	January 11	January 11
Start Time (approx.)		10:55	12:52	14:30	15:56
Stop Time (approx.)		11:15	13:12	14:50	16:16
Operating Data					
	Trona processing rate (tons/hr)	162	162	162	162
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.984	0.984	0.984	0.984
P_b	Barometric pressure (in. Hg)	23.78	23.78	23.78	23.78
V_m	Volume metered, meter conditions (liters)	1.01	1.00	1.00	1.01
V_m	Volume metered, meter conditions (ft^3)	0.0357	0.0353	0.0353	0.0357
T_m	Dry gas meter temperature (°F)	61	61	66	62
ΔH	Meter box orifice pressure drop (in. H_2O)	0.35	1.00	0.80	0.80
Calculated Results					
V_{mstd}	Volume metered, standard (ft^3)	0.028	0.028	0.028	0.028
Flow Results					
Q_a	Volumetric flow rate, actual (acfm)	150,300	142,700	143,700	153,500
Q_{std}	Volumetric flow rate, standard (dscfm)	49,440	47,240	48,050	50,990
1,1,2,2-Tetrachloroethane (MW=167.86)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
Tetrachloroethene (MW=165.85)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
Toluene (MW=92.13)					
m	Matter collected (μg)	2.121	5.471	4.516	1.756
C	Concentration (lb/dscf)	1.65E-07	4.30E-07	3.59E-07	1.37E-07
C	Concentration (gr/dscf)	0.0012	0.0030	0.0025	0.0010
C	Concentration (mg/dscm)	2.65	6.88	5.74	2.19
C	Concentration (ppm)	0.69	1.80	1.50	0.57
E	Emission rate (lb/hr)	0.49	1.22	1.03	0.42
E	Emission rate (lb/tons of trona)	0.003	0.008	0.006	0.003
1,1,2-Trichloroethane (MW=133.42)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
Trichloroethene (MW=131.40)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
Isoocatane (MW=114.22)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
Vinyl acetate (MW=86.09)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL

BDL: indicates value was below detection limits.

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

VOLATILE ORGANIC COMPOUNDS PARAMETERS
Method 0030 collected in Sorbent Cartridges

Run No.		1	2	3	4
Date (1995)		January 11	January 11	January 11	January 11
Start Time (approx.)		10:55	12:52	14:30	15:56
Stop Time (approx.)		11:15	13:12	14:50	16:16
Operating Data					
	Trona processing rate (tons/hr)	162	162	162	162
Sampling Conditions					
Y_d	Dry gas meter correction factor	0.984	0.984	0.984	0.984
P_b	Barometric pressure (in. Hg)	23.78	23.78	23.78	23.78
V_m	Volume metered, meter conditions (liters)	1.01	1.00	1.00	1.01
V_m	Volume metered, meter conditions (ft^3)	0.0357	0.0353	0.0353	0.0357
T_m	Dry gas meter temperature (°F)	61	61	66	62
ΔH	Meter box orifice pressure drop (in. H_2O)	0.35	1.00	0.80	0.80
Calculated Results					
V_{mstd}	Volume metered, standard (ft^3)	0.028	0.028	0.028	0.028
Flow Results					
Q_a	Volumetric flow rate, actual (acfm)	150,300	142,700	143,700	153,500
Q_{std}	Volumetric flow rate, standard (dscfm)	49,440	47,240	48,050	50,990
Vinyl bromide (MW=106.95)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
Vinyl chloride (MW=62.50)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
1,1-Dichloroethene (MW=96.94)					
m	Matter collected (μg)	BDL	BDL	BDL	BDL
o-Xylene (MW=106.16)					
m	Matter collected (μg)	0.194	0.382	0.201	0.093
C	Concentration (lb/dscf)	1.51E-08	3.00E-08	1.60E-08	7.25E-09
C	Concentration (gr/dscf)	1.06E-04	2.10E-04	1.12E-04	5.08E-05
C	Concentration (mg/dscm)	0.24	0.48	0.26	0.12
C	Concentration (ppm)	0.055	0.109	0.058	0.026
E	Emission rate (lb/hr)	0.045	0.085	0.046	0.022
E	Emission rate (lb/tons of trona)	0.0003	0.0005	0.0003	0.0001
m-/p-Xylene (MW=106.16)					
m	Matter collected (μg)	1.482	3.513	1.638	0.735
C	Concentration (lb/dscf)	1.16E-07	2.76E-07	1.30E-07	5.73E-08
C	Concentration (gr/dscf)	8.09E-04	1.93E-03	9.10E-04	4.01E-04
C	Concentration (mg/dscm)	1.85	4.42	2.08	0.92
C	Concentration (ppm)	0.42	1.00	0.47	0.21
E	Emission rate (lb/hr)	0.34	0.78	0.37	0.18
E	Emission rate (lb/tons of trona)	0.002	0.005	0.002	0.001

BDL: indicates value was below detection limits.

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

VELOCITY AND MOISTURE PARAMETERS

Run No.		5	6	7
Date (1995)		January 12	January 12	January 12
Start Time (approx.)		09:22	10:50	12:10
Stop Time (approx.)		10:07	11:35	12:55
Operating Data				
	Trona processing rate (tons/hr)	147	147	147
Sampling Conditions				
Y_d	Dry gas meter correction factor	0.9853	0.9853	0.9853
C_p	Pitot tube coefficient	0.84	0.84	0.84
P_g	Static pressure (in. H_2O)	-0.3	-0.3	-0.3
A_s	Sample location area (ft^2)	85.90	85.90	85.90
P_{bar}	Barometric pressure (in. Hg)	23.81	23.81	23.81
O_2	Oxygen (dry volume %)	9.3	9.0	8.9
CO_2	Carbon dioxide (dry volume %)	13.0	13.4	14.0
V_{lc}	Liquid collected (ml)	276.5	258.5	261.5
V_m	Volume metered, meter conditions (ft^3)	28.88	27.71	28.78
T_m	Dry gas meter temperature (°F)	57	74	77
T_s	Sample temperature (°F)	337	331	316
ΔH	Meter box orifice pressure drop (in. H_2O)	1.12	0.96	1.03
Flow Results				
V_{wstd}	Volume of water collected (ft^3)	13.01	12.17	12.31
V_{mstd}	Volume metered, standard (ft^3)	23.18	21.55	22.25
P_s	Sample gas pressure, absolute (in. Hg)	23.79	23.79	23.79
P_v	Vapor pressure, actual (in. Hg)	23.79	23.79	23.79
B_{wo}	Moisture in sample (% by volume)	35.96	36.09	35.62
B_{ws}	Saturated moisture (% by volume)	100.00	100.00	100.00
$\sqrt{\Delta P}$	Velocity head ($\sqrt{in.}$ H_2O)	0.322	0.321	0.328
M_d	MW of sample gas, dry (lb/lb-mole)	30.45	30.50	30.60
M_s	MW of sample gas, wet (lb/lb-mole)	25.97	25.99	26.11
V_s	Velocity of sample (ft/sec)	26.3	26.0	26.3
Q_a	Volumetric flow rate, actual (acfm)	135,300	134,200	135,700
Q_{std}	Volumetric flow rate, standard (dscfm)	45,640	45,510	47,280

$\bar{X}$

35.89

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

TOTAL HYDROCARBONS PARAMETERS
Method 25A by Monitors

Run No.		5	6	7
Date (1995)		January 17	January 17	January 17
Start Time (approx.)		09:16	10:47	12:10
Stop Time (approx.)		10:15	11:46	13:09
Operating Data				
	Trona processing rate (tons/hr)	147	147	147
Gas Conditions				
O_2	Oxygen (dry volume %)	9.3	9.0	8.9
CO_2	Carbon Dioxide (dry volume %)	13.0	13.4	14.0
B_{wo}	Moisture in sample (% by volume)	36.0	36.1	35.6
Q_{std}	Volumetric flow rate, standard (dscfm)	45,640	45,510	47,280
Data Acquisition				
C	Effluent gas concentration (ppmwv)	269.1	260.4	288.9
Calibration Gases				
C_{oi}	Calibration bias check, initial zero gas	1.8	4.9	6.2
C_{mi}	Calibration bias check, initial upscale gas	551.4	550.6	546.0
C_{of}	Calibration bias check, final zero gas	4.9	6.2	8.6
C_{mf}	Calibration bias check, final upscale gas	550.6	546.0	551.9
C_{ma}	Actual concentration of upscale gas	547.5	547.5	547.5
Calculated Results				
C_{gas}	Concentration drift corrected (ppmwv)	265.7	257.1	284.6
C_{gas}	Concentration moisture corrected (ppmdv)	415.0	402.3	442.1
E	Emission rate (lb/hr)	130.0	125.7	143.5
E	Emission rate (lb/tons of trona)	0.885	0.855	0.976

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

CARBON MONOXIDE AND VOLATILE ORGANICS PARAMETERS
Samples Collected in Tedlar Bags

Run No.		5[1]	6[1]	7
Date (1995)		January 12	January 12	January 12
Start Time (approx.)		09:22	10:50	12:10
Stop Time (approx.)		10:22	11:50	13:10
Operating Data				
	Trona processing rate (tons/hr)	147	147	147
Sampling Locations				
P_{bar}	Barometric pressure (in. Hg)	23.81	23.81	23.81
V_m	Volume metered, meter conditions (liter)	17.31	17.15	18.94
V_m	Volume metered, meter conditions (ft^3)	0.61	0.61	0.67
ΔH	Meter box orifice pressure drop (in. H_2O)	1.00	1.00	1.00
Y_d	Dry gas meter correction factor	1.0145	1.0145	1.0145
T_m	Dry gas meter temperature (°F)	59	76	79
Calculated Results				
V_{mstd}	Volume metered, standard (ft^3)	0.50	0.48	0.53
Results from Velocity and Moisture Parameters				
Q_a	Volumetric flow rate, actual (acfm)	135,300	134,200	135,700
Q_{std}	Volumetric flow rate, standard (dscfm)	45,640	45,510	47,280
Carbon Monoxide (MW = 28.01)				
C	Concentration (ppmdv)	18.00	6.00	3,255.40
E	Emission rate (lb/hr)	3.58	1.19	671.35
E	Emission rate (lb/tons of trona)	0.024	0.008	4.57
Ethane (MW = 30.07)				
C	Concentration (ppmdv)	BDL	BDL	BDL
Methane (MW = 16.04)				
C	Concentration (ppmdv)	BDL	59.30	532.00
E	Emission rate (lb/hr)	BDL	6.74	62.83
E	Emission rate (lb/tons of trona)	BDL	0.046	0.427

[1] Analytical results indicate that theTedlar bags leaked.
BDL: Indicates the value was below the detection limit.

Revision 0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

VOLATILE ORGANICS PARAMETERS
M18 collected in Charcoal Tubes

Run No.		5	6	7
Date (1995)		January 12	January 12	January 12
Start Time (approx.)		09:22	10:50	12:10
Stop Time (approx.)		10:22	11:50	13:10
Operating Conditions				
	Trona processing rate (tons/hr)	147	147	147
Sampling Locations				
P_{bar}	Barometric pressure (in. Hg)	23.81	23.81	23.81
V_m	Volume metered, meter conditions (liter)	17.31	17.15	18.94
V_m	Volume metered, meter conditions (ft^3)	0.61	0.61	0.67
ΔH	Meter box orifice pressure drop (in. H_2O)	1.00	1.00	1.00
Y_d	Dry gas meter correction factor	1.0145	1.0145	1.0145
T_m	Dry gas meter temperature (°F)	59	76	79
Calculated Results				
V_{mstd}	Volume metered, standard (ft^3)	0.50	0.48	0.53
Results from Velocity and Moisture Parameters				
Q_a	Volumetric flow rate, actual (acfm)	135,300	134,200	135,700
Q_{std}	Volumetric flow rate, standard (dscfm)	45,640	45,510	47,280
1, 3 Butadiene (MW = 54.09)				
m	Matter collected (mg)	0.3029	0.3188	0.5439
C	Concentration (mg/dscm)	21.23	23.31	36.21
C	Concentration (ppmdv)	9.44	10.37	16.10
E	Emission rate (lb/hr)	3.63	3.97	6.41
E	Emisison rate (lb/tons of trona)	0.02	0.03	0.04
1-1-1 Trichloroethane (MW = 133.42)				
m	Matter collected (mg)	BDL	BDL	BDL
Acrylonitrile (MW = 53.06)				
m	Matter collected (mg)	BDL	BDL	BDL
Benzene (MW = 78.12)				
m	Matter collected (mg)	0.2650	0.2104	0.3564
C	Concentration (mg/dscm)	18.57	15.38	23.73
C	Concentration (ppmdv)	5.72	4.74	7.31
E	Emission rate (lb/hr)	3.18	2.62	4.20
E	Emission rate (lb/tons of trona)	0.02	0.02	0.03

BDL: Indicates the value was below the detection limit.

Revision 0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

VOLATILE ORGANICS PARAMETERS
M18 collected in Charcoal Tubes

Run No.		5	6	7
Date (1995)		January 12	January 12	January 12
Start Time (approx.)		09:22	10:50	12:10
Stop Time (approx.)		10:22	11:50	13:10
Operating Conditions				
	Trona processing rate (tons/hr)	147	147	147
Sampling Locations				
P_{bar}	Barometric pressure (in. Hg)	23.81	23.81	23.81
V_m	Volume metered, meter conditions (liter)	17.31	17.15	18.94
V_m	Volume metered, meter conditions (ft^3)	0.61	0.61	0.67
ΔH	Meter box orifice pressure drop (in. H_2O)	1.00	1.00	1.00
Y_d	Dry gas meter correction factor	1.0145	1.0145	1.0145
T_m	Dry gas meter temperature (°F)	59	76	79
Calculated Results				
V_{mstd}	Volume metered, standard (ft^3)	0.50	0.48	0.53
Results from Velocity and Moisture Parameters				
Q_a	Volumetric flow rate, actual (acfm)	135,300	134,200	135,700
Q_{std}	Volumetric flow rate, standard (dscfm)	45,640	45,510	47,280
Ethylbenzene (MW = 78.12)				
m	Matter collected (mg)	0.0212	0.0259	0.0447
C	Concentration (mg/dscm)	1.49	1.89	2.98
C	Concentration (ppmdv)	0.34	0.43	0.67
E	Emission rate (lb/hr)	0.25	0.32	0.53
E	Emisison rate (lb/tons of trona)	0.002	0.002	0.004
Hexane (MW = 86.18)				
m	Matter collected (mg)	0.0268	0.0240	0.0407
C	Concentration (mg/dscm)	1.88	1.75	2.71
C	Concentration (ppmdv)	0.52	0.49	0.76
E	Emission rate (lb/hr)	0.32	0.30	0.48
E	Emission rate (lb/tons of trona)	0.002	0.002	0.003
Methylene Chloride (MW - 84.94)				
m	Matter collected (mg)	0.0762	0.0493	0.0983
C	Concentration (mg/dscm)	5.34	3.60	6.54
C	Concentration (ppmdv)	1.51	1.02	1.85
E	Emission rate (lb/hr)	0.91	0.61	1.16
E	Emission rate (lb/tons of trona)	0.01	0.004	0.01

BDL: Indicates the value was below the detection limit.

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack

VOLATILE ORGANICS PARAMETERS
M18 collected in Charcoal Tubes

Run No.		5	6	7
Date (1995)		January 12	January 12	January 12
Start Time (approx.)		09:22	10:50	12:10
Stop Time (approx.)		10:22	11:50	13:10
Operating Conditions				
	Trona processing rate (tons/hr)	147	147	147
Sampling Locations				
P_{bar}	Barometric pressure (in. Hg)	23.81	23.81	23.81
V_m	Volume metered, meter conditions (liter)	17.31	17.15	18.94
V_m	Volume metered, meter conditions (ft^3)	0.61	0.61	0.67
ΔH	Meter box orifice pressure drop (in. H_2O)	1.00	1.00	1.00
Y_d	Dry gas meter correction factor	1.0145	1.0145	1.0145
T_m	Dry gas meter temperature (°F)	59	76	79
Calculated Results				
V_{mstd}	Volume metered, standard (ft^3)	0.50	0.48	0.53
Results from Velocity and Moisture Parameters				
Q_a	Volumetric flow rate, actual (acfm)	135,300	134,200	135,700
Q_{std}	Volumetric flow rate, standard (dscfm)	45,640	45,510	47,280
Styrene (MW = 84.93)				
m	Matter collected (mg)	0.0182	0.0198	0.0380
C	Concentration (mg/dscm)	1.28	1.45	2.53
C	Concentration (ppmdv)	0.36	0.41	0.72
E	Emission rate (lb/hr)	0.22	0.25	0.45
E	Emisison rate (lb/tons of trona)	0.001	0.002	0.003
Toluene (MW = 92.15)				
m	Matter collected (mg)	0.1039	0.0769	0.1540
C	Concentration (mg/dscm)	7.28	5.62	10.25
C	Concentration (ppmdv)	1.90	1.47	2.68
E	Emission rate (lb/hr)	1.24	0.96	1.82
E	Emission rate (lb/tons of trona)	0.01	0.01	0.01
Xylene (MW = 106.16)				
m	Matter collected (mg)	0.0593	0.0631	0.1080
C	Concentration (mg/dscm)	4.16	4.61	7.19
C	Concentration (ppmdv)	0.94	1.05	1.63
E	Emission rate (lb/hr)	0.71	0.79	1.27
E	Emission rate (lb/tons of trona)	0.005	0.005	0.009

BDL: Indicates the value was below the detection limit.

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 1&2 Calciner Stack

VELOCITY AND MOISTURE PARAMETERS

Run No.		1	2	3
Date (1995)		January 17	January 17	January 17
Start Time (approx.)		08:55	11:00	12:25
Stop Time (approx.)		09:40	11:45	13:05
Operating Data				
	Trona processing rate (tons/hr)	244	244	244
Sampling Conditions				
Y_d	Dry gas meter correction factor	0.9853	0.9853	0.9853
C_p	Pitot tube coefficient	0.84	0.84	0.84
P_g	Static pressure (in. H_2O)	-0.8	-0.8	-0.8
A_s	Sample location area (ft^2)	113.10	113.10	113.10
P_{bar}	Barometric pressure (in. Hg)	23.81	23.81	23.81
O_2	Oxygen (dry volume %)	14.7	14.8	14.7
CO_2	Carbon dioxide (dry volume %)	8.2	8.2	8.1
V_{lc}	Liquid collected (ml)	94.5	94.9	91.9
V_m	Volume metered, meter conditions (ft^3)	26.95	27.76	27.90
T_m	Dry gas meter temperature (°F)	44	58	62
T_s	Sample temperature (°F)	456	458	457
ΔH	Meter box orifice pressure drop (in. H_2O)	0.95	0.95	0.95
Flow Results				
V_{wstd}	Volume of water collected (ft^3)	4.45	4.47	4.33
V_{mstd}	Volume metered, standard (ft^3)	22.20	22.24	22.17
P_s	Sample gas pressure, absolute (in. Hg)	23.75	23.75	23.75
P_v	Vapor pressure, actual (in. Hg)	23.75	23.75	23.75
B_{wo}	Moisture in sample (% by volume)	16.70	16.73	16.33
B_{ws}	Saturated moisture (% by volume)	100.00	100.00	100.00
$\sqrt{\Delta P}$	Velocity head ($\sqrt{\text{in. } H_2O}$)	1.080	1.071	1.068
M_d	MW of sample gas, dry (lb/lb-mole)	29.90	29.90	29.88
M_s	MW of sample gas, wet (lb/lb-mole)	27.91	27.91	27.94
V_s	Velocity of sample (ft/sec)	91.1	90.5	90.2
Q_a	Volumetric flow rate, actual (acfm)	618,300	614,200	612,000
Q_{std}	Volumetric flow rate, standard (dscfm)	235,700	233,300	234,000

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 1&2 Calciner Stack

TOTAL HYDROCARBONS PARAMETERS
Method 25A by Monitors

Run No.		1	2	3
Date (1995)		January 17	January 17	January 17
Start Time (approx.)		08:54	10:54	12:21
Stop Time (approx.)		09:53	11:53	13:20
Operating Data				
	Trona processing rate (tons/hr)	244	244	244
Gas Conditions				
O_2	Oxygen (dry volume %)	14.7	14.8	14.7
CO_2	Carbon Dioxide (dry volume %)	8.2	8.2	8.1
B_{wo}	Moisture in sample (% by volume)	16.7	16.7	16.3
Q_{std}	Volumetric flow rate, standard (dscfm)	235,700	233,300	234,000
Data Acquisition				
C	Effluent gas concentration (ppmwv)	30.2	42.9	33.2
Calibration Gases				
C_{oi}	Calibration bias check, initial zero gas	0.3	1.0	0.9
C_{mi}	Calibration bias check, initial upscale gas	54.9	55.6	55.4
C_{of}	Calibration bias check, final zero gas	1.0	0.9	1.3
C_{mf}	Calibration bias check, final upscale gas	55.6	55.4	56.0
C_{ma}	Actual concentration of upscale gas	53.8	53.8	53.8
Calculated Results				
C_{gas}	Concentration drift corrected (ppmwv)	29.1	41.4	31.7
C_{gas}	Concentration moisture corrected (ppmdv)	35.0	49.7	37.9
E	Emission rate (lb/hr)	56.6	79.6	60.8
E	Emission rate (lb/tons of trona)	0.23	0.33	0.25

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 1&2 Calciner Stack

CARBON MONOXIDE AND VOLATILE ORGANICS PARAMETERS
Samples Collected in Tedlar Bags

Run No.		1	2	3
Date (1995)		January 17	January 17	January 17
Start Time (approx.)		08:54	10:54	12:21
Stop Time (approx.)		09:53	11:53	13:20
Operating Data				
	Trona processing rate (tons/hr)	244	244	244
Sampling Conditions				
P_{bar}	Barometric pressure (in. Hg)	23.81	23.81	23.81
V_m	Volume metered, meter conditions (liter)	17.75	17.41	16.86
V_m	Volume metered, meter conditions (ft^3)	0.63	0.61	0.60
ΔH	Meter box orifice pressure drop (in. H_2O)	1.00	1.00	1.00
Y_d	Dry gas meter correction factor	1.0145	1.0145	1.0145
T_m	Dry gas meter temperature (°F)	42	53	54
Calculated Results				
V_{mstd}	Volume metered, standard (ft^3)	0.53	0.51	0.50
Results from Velocity and Moisture Parameters				
Q_a	Volumetric flow rate, actual (acfm)	618,300	614,200	612,000
Q_{std}	Volumetric flow rate, standard (dscfm)	235,700	233,300	234,000
Carbon Monoxide (MW = 28.01)				
C	Concentration (ppmdv)	340.90	62.40	45.00
E	Emission rate (lb/hr)	350.47	63.50	45.93
E	Emisison rate (lb/tons of trona)	1.44	0.26	0.19
Ethane (MW = 30.07)				
C	Concentration (ppmdv)	BDL	BDL	BDL
Methane (MW = 16.04)				
C	Concentration (ppmdv)	6.86	8.23	3.74
E	Emission rate (lb/hr)	4.04	4.80	2.19
E	Emission rate (lb/tons of trona)	0.02	0.02	0.01

BDL: Indicates the value was below the detection limit.

Revision 0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 1&2 Calciner Stack

VOLATILE ORGANICS PARAMETERS
Method 18 collected in Charcoal Tubes

Run No.		1	2	3
Date (1995)		January 17	January 17	January 17
Start Time (approx.)		08:55	11:00	12:25
Stop Time (approx.)		09:55	12:00	13:25
Operating Data				
	Trona processing rate (tons/hour)	244	244	244
Sampling Locations				
P_{bar}	Barometric pressure (in. Hg)	23.81	23.81	23.81
V_m	Volume metered, meter conditions (liter)	17.75	17.41	16.86
V_m	Volume metered, meter conditions (ft^3)	0.63	0.61	0.60
ΔH	Meter box orifice pressure drop (in. H_2O)	1.00	1.00	1.00
Y_d	Dry gas meter correction factor	1.0145	1.0145	1.0145
T_m	Dry gas meter temperature (°F)	42	53	54
Calculated Results				
V_{mstd}	Volume metered, standard (ft^3)	0.53	0.51	0.50
Results from Velocity and Moisture Parameters				
Q_a	Volumetric flow rate, actual (acfm)	618,300	614,200	612,000
Q_{std}	Volumetric flow rate, standard (dscfm)	235,700	233,300	234,000
Styrene (MW = 84.93)				
m	Matter collected (mg)	BDL	BDL	BDL
Toluene (MW = 92.15)				
m	Matter collected (mg)	0.0170	0.0289	0.0200
C	Concentration (mg/dscm)	1.12	1.99	1.42
C	Concentration (ppmdv)	0.29	0.52	0.37
E	Emission rate (lb/hr)	0.99	1.74	1.25
E	Emission rate (lb/tons of trona)	0.004	0.007	0.005
Xylene (MW = 106.16)				
m	Matter collected (mg)	0.0253	0.0376	0.0278
C	Concentration (mg/dscm)	1.67	2.59	1.98
C	Concentration (ppmdv)	0.38	0.59	0.45
E	Emission rate (lb/hr)	1.48	2.27	1.74
E	Emission rate (lb/tons of trona)	0.006	0.009	0.007

BDL: Indicates the value was below the detection limit.

Revision 0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 1&2 Calciner Stack

VOLATILE ORGANIC COMPOUNDS PARAMETERS
Method 0030 collected in Sorbent Cartridges

Run No.		1	2	3
Date (1995)		January 17	January 17	January 17
Start Time (approx.)		08:55	11:00	12:25
Stop Time (approx.)		09:15	11:20	12:45
Operating Data				
	Trona processing rate (tons/hr)	244	244	244
Sampling Conditions				
Y_d	Dry gas meter correction factor	0.9837	0.9837	0.9837
P_b	Barometric pressure (in. Hg)	23.81	23.81	23.81
V_m	Volume metered, meter conditions (liters)	1.01	1.02	1.01
V_m	Volume metered, meter conditions (ft^3)	0.0357	0.0360	0.0357
T_m	Dry gas meter temperature (°F)	42	50	50
ΔH	Meter box orifice pressure drop (in. H_2O)	1.45	1.38	1.35
Calculated Results				
V_{mstd}	Volume metered, standard (ft^3)	0.0295	0.0293	0.0290
Flow Results				
Q_a	Volumetric flow rate, actual (acfm)	618,300	614,200	612,000
Q_{std}	Volumetric flow rate, standard (dscfm)	235,700	233,300	234,000
Acrylonitrile (MW=53.06)				
m	Matter collected (μg)	0.351	0.426	0.304
C	Concentration (lb/dscf)	2.62E-08	3.20E-08	2.31E-08
C	Concentration (gr/dscf)	1.84E-04	2.24E-04	1.62E-04
C	Concentration (mg/dscm)	0.42	0.51	0.37
C	Concentration (ppm)	0.19	0.23	0.17
E	Emission rate (lb/hr)	0.37	0.45	0.32
E	Emission rate (lb/tons of trona)	0.0015	0.0018	0.0013
Allyl chloride (MW=76.53)				
m	Matter collected (μg)	BDL	BDL	BDL
Benzene (MW=78.11)				
m	Matter collected (μg)	1.393	1.661	1.158
C	Concentration (lb/dscf)	1.04E-07	1.25E-07	8.80E-08
C	Concentration (gr/dscf)	7.28E-04	8.74E-04	6.16E-04
C	Concentration (mg/dscm)	1.67	2.00	1.41
C	Concentration (ppm)	0.51	0.62	0.43
E	Emission rate (lb/hr)	1.47	1.75	1.23
E	Emissiom rate (lb/tons of trona)	0.006	0.007	0.005
Bromoform (MW=252.77)				
m	Matter collected (μg)	BDL	BDL	BDL

BDL: Indicates that the value was below the detection limits.

Revision 0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 1&2 Calciner Stack

VOLATILE ORGANIC COMPOUNDS PARAMETERS
Method 0030 collected in Sorbent Cartridges

Run No.		1	2	3
Date (1995)		January 17	January 17	January 17
Start Time (approx.)		08:55	11:00	12:25
Stop Time (approx.)		09:15	11:20	12:45
Operating Data				
	Trona processing rate (tons/hr)	244	244	244
Sampling Conditions				
Y_d	Dry gas meter correction factor	0.9837	0.9837	0.9837
P_b	Barometric pressure (in. Hg)	23.81	23.81	23.81
V_m	Volume metered, meter conditions (liters)	1.01	1.02	1.01
V_m	Volume metered, meter conditions (ft^3)	0.0357	0.0360	0.0357
T_m	Dry gas meter temperature (°F)	42	50	50
ΔH	Meter box orifice pressure drop (in. H_2O)	1.45	1.38	1.35
Calculated Results				
V_{mstd}	Volume metered, standard (ft^3)	0.0295	0.0293	0.0290
Flow Results				
Q_a	Volumetric flow rate, actual (acfm)	618,300	614,200	612,000
Q_{std}	Volumetric flow rate, standard (dscfm)	235,700	233,300	234,000
1,2-Epoxybutane (MW=72.11)				
m	Matter collected (μg)	BDL	BDL	BDL
Dibromoethane (MW=187.88)				
m	Matter collected (μg)	BDL	BDL	BDL
1,2-Dichloroethane (MW=98.97)				
m	Matter collected (μg)	BDL	BDL	BDL
1,1-Dichloroethane (MW=98.97)				
m	Matter collected (μg)	BDL	BDL	BDL
n-Hexane (MW=86.17)				
m	Matter collected (μg)	0.194	0.269	0.148
C	Concentration (lb/dscf)	1.45E-08	2.02E-08	1.12E-08
C	Concentration (gr/dscf)	1.01E-04	1.42E-04	7.87E-05
C	Concentration (mg/dscm)	0.23	0.32	0.18
C	Concentration (ppm)	0.065	0.090	0.050
E	Emission rate (lb/hr)	0.20	0.28	0.16
E	Emission rate (lb/tons of trona)	0.0008	0.0012	0.0006

BDL: Indicates that the value was below the detection limits.

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 1&2 Calciner Stack

VOLATILE ORGANIC COMPOUNDS PARAMETERS
Method 0030 collected in Sorbent Cartridges

Run No.		1	2	3
Date (1995)		January 17	January 17	January 17
Start Time (approx.)		08:55	11:00	12:25
Stop Time (approx.)		09:15	11:20	12:45
Operating Data				
	Trona processing rate (tons/hr)	244	244	244
Sampling Conditions				
Y_d	Dry gas meter correction factor	0.9837	0.9837	0.9837
P_b	Barometric pressure (in. Hg)	23.81	23.81	23.81
V_m	Volume metered, meter conditions (liters)	1.01	1.02	1.01
V_m	Volume metered, meter conditions (ft^3)	0.0357	0.0360	0.0357
T_m	Dry gas meter temperature (°F)	42	50	50
ΔH	Meter box orifice pressure drop (in. H_2O)	1.45	1.38	1.35
Calculated Results				
V_{mstd}	Volume metered, standard (ft^3)	0.0295	0.0293	0.0290
Flow Results				
Q_a	Volumetric flow rate, actual (acfm)	618,300	614,200	612,000
Q_{std}	Volumetric flow rate, standard (dscfm)	235,700	233,300	234,000
Bromomethane (MW=94.95)				
m	Matter collected (μg)	0.009	0.008	0.006
C	Concentration (lb/dscf)	6.72E-10	6.02E-10	4.56E-10
C	Concentration (gr/dscf)	4.71E-06	4.21E-06	3.19E-06
C	Concentration (mg/dscm)	0.0108	0.0096	0.0073
C	Concentration (ppm)	0.0027	0.0024	0.0018
E	Emission rate (lb/hr)	0.010	0.008	0.006
E	Emission rate (lb/tons of trona)	0.000039	0.000035	0.000026
Chloromethane (MW=50.49)				
m	Matter collected (μg)	0.029	0.016	0.016
C	Concentration (lb/dscf)	2.17E-09	1.20E-09	1.22E-09
C	Concentration (gr/dscf)	1.52E-05	8.42E-06	8.51E-06
C	Concentration (mg/dscm)	0.035	0.019	0.019
C	Concentration (ppm)	0.0165	0.0092	0.0093
E	Emission rate (lb/hr)	0.031	0.017	0.017
E	Emission rate(lb/tons of trona)	0.00013	0.00007	0.00007
1,1,1-Trichloroethane (MW=133.42)				
m	Matter collected (μg)	BDL	BDL	BDL
2-Butanone (MW=72.11)				
m	Matter collected (μg)	0.370	0.442	0.292
C	Concentration (lb/dscf)	2.76E-08	3.32E-08	2.22E-08
C	Concentration (gr/dscf)	1.93E-04	2.33E-04	1.55E-04
C	Concentration (mg/dscm)	0.44	0.53	0.36
C	Concentration (ppm)	0.15	0.18	0.12
E	Emission rate (lb/hr)	0.39	0.47	0.31
E	Emission rate (lb/tons of trona)	0.0016	0.0019	0.0013

BDL: Indicates that the value was below the detection limits.

Revision 0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 1&2 Calciner Stack

VOLATILE ORGANIC COMPOUNDS PARAMETERS
Method 0030 collected in Sorbent Cartridges

Run No.		1	2	3
Date (1995)		January 17	January 17	January 17
Start Time (approx.)		08:55	11:00	12:25
Stop Time (approx.)		09:15	11:20	12:45
Operating Data				
	Trona processing rate (tons/hr)	244	244	244
Sampling Conditions				
Y_d	Dry gas meter correction factor	0.9837	0.9837	0.9837
P_b	Barometric pressure (in. Hg)	23.81	23.81	23.81
V_m	Volume metered, meter conditions (liters)	1.01	1.02	1.01
V_m	Volume metered, meter conditions (ft^3)	0.0357	0.0360	0.0357
T_m	Dry gas meter temperature (°F)	42	50	50
ΔH	Meter box orifice pressure drop (in. H_2O)	1.45	1.38	1.35
Calculated Results				
V_{mstd}	Volume metered, standard (ft^3)	0.0295	0.0293	0.0290
Flow Results				
Q_a	Volumetric flow rate, actual (acfm)	618,300	614,200	612,000
Q_{std}	Volumetric flow rate, standard (dscfm)	235,700	233,300	234,000
Idomethane (MW=141.95)				
m	Matter collected (μg)	BDL	BDL	BDL
4-Methyl-2-pentanone (MW=100.16)				
m	Matter collected (μg)	BDL	BDL	BDL
Tert-butyl methyl ether (MW=88.15)				
m	Matter collected (μg)	BDL	BDL	BDL
Methylene chloride (MW=84.94)				
m	Matter collected (μg)	0.105	0.093	0.028
C	Concentration (lb/dscf)	7.84E-09	6.99E-09	2.13E-09
C	Concentration (gr/dscf)	5.49E-05	4.90E-05	1.49E-05
C	Concentration (mg/dscm)	0.13	0.11	0.03
C	Concentration (ppm)	0.036	0.032	0.010
E	Emission rate (lb/hr)	0.111	0.098	0.030
E	Emission rate (lb/tons of trona)	0.00045	0.00040	0.00012
Methyl methacrylate (MW=100.11)				
m	Matter collected (μg)	BDL	BDL	BDL

BDL: Indicates that the value was below the detection limits.

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 1&2 Calciner Stack

VOLATILE ORGANIC COMPOUNDS PARAMETERS
Method 0030 collected in Sorbent Cartridges

Run No.		1	2	3
Date (1995)		January 17	January 17	January 17
Start Time (approx.)		08:55	11:00	12:25
Stop Time (approx.)		09:15	11:20	12:45
Operating Data				
	Trona processing rate (tons/hr)	244	244	244
Sampling Conditions				
Y_d	Dry gas meter correction factor	0.9837	0.9837	0.9837
P_b	Barometric pressure (in. Hg)	23.81	23.81	23.81
V_m	Volume metered, meter conditions (liters)	1.01	1.02	1.01
V_m	Volume metered, meter conditions (ft^3)	0.0357	0.0360	0.0357
T_m	Dry gas meter temperature (°F)	42	50	50
ΔH	Meter box orifice pressure drop (in. H_2O)	1.45	1.38	1.35
Calculated Results				
V_{mstd}	Volume metered, standard (ft^3)	0.0295	0.0293	0.0290
Flow Results				
Q_a	Volumetric flow rate, actual (acfm)	618,300	614,200	612,000
Q_{std}	Volumetric flow rate, standard (dscfm)	235,700	233,300	234,000
1,2-Dichloropropane (MW=112.99)				
m	Matter collected (μg)	BDL	BDL	BDL
Styrene (MW=104.14)				
m	Matter collected (μg)	0.112	0.160	0.121
C	Concentration (lb/dscf)	8.37E-09	1.20E-08	9.19E-09
C	Concentration (gr/dscf)	5.86E-05	8.42E-05	6.43E-05
C	Concentration (mg/dscm)	0.13	0.19	0.15
C	Concentration (ppm)	0.031	0.045	0.034
E	Emission rate (lb/hr)	0.12	0.17	0.13
E	Emission rate (lb/tons of trona)	0.0005	0.0007	0.0005
1,1,2,2-Tetrachloroethane (MW=167.86)				
m	Matter collected (μg)	BDL	BDL	BDL
Tetrachloroethene (MW=165.85)				
m	Matter collected (μg)	BDL	BDL	BDL

BDL: Indicates that the value was below the detection limits.

Revision 0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 1&2 Calciner Stack

VOLATILE ORGANIC COMPOUNDS PARAMETERS
Method 0030 collected in Sorbent Cartridges

Run No.		1	2	3
Date (1995)		January 17	January 17	January 17
Start Time (approx.)		08:55	11:00	12:25
Stop Time (approx.)		09:15	11:20	12:45
Operating Data				
	Trona processing rate (tons/hr)	244	244	244
Sampling Conditions				
Y_d	Dry gas meter correction factor	0.9837	0.9837	0.9837
P_b	Barometric pressure (in. Hg)	23.81	23.81	23.81
V_m	Volume metered, meter conditions (liters)	1.01	1.02	1.01
V_m	Volume metered, meter conditions (ft^3)	0.0357	0.0360	0.0357
T_m	Dry gas meter temperature (°F)	42	50	50
ΔH	Meter box orifice pressure drop (in. H_2O)	1.45	1.38	1.35
Calculated Results				
V_{mstd}	Volume metered, standard (ft^3)	0.0295	0.0293	0.0290
Flow Results				
Q_a	Volumetric flow rate, actual (acfm)	618,300	614,200	612,000
Q_{std}	Volumetric flow rate, standard (dscfm)	235,700	233,300	234,000
Toluene (MW=92.13)				
m	Matter collected (μg)	0.890	1.480	0.992
C	Concentration (lb/dscf)	6.65E-08	1.11E-07	7.53E-08
C	Concentration (gr/dscf)	4.65E-04	7.79E-04	5.27E-04
C	Concentration (mg/dscm)	1.06	1.78	1.21
C	Concentration (ppm)	0.28	0.47	0.32
E	Emission rate (lb/hr)	0.94	1.56	1.06
E	Emission rate (lb/tons of trona)	0.0039	0.0064	0.0043
1,1,2-Trichloroethane (MW=133.42)				
m	Matter collected (μg)	BDL	BDL	BDL
Trichloroethene (MW=131.40)				
m	Matter collected (μg)	BDL	BDL	BDL
Isoocatane (MW=114.22)				
m	Matter collected (μg)	BDL	BDL	BDL
Vinyl acetate (MW=86.09)				
m	Matter collected (μg)	BDL	BDL	BDL
Vinyl bromide (MW=106.95)				
m	Matter collected (μg)	BDL	BDL	BDL
Vinyl chloride (MW=62.50)				
m	Matter collected (μg)	BDL	BDL	BDL

BDL: Indicates that the value was below the detection limits.

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 1&2 Calciner Stack

VOLATILE ORGANIC COMPOUNDS PARAMETERS
Method 0030 collected in Sorbent Cartridges

Run No.		1	2	3
Date (1995)		January 17	January 17	January 17
Start Time (approx.)		08:55	11:00	12:25
Stop Time (approx.)		09:15	11:20	12:45
Operating Data				
	Trona processing rate (tons/hr)	244	244	244
Sampling Conditions				
Y_d	Dry gas meter correction factor	0.9837	0.9837	0.9837
P_b	Barometric pressure (in. Hg)	23.81	23.81	23.81
V_m	Volume metered, meter conditions (liters)	1.01	1.02	1.01
V_m	Volume metered, meter conditions (ft^3)	0.0357	0.0360	0.0357
T_m	Dry gas meter temperature (°F)	42	50	50
ΔH	Meter box orifice pressure drop (in. H_2O)	1.45	1.38	1.35
Calculated Results				
V_{mstd}	Volume metered, standard (ft^3)	0.0295	0.0293	0.0290
Flow Results				
Q_a	Volumetric flow rate, actual (acfm)	618,300	614,200	612,000
Q_{std}	Volumetric flow rate, standard (dscfm)	235,700	233,300	234,000
1,1-Dichloroethene (MW=96.94)				
m	Matter collected (μg)	BDL	BDL	BDL
o-Xylene (MW=106.16)				
m	Matter collected (μg)	0.043	0.062	0.048
C	Concentration (lb/dscf)	3.21E-09	4.66E-09	3.65E-09
C	Concentration (gr/dscf)	2.25E-05	3.26E-05	2.55E-05
C	Concentration (mg/dscm)	0.051	0.075	0.058
C	Concentration (ppm)	0.012	0.017	0.013
E	Emission rate (lb/hr)	0.045	0.065	0.051
E	Emission rate (lb/tons of trona)	0.00019	0.00027	0.00021
m-/p-Xylene (MW=106.16)				
m	Matter collected (μg)	0.708	1.139	0.792
C	Concentration (lb/dscf)	5.29E-08	8.57E-08	6.02E-08
C	Concentration (gr/dscf)	3.70E-04	6.00E-04	4.21E-04
C	Concentration (mg/dscm)	0.85	1.37	0.96
C	Concentration (ppm)	0.19	0.31	0.22
E	Emission rate (lb/hr)	0.75	1.20	0.84
E	Emission rate (lb/tons of trona)	0.0031	0.0049	0.0035

BDL: Indicates that the value was below the detection limits.

Revision 0

CALIBRATION DATA

C

Reference Method
Sampling System

Client: SOLVAY MINERALS
Plant: SODA ASH
Unit: EP5, EP 1/2, CRUSHER
Location: STACKS
Run #'s:

Job #: 7356-1
Operator: J.K.
Date: 1/10/95 - 1/18/95
Data Acquisition: Chart / ✓ Computer
File Names: C:\JOBS\SOLVAY

Instrumentation Data for Reference Method:

#	Constituent	Manufacturer	Serial/Asset#	Range Used	Oper. Principle	Units Reported
1	THC	JUM	2870	0-1000, 0-100	FID	ppm(WET)
2						
3						
4						
5						
6						

Reference Method System Performance Checks:

System Leak Check Passed: ✓✓✓
Calibration Error Check Passed: ✓✓✓

System Response Time:
EP-5 - 1:05
EP-12 - 1:10
CRUSHER - 0:45

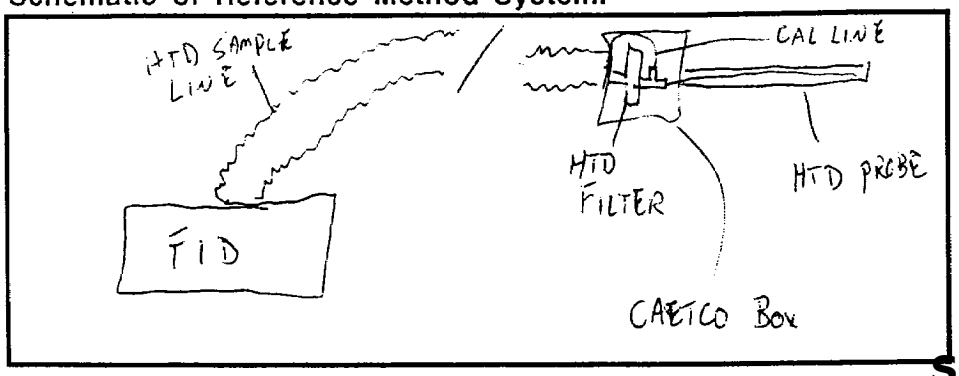
RATA: Yes (No) (circle one)
If yes, circle the units the RATA is based on, and include DS 077 to describe the facility's CEM system.

Calibration Materials Data:

#	Constituent	Concentration	Cylinder ID	Protocol?
	PROPANE	25.28	ALM016896	(YES) / NO
2	↓	53.80	ALM018463	(YES) / NO
3	↓	84.91	ALM023260	(YES) / NO
4	↓	849.6	ALM005524	(YES) / NO
5	↓	547.5	AAL4614	(YES) / NO
6	↓	250.1	ALM047523	(YES) / NO
7	Ø AIR	Ø	IL2381	YES / (NO)
8				YES / NO
9				YES / NO
10				YES / NO
11				YES / NO
12				YES / NO
13				YES / NO
14				YES / NO

Comments:

Schematic of Reference Method System:



DS 076 RM CEM System
EXCL/TRG.R1-2/4/94

Clean Air Engineering

Scott Specialty Gases, Inc.

1290 COMBERMERE STREET, TROY, MI 48083 (313) 589-2950 FAX: (313) 589-2134

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
C A E INSTRUMENT RENTAL
246 WOODWORK LANE
PALATINE IL 60067-9760

Assay Laboratory
Scott Specialty Gases, Inc.
1290 Combermere
Troy, MI 48083

Purchase Order 10367-71500
Scott Project # 560647

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol 1 Procedure #G1, Section Number 3.0.4

Cylinder Number ALM016896
Cylinder Pressure 1900 psig
Certification Date 1-21-94
Previous Certification Dates None
Expiration Date 1-21-97

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Propane	**25.28 ppm**	**±1% NIST Directly Traceable**

Balance Gas: Nitrogen

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
SRM 2643A	10-14-95	SX-20305	99.12 ppm Propane in N_2

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
Prop: Beckman/400/1002059	1-8-94	Flame Ionization Detector

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve
Propane	Date: 1-21-94 Response Units: mv Z1=0.00 R1=99.10 T1=25.30 R2=99.10 Z2=0.00 T2=25.30 Z3=0.00 T3=25.30 R3=99.10 Avg. Conc. of Cust. Cyl. 25.28 ppm		Concentration=A+Bx+Cx^2+Dx^3+Ex^4 r=0.99999 SRM 2643A Constants: A=-0.03442105 B=1.000549 C=0 D=0 E=0
			Concentration=A+Bx+Cx^2+Dx^3+Ex^4
			Concentration=A+Bx+Cx^2+Dx^3+Ex^4

Special Notes

Analyst Frank P. Doran

SOLVAY2016_6_000093

Scott Specialty Gases, Inc.

1290 COMBERMERE STREET, TROY, MI 48083 (313) 589-2950 FAX: (313) 589-2134

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
C A E INSTRUMENT RENTAL
246 WOODWORK LANE
PALATINE, IL 60067-9760

Assay Laboratory
Scott Specialty Gases, Inc.
1290 Combermere
Troy, MI 48083

Purchase Order 10084-71500
Scott Project # 559258

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol 1 Procedure #G1, Section Number 3.0.4

Cylinder Number ALM018463
Cylinder Pressure 1900 psig
Certification Date 12-6-93
Previous Certification Dates None
Expiration Date 12-6-96

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Propane	53.80 ppm	±1% NIST Directly Traceable

Balance Gas: Nitrogen

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
SRM 2643A	10-14-95	SX-20305	99.12 ppm Propane in N_2

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
Prop: Beckman/400/1002059	11-15-93	Flame Ionization Detector

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve
Propane	Date: 12-6-93 Response Units: mv Z1=0.00 R1=99.10 T1=53.80 R2=99.10 Z2=0.00 T2=53.80 Z3=0.00 T3=53.80 R3=99.10 Avg. Conc. of Cust. Cyl. 53.80 ppm		Concentration=$A+Bx+Cx^2+Dx^3+Ex^4$ r=0.99999 SRM 2643A Constants: A=-0.03442105 B=1.000549 C=0 D=0 E=0
			Concentration=$A+Bx+Cx^2+Dx^3+Ex^4$
			Concentration=$A+Bx+Cx^2+Dx^3+Ex^4$

Special Notes

Analyst Frank P. Doran

SOLVAY2016_6_000094

Scott Specialty Gases, Inc.

1290 COMBERMERE STREET, TROY, MI 48083 (810) 589-2950 FAX:(810) 589-2134

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
C A E INSTRUMENT RENTAL
246 WOODWORK LANE
PALATINE, IL 60067

Assay Laboratory
Scott Specialty Gases, Inc
1290 Combermere
Troy, MI 48083

Purchase Order : 12021-71500
Scott Project # : 570587

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards; Procedure G1; September, 1993.

Cylinder Number : ALM005524
Cylinder Pressure + : 1900 psig
Certificate Date : 9/7/94
Previous Certificate Date : None
Expiration Date : 9/7/97

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Propane	849.6 ppm	±1% NIST Directly Traceable

Balance Gas: Nitrogen

+Do not use when cylinder presssure is below 150 psig.
*Analytical accuracy is inclusive of usual known error sources which at least include precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM 2646	10/14/95	AAL18426	973.2 ppm Propane in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
Propane : Beckman/400/1002059	8/15/94	Flame Ionization Detection

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components
Propane

First Triad Analysis

Date: 9/7/94	Response Units: mv	
Z1=0.00	R1=97.30	T1=85.00
R2=97.30	Z2=0.00	T2=84.90
Z3=0.00	T3=84.90	R3=97.30
Avg. Conc. of Cust. Cyl. 849.6 ppm		

Second Triad Analysis

Calibration Curve

Concentration=A+Bx+Cx^2+Dx^3+Ex^4	
r=1.00000	NTRM 2646
Constants:	A=0.049241000
B=10.002000000	C=0.000000000
D=0.000000000	E=0.000000000

Special Notes

Matt Bass
Analyst

SOLVAY2016_6_000095

MISP/P-1

Scott Specialty Gases, Inc.

1290 COMBERMERE STREET, TROY, MI 48083 (313) 589-2950 FAX: (313) 589-2134

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
C A E INSTRUMENT RENTAL
246 WOODWORK LANE
PALATINE IL 60067-9760

Assay Laboratory
Scott Specialty Gases, Inc.
1290 Combermere
Troy, MI 48083

Purchase Order 10367-71500
Scott Project # 560647

ANALYTICAL INFORMATION

Certified to exceed the minimum specifications of EPA Protocol 1 Procedure #G1, Section Number 3.0.4

Cylinder Number AAL4514
Cylinder Pressure 1900 psig

Certification Date 1-26-94
Previous Certification Dates None

Expiration Date 1-26-97

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Propane	547.5 ppm	±1% NIST Directly Traceable

Balance Gas: Nitrogen

*Analytical uncertainty is inclusive of usual known error sources which at least includes reference standard error & precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
CRM 2646	12-31-93	AAL-18432	973.2 ppm Propane in N_2

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
Prop: Beckman/400/1002059	1-6-94	Flame Ionization Detector

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve
Propane	Date: 1-26-94 Response Units: mv Z1=0.00 R1=96.40 T1=54.20 R2=96.40 Z2=0.00 T2=54.20 Z3=0.00 T3=54.20 R3=96.40 Avg. Conc. of Cust. Cyl. 547.5 ppm		Concentration=A+Bx+Cx^2+Dx^3+Ex^4 r=0.99999 CRM 2646 Constants: A=0.7421058 B=10.10758 C=0 D=0 E=0
			Concentration=A+Bx+Cx^2+Dx^3+Ex^4
			Concentration=A+Bx+Cx^2+Dx^3+Ex^4

Special Notes

SOLVAY2016_6_000096

Analyst Frank P. Doran

Scott Specialty Gases, Inc.

1290 COMBERMERE STREET, TROY, MI 48083 (810) 589-2950 FAX:(810) 589-2134

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
C A E INSTRUMENT RENTAL
246 WOODWORK LANE
PALATINE, IL 60067

Assay Laboratory
Scott Specialty Gases, Inc
1290 Combermere
Troy, MI 48083

Purchase Order : 11785-71500
Scott Project # : 569024

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay and Certification of Gaseous Calibration Standards; Procedure G1; September, 1993.

Cylinder Number : ALM047523
Cylinder Pressure + : 1900 psig
Certificate Date : 8/8/94
Previous Certificate Date : None
Expiration Date : 8/8/97

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Propane	250.1 ppm	±1% NIST Directly Traceable

Balance Gas: Nitrogen

+Do not use when cylinder presssure is below 150 psig.
*Analytical accuracy is inclusive of usual known error sources which at least include precision of the measurement processes.

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM 2646	10/14/95	AAL18426	973.2 ppm Propane in Nitrogen

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
Beckman/400/1002059	8/4/94	Flame Ionization Detection

ANALYZER READINGS (Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

Components
Propane

First Triad Analysis

Date: 8/8/94	Response Units: mv	
Z1=0.00	R1=97.30	T1=25.00
R2=97.30	Z2=0.00	T2=25.00
Z3=0.00	T3=25.00	R3=97.30
Avg. Conc. of Cust. Cyl. 250.1 ppm		

Second Triad Analysis

Calibration Curve

Concentration=A+Bx+Cx^2+Dx^3+Ex^4	
r=1.00000	NTRM 2646
Constants:	A=0.049241000
B=10.002000000	C=0.000000000
D=0.000000000	E=0.000000000

Special Notes

Don Eichler Jr
Analyst

SOLVAY2016_6_000097

MISP/P-1

Scott Specialty Gases

Scott Environmental Technology, Inc.

1290 COMBERMERE STREET, TROY, MICHIGAN 48084 (313) 589-2950

Shipped From : Scott Michigan

Our Project # : 527476

Your P.O. # : 3114-71500

Expiration Date : 2-27-93

Cylinder Number : ALM-023260

Cylinder Pressure 1900 psig

ustomer :
C A E INSTRUMENT RENTAL
246 WOODWORK LANE
PALATINE, IL. 60067

**** CERTIFICATE OF ANALYSIS - EPA PROTOCOL GASES ****
PERFORMED ACCORDING TO SECTION 3.0.4

Certified Per Traceability Protocol # 1 — Procedure # 81

File # PO-1141

Certified Accuracy 1 % NBS Traceable

ANALYZED CYLINDER		REFERENCE STD			INSTRUMENTATION		
COMPONENT	CERTIFIED CONC.	SRM # (CRM #)	CYLINDER NUMBER	CONC.	INSTR/MODEL/SERIAL #	LAST CALIBRATION DATE	ANALYTICAL PRINCIPLE
ROPANE	251.4 PPM	2645A	FF-26816	498.5 PPM	BECKMAN	8-14-91	FLAME IONIZATION DETECTOR
		GMIS*	A-10236	189.2 PPM	400		
					1002059		

ALANCE GAS : NITROGEN

ANALYSIS — DATE : 8-27-91

ZERO GAS (mV)	TEST GAS (mV)	RESULTS PPM	REFERENCE GAS CONC.	REFERENCE GAS (mV)	RESULTS PPM
.00	50.50	251.4	498.5 PPM	100.00	498.5
.00	50.50	251.4		100.00	498.5
.00	50.50	251.4		100.00	498.5
	CALCULATED	251.4			
	RESULTS	251.4			
		251.4			
	AVERAGE :	251.4 PPM			

CALIBRATION CURVE 1 st DEGREE

SRM # (CRM #)	CONC. PPM	SPLIT PT (%)	DVM (mV)	FITTED VALUE	PERCENT ERROR
2645A	498.5	100	100.00	498.5	-0.00
	189.2	38	38.20	189.9	0.40
	100.0	20	20.30	100.6	0.58
2643	98.54	20	19.90	98.58	0.04
	0.0000	0	0.00	0.0000	0.00
		0		0.0000	0.00
		0		0.00	0.00
2643	98.54	LOW	19.90	98.58	0.04
2645A	498.5	HIGH	100.00	498.5	-0.00

SOLVAY2016_6_000098

* GMIS - GAS MANUFACTURER'S INTERNAL STANDARD

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

Analyst : [signature] Approved By : [signature]

Meter Box Full Test Calibration

ate: 10.6.94

Operator: M. KUBERA

eter Box No.: 66-13	Meter Box ΔH@: 1.8063	Meter Box Yd: 0.9853	Barometric Pressure: 29.36

				Standard Meter Gas Volume			Meter Box Gas Volume (ft^3)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)					
Q	ΔH	ΔP	Y_{ds}	Initial	Final	V_{ds} Net	Initial	Final	V_d Net	In	Out	T_{ds} Ave.	In	T_o Out	T_d Ave.	Θ Time	Y_d	ΔH@
4	3.0	-4.1	1.0000	0	13.54	13.54	514.755	528.513	13.758	70	70	70	87	78	83	14.05	0.9904	1.8324
4	3.0	-4.1	1.0000	0	10.38	10.38	528.513	539.108	10.595	70	70	70	89	80	85	10.77	0.9896	1.8253
59	0.5	-2.0	1.0000	0	5.00	5.00	547.108	552.285	5.177	70	70	70	86	82	84	12.45	0.9851	1.7456
59	0.5	-2.0	1.0000	0	5.00	5.00	557.486	562.674	5.188	70	70	70	88	82	85	12.46	0.9848	1.7484
66	1.5	-2.8	1.0000	0	10.05	10.05	564.514	574.969	10.455	70	70	70	90	83	87	14.84	0.9814	1.8382
65	1.5	-2.8	1.0000	0	10.884	10.884	574.969	586.299	11.33	70	70	70	90	83	87	16.12	0.9808	1.8480
																Average	0.9853	1.8063

Nomenclature

- Barometric Pressure (in. Hg)
- Flow Rate (cfm)
- H Orifice Pressure Differential (in. H_20)
- Inlet Pressure Differential (in. H_20)
- Gas Meter Volume - Dry (ft^3)
- ds Standard Meter Volume - Dry (ft^3)
- Average Meter Box Temperature (°F)
- Outlet Meter Box Temperature (°F)
- ds Average Standard Meter Temperature (°F)
- Meter Correction Factor (unitless)
- ds Standard Meter Correction Factor (unitless)
- H@ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H_20)

Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d + 460}{T_{ds} + 460}\right]\left[\frac{P_b + \Delta P / 13.6}{P_b + \Delta H / 13.6}\right]$$

$$\Delta H@ = \frac{0.0319(\Delta H)}{P_b(T_o + 460)}\left[\frac{(T_{ds} + 460)\,\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64\ (V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$$

Calibrations

Vacuum Gauge		Thermometers		
Standard (in. Hg)	Vacuum Gauge	Standard (°F)	Inlet	Outlet
5.4	5			
10.4	10			
15.5	15			
20	20			
25	25			
26.4	27			

SOLVAY2016_6_000099

Pyrometer Calibration Sheet

Pyrometer No.: 66-13

Office: Pontotoc

Calibrated by: MK

Client:

Date: 10·6·94

Job or Ref No.:

Temperature Scale Used: ☑ Fahrenheit ☐ Celsius

Full Test ☑ Post Test ☐

Calibration Reference Settings for Fahrenheit Scale	Pyrometer Reading	Calibration Reference Settings for Celsius Scale
50 °F	50	25 °C
100 °F	100	50 °C
150 °F	150	75 °C
200 °F	201	100 °C
250 °F	251	125 °C
300 °F	300	150 °C
350 °F	350	175 °C
400 °F	400	200 °C
450 °F	449	225 °C
500 °F	499	250 °C
550 °F	550	275 °C
600 °F	600	300 °C

Calibration Reference Information

Reference Used: TEGAM

Digimite/Other

Serial No.: T-87859

Calibrated By: METROLOGY CO.

Date Calibrated: 5·25·93

Calibration Report No.: R 022976

SOLVAY2016_6_000100

Meter Box Critical Orifice
Post Test Data Sheet

CAE Project No. 7356-1

Location SOLVAY

Date 1/20/95

Meter #~~61~~ - 66-13

Meter Yd 0.9853

Meter ΔH@ 1.8063

Full Test Cal. Date 10/4/94

Critical Orifice Cal. Date 8/20/94

Pbar 25.03

Orifice Used 0.552

Volume	Elapsed Time	Tmi	Tmo	Tamb	ΔH	Vacuum
897.30	*********	77	72	*********	*********	*********
900.83	5	77	72	77	1.2	8
904.35	10	77	72	77	1.2	8
907.88	15	77	72	77	1.2	8
10.58		74.5		77		

Calibrated by Ron M. Lukan

$$K' = \frac{(17.64)(10.58)(0.9853)(25.03 + 1.2/13.6)(\sqrt{460+77})}{(25.03)(460+74.5)(15)}$$

$$\frac{107028.24}{200678.03}$$

0.533

CS 005 Critical Orifice
EXCL/D61.R1-2/9/94

Clean Air Engineering

SOLVAY2010_6_000101

Meter Box Full Test Calibration

ate: 10-14-94 Operator: M. KUBERA

eter Box No.: 71-V7	Meter Box ΔH@:	Meter Box Yd: 1.0145	Barometric Pressure: 29.35

				Standard Meter Gas Volume			Meter Box Gas Volume (ft^3)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)					
Q	ΔH	ΔP	Y_{ds}	Initial	Final	V_{ds} Net	Initial	Final	V_d Net	In	Out	T_{ds} Ave.	In	T_o Out	T_d Ave.	Θ Time	Y_d	ΔH@
32	1.8	-1.4	1.0000	0	1.00	1.00	0	28.41	1.0033	72	72	72	87	87	87	29.62	1.0166	—
32	1.8	-1.4	1.0000	0	1.00	1.00	0	28.53	1.0075	72	72	72	88	88	88	29.63	1.0142	—
32	1.8	-1.4	1.0000	0	1.02	1.02	0	29.19	1.0308	72	72	72	89	89	89	30.25	1.0129	—
																Average	1.0145	—

Nomenclature

o	Barometric Pressure (in. Hg)
	Flow Rate (cfm)
H	Orifice Pressure Differential (in. H_20)
P	Inlet Pressure Differential (in. H_20)
d	Gas Meter Volume - Dry (ft^3)
ds	Standard Meter Volume - Dry (ft^3)
d	Average Meter Box Temperature (°F)
o	Outlet Meter Box Temperature (°F)
ds	Average Standard Meter Temperature (°F)
d	Meter Correction Factor (unitless)
ds	Standard Meter Correction Factor (unitless)
H@	Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H_20)

Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d + 460}{T_{ds} + 460}\right]\left[\frac{P_b + \Delta P / 13.6}{P_b + \Delta H / 13.6}\right]$$

$$\Delta H@ = \frac{0.0319(\Delta H)}{P_b(T_o + 460)}\left[\frac{(T_{ds} + 460)\,\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64\,(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$$

Calibrations

Vacuum Gauge

Standard (in. Hg)	Vacuum Gauge
5.2	5
10.3	10
15.5	15
20.3	20
24.3	24

Thermometers

Standard (°F)	Inlet	Outlet

SOLVAY2016_6_0001102

Pyrometer Calibration Sheet

Pyrometer No.: 71-V7

Office: RENTALS

Calibrated by: Ron

Client:

Date: 12-28-94

Job or Ref No.:

Temperature Scale Used: ☑ Fahrenheit ☐ Celsius

Pre-Test ☑ Post-Test ☐

Calibration Reference Settings for Fahrenheit Scale	Pyrometer Reading	Calibration Reference Settings for Celsius Scale
50 °F	50°	25 °C
100 °F	100°	50 °C
150 °F	150°	75 °C
200 °F	201°	100 °C
250 °F	251°	125 °C
300 °F	301°	150 °C
350 °F	351°	175 °C
400 °F	400°	200 °C
450 °F	450°	225 °C
500 °F	499°	250 °C
550 °F	550°	275 °C
600 °F	601°	300 °C

Calibration Reference Information

Reference Used: TEGAM 840 Digimite/Other

Serial No.: T-87859

Calibrated By: J.H. METEROLOGY

Date Calibrated: 5-19-94

Calibration Report No.: R022976

Meter Box Post Test Calibration

Client/Owner: SOLVAY MINERALS

Date: 1/20/95

Project Number: 7356-1

Operator: RON M. LUIKAART

Meter Box No.: 71-V7	Meter Box Vacuum: 1	Meter Box Yd: 1.0145	Barometric Pressure: 24.96

				Standard Meter Gas Volume			Meter Box Gas Volume (ft^3)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)					
Q	ΔH	ΔP	Y_{ds}	Initial	Final	V_{ds} Net	Initial	Final	V_d Net	In	Out	T_{ds} Ave.	In	T_o Out	T_d Ave.	Θ Time	Y_d	ΔH@
.028	1.8	-.6	1.0000	0	1.110	1.110	832.560	865.150	1.151	69	69	69	85	85	85	32.55	0.9866	N/A
.028	1.8	-.6	1.0000	0	1.052	1.052	865.150	896.160	1.095	67	67	67	85	85	85	30.88	0.9866	N/A
.028	1.8	-.8	1.0000	0	1.074	1.074	896.160	927.820	1.118	67	67	67	85	85	85	32.00	0.9859	N/A
																Average	0.9864	

Nomenclature	
P_b	Barometric Pressure (in. Hg)
Q	Flow Rate (cfm)
ΔH	Orifice Pressure Differential (in. H_20)
ΔP	Inlet Pressure Differential (in. H_20)
V_d	Gas Meter Volume - Dry (ft^3)
V_{ds}	Standard Meter Volume - Dry (ft^3)
T_d	Average Meter Box Temperature (°F)
T_o	Outlet Meter Box Temperature (°F)
T_{ds}	Average Standard Meter Temperature (°F)
Y_d	Meter Correction Factor (unitless)
Y_{ds}	Standard Meter Correction Factor (unitless)
ΔH@	Orifice Pressure Differential giving 0.75 cfm of air at 70°F and 29.92 in. Hg (in. H_20)

Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d + 460}{T_{ds} + 460}\right]\left[\frac{P_b + \Delta P / 13.6}{P_b + \Delta H / 13.6}\right]$$

$$\Delta H@ = \frac{0.0317\,(\Delta H)}{P_b\,(T_o + 460)}\left[\frac{(T_{ds} + 460)\,\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64\,(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$$

Post Test Meter Calibration
CS 002-10/CNVS/TRG-8/1/93

SOLVAY2016_6_000104

Meter Box Full Test Calibration

Date: 8.12.94 Operator: M. KUBERA

Meter Box No.: 71-V12	Meter Box ΔH@: –	Meter Box Yd: 0.9837	Barometric Pressure: 29.45

				Standard Meter Gas Volume			Meter Box Gas Volume (ft^3)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)					
Q	ΔH	ΔP	Y_{ds}	Initial	Final	V_{ds} Net	Initial	Final	V_d Net	In	Out	T_{ds} Ave.	In	T_o Out	T_d Ave.	Θ Time	Y_d	ΔH@
.030	2.0	-1.2	1.0000	0	1.00	1.00	0	29.2	1.0329	76	76	76	90	90	90	31.37	0.9855	–
.029	2.0	-1.2	1.0000	0	1.00	1.00	0	29.35	1.0365	76	76	76	91	91	91	32.5	0.9839	–
.029	2.0	-1.2	1.0000	0	1.00	1.00	0	29.52	1.0425	76	76	76	93	93	93	33.21	0.9817	–
																Average	0.9837	–

Nomenclature

- P_b Barometric Pressure (in. Hg)
- Q Flow Rate (cfm)
- ΔH Orifice Pressure Differential (in. H_20)
- ΔP Inlet Pressure Differential (in. H_20)
- V_d Gas Meter Volume - Dry (ft^3)
- V_{ds} Standard Meter Volume - Dry (ft^3)
- T_d Average Meter Box Temperature (°F)
- T_o Outlet Meter Box Temperature (°F)
- T_{ds} Average Standard Meter Temperature (°F)
- Y_d Meter Correction Factor (unitless)
- Y_{ds} Standard Meter Correction Factor (unitless)
- ΔH@ Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H_20)

Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d + 460}{T_{ds} + 460}\right]\left[\frac{P_b + \Delta P / 13.6}{P_b + \Delta H / 13.6}\right]$$

$$\Delta H@ = \frac{0.0319(\Delta H)}{P_b(T_o + 460)}\left[\frac{(T_{ds} + 460)\,\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64\ (V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$$

Calibrations

Vacuum Gauge		Thermometers		
Standard (in. Hg)	Vacuum Gauge	Standard (°F)	Inlet	Outlet
5.4	5			
10.4	10			
15.3	15			
19.4	20			
24.3	25			

SOLVAY2016_6_000105

Pyrometer Calibration Sheet

Pyrometer No.: 71-V12

Office: RENTALS

Calibrated by: [illegible]

Client:

Date: 1-3-95

Job or Ref No.:

Temperature Scale Used: ☑ Fahrenheit ☐ Celsius

Pre-Test ☑ Post-Test ☐

Calibration Reference Settings for Fahrenheit Scale	Pyrometer Reading	Calibration Reference Settings for Celsius Scale
50 °F	50°	25 °C
100 °F	99°	50 °C
150 °F	150°	75 °C
200 °F	200°	100 °C
250 °F	251°	125 °C
300 °F	301°	150 °C
350 °F	350°	175 °C
400 °F	399°	200 °C
450 °F	448°	225 °C
500 °F	498°	250 °C
550 °F	549°	275 °C
600 °F	599°	300 °C

Calibration Reference Information

Reference Used: TEGAM 840 Serial No.: T-87859

Digimite (Other)

Calibrated By: J.H. METEROLOGY Date Calibrated: 5-19-94

Calibration Report No.: R022976

Meter Box Post Test Calibration

Client/Owner: SOLVAY MINERALS

Date: 1/20/95

Project Number: 7356-1

Operator: RON M. LUITAART

Meter Box No.: 71-V12	Meter Box Vacuum: 1	Meter Box Yd: 0.9837	Barometric Pressure: 24.96

				Standard Meter Gas Volume			Meter Box Gas Volume (ft^3)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)					
Q	ΔH	ΔP	Y_{ds}	Initial	Final	V_{ds} Net	Initial	Final	V_d Net	In	Out	T_{ds} Ave.	In	T_o Out	T_d Ave.	Θ Time	Y_d	ΔH@
.024	1.8	-.8	1.0000	0	1.030	1.030	0	1.052	1.052	67	67	67	86	86	86	3555	1.0067	N/A
.025	1.8	-.8	1.0000	0	1.000	1.000	0	1.024	1.024	66	66	66	86	86	86	3400	1.0060	N/A
.025	1.8	-.8	1.0000	0	1.017	1.017	0	1.038	1.038	66	66	66	85	85	85	3475	1.0074	N/A
																Average	1.0067	

Nomenclature	
P_b	Barometric Pressure (in. Hg)
Q	Flow Rate (cfm)
ΔH	Orifice Pressure Differential (in. H_2O)
ΔP	Inlet Pressure Differential (in. H_2O)
V_d	Gas Meter Volume - Dry (ft^3)
V_{ds}	Standard Meter Volume - Dry (ft^3)
T_d	Average Meter Box Temperature (°F)
T_o	Outlet Meter Box Temperature (°F)
T_{ds}	Average Standard Meter Temperature (°F)
Y_d	Meter Correction Factor (unitless)
Y_{ds}	Standard Meter Correction Factor (unitless)
ΔH@	Orifice Pressure Differential giving 0.75 cfm of air at 70°F and 29.92 in. Hg (in. H_2O)

Equations

$$Y_d = (Y_{ds})\left[\frac{V_{ds}}{V_d}\right]\left[\frac{T_d + 460}{T_{ds} + 460}\right]\left[\frac{P_b + \Delta P / 13.6}{P_b + \Delta H / 13.6}\right]$$

$$\Delta H@ = \frac{0.0317\,(\Delta H)}{P_b\,(T_o + 460)}\left[\frac{(T_{ds} + 460)\,\Theta}{(V_{ds})(Y_{ds})}\right]^2$$

$$Q = \frac{17.64\,(V_{ds})(P_b)}{(T_{ds} + 460)(\Theta)}$$

SOLVAY2016_6_000107

SAMPLE PROBE CALIBRATION DATA

Probe Type & I.D. number: 8' S-TYPE PITOT 12/8/94-2

D. CHIOVARE 1-5-95

Thermocouple Calibration

Reference Type: _____ Reference I.D. No: _____ Pyrometer I.D. No: _____ Degrees: F / C

Point No.	Target Temp.	Reference Temp	Indicated Temp	Temp Difference	% Difference
1	ice-32F				
2	ambient-70F				
3	hot oil-150F				
4	boiling H2O-212F				
5	hot oil-320F				

Specification: %Difference ≤ 1.5

Does assembly meet specifications? YES / NO → If "NO" thermocouple must be replaced.

Geometric Pitot Calibration *diagrams on reverse*

Is pitot assembly in good repair? YES / NO If "NO" explain: _____

[X] "S" Pitot

Measurement		Specification
α1= 0	α2= 0	<10°
β1= 0	β2= 0	<5°
γ= 2	θ= 0	
Pa= .348	Pb= .348	Pa + Pb = A
A= .696	Dt= .250	

Calculations

z = A sin(γ) =	.0242	<0.125"
w = A sin(θ) =	0	<0.03125"

Does assembly meet specifications? YES / NO → *If "NO" wind tunnel calibration is required.*

[ ] Standard Pitot

Measurement		Specification
Tube O.D.	"	(D)
Static Hole I.D.	"	(D X 0.1)
Length,		
Tip to Static	"	(6 X D Minimum)
Static to Bend	"	(8 X D Minimum)

Does assembly meet specifications? YES / NO

If "YES" "S" pitot Cp=0.84: Std pitot Cp=0.99

Wind Tunnel Pitot Calibration

Reference Pitot I.D. No: _____ Reference Pitot Cp: _____

SIDE A:

Trial No.	Reference ΔP	Probe ΔP	Probe Cp	Cp Deviation
1				
2				
3				
		Average Probe Cp=		
		Side A "S" =		

SIDE B:

Trial No.	Reference ΔP	Probe ΔP	Probe Cp	Cp Deviation
1				
2				
3				
		Average Probe Cp=		
		Side B "S" =		

Where,

Probe Cp=√(Reference ΔP / Probe ΔP)

Specification

Avg Cp Side A - Avg Cp Side B ≤ 0.01

SAMPLE PROBE CALIBRATION DATA

Probe Type & I.D. number: 6' S-TYPE PITOT 12-8-94-4

D. CHIOVARE 1-5-95

Thermocouple Calibration

Reference Type: _____ Reference I.D. No: _____ Pyrometer I.D. No: _____ Degrees: F / C

Point No.	Target Temp.	Reference Temp	Indicated Temp	Temp Difference	% Difference
1	ice-32F				
2	ambient-70F				
3	hot oil-150F				
4	boiling H2O-212F				
5	hot oil-320F				

Specification: %Difference ≤ 1.5

Does assembly meet specifications? YES / NO → If "NO" thermocouple must be replaced.

Geometric Pitot Calibration *diagrams on reverse*

Is pitot assembly in good repair? YES / NO If "NO" explain: _____

[X] "S" Pitot

Measurement		Specification
α1= 1	α2= 1	<10°
β1= 1	β2= 1	<5°
γ= 1	θ= 1	
Pa= .349	Pb= .349	Pa + Pb = A
A= .698	Dt= .250	

Calculations

z = A sin	= .0121	<0.125"
w = A sin	= .0121	<0.03125"

Does assembly meet specifications? YES / NO → *If "NO" wind tunnel calibration is required.*

[ ] Standard Pitot

Measurement		Specification
Tube O.D.	_____ "	(D)
Static Hole I.D.	_____ "	(D X 0.1)
Length,		
Tip to Static	_____ "	(6 X D Minimum)
Static to Bend	_____ "	(8 X D Minimum)

Does assembly meet specifications? YES / NO

If "YES" "S" pitot Cp=0.84: Std pitot Cp=0.99

Wind Tunnel Pitot Calibration

Reference Pitot I.D. No: _____ Reference Pitot Cp: _____

SIDE A:

Trial No.	Reference ΔP	Probe ΔP	Probe Cp	Cp Deviation
1				
2				
3				
		Average Probe Cp=		
		Side A "S" =		

SIDE B:

Trial No.	Reference ΔP	Probe ΔP	Probe Cp	Cp Deviation
1				
2				
3				
		Average Probe Cp=		
		Side B "S" =		

Where,

Probe Cp=√(Reference ΔP / Probe ΔP)

Specification

Avg Cp Side A - Avg Cp Side B ≤ 0.01

D

FIELD DATA

D

Location: STACK Run: 1

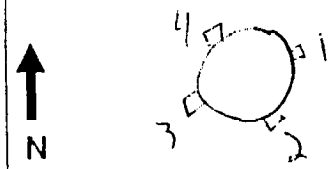
Moisture Determination Field Data Sheet

Client SOLVAY	Project Number 7356-1
Plant SOLVAY	Unit FP-5
Date 1-11-95	Inlet/outlet/stack
Meter Operator S. FERGUSON	
Probe Operator S. FER.	

Sample Box Number KO	
Pyrometer Number 66-13	
Meter Box Number 66-13	
Meter ΔH@ 1.8063	Meter Y_d 0.9853

Leak Rate Before: .0009	cc/m	cf/m @	15	"Hg
Leak Rate After: 0.000	cc/m	cf/m @	15	"Hg

Schematic of Testing Location



First point all the way IN OUT	Method 4	
Area (ft^2) 85.90	Port Len. (in.) 12.5	Gas Flow IN OUT
Filter Material N/A		

Ambient Temp. (°F) 40	Bar. Press. (in. Hg) 23.78
Assumed Moisture (%) —	

Heater Box Setting —	Probe Heater Setting —
Probe Length 5'	Probe Number —
Probe Material S.S.	

IGS Bag ID Number R1			
% O_2 10.4		% CO_2 12.2	
H_2O (ml) 272		Silica Gel (gm) 26.5	
Total V_{lc} 298.5			

Start Time: 1108 AM / PM	Stop Time: 1148 AM / PM

496.03

Traverse Point Number	Min/pt 5 / Clock Time	Pump Vacuum (in. Hg)	Stack Temp, Ts (°F)	Bath Temp, (°F)	Orifice Setting ΔH (in. H_2O)	Initial Volume ~~495.80~~ / Gas Sample Volume V_m Circle one: (L) (ft^3)	Gas Sample Temperature at Dry Gas Meter: Inlet $T_{m\ in}$ (°F)	Outlet $T_{m\ out}$ (°F)	Probe Temp. T_p (°F)			Notes
1-2	5	2	N/A	54	1.8	500.13	61	61	N/A			
	10	2		54	1.8	504.31	62	61				
	15	2		60	1.8	508.25	62	61				
	20	2		62	1.85	512.12	63	61				
	25	2		63	1.3	515.68	64	61				
	30	2		65	1.3	519.20	64	61				
	35	2		65	1.3	522.72	65	61				
	40	2		63	1.3	526.26	66	62				
	~~45~~											
												%BWO=36.9
Average						30.23						
Total	40				1.51		62					

SOLVAY2016_6_0001112

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Location: STACK Run: 2

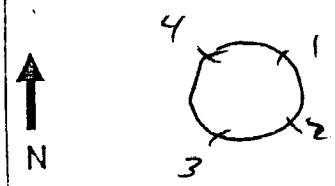
Moisture Determination Field Data Sheet

Client SOLVAY	Project Number 7356-1
Plant SOLVAY	Unit EP-5
Date 1-11-95	Inlet/outlet/stack
Meter Operator SF	
Probe Operator SF	

Sample Box Number 60	
Pyrometer Number 66-13	
Meter Box Number 66-13	
Meter ΔH@ 1.8063	Meter Y_d 0.9853

Leak Rate Before: 0.001 cc/m cf/m @ 15	"Hg
Leak Rate After: 0.002 cc/m cf/m @ 15	"Hg

Schematic of Testing Location



First point all the way IN OUT	Method 4	
Area (ft^2) 85.9	Port Len. (in.) 12.5	Gas Flow IN OUT
Filter Material —		

Ambient Temp. (°F) 40	Bar. Press. (in. Hg) 23.78
Assumed Moisture (%) —	

Heater Box Setting —	Probe Heater Setting —
Probe Length 5'	Probe Number —
Probe Material SS	

IGS Bag ID Number R2	
% O_2 8.9	% CO_2 13.8
H_2O (ml) 240	Silica Gel (gm) 7.5
Total V_{lc} 247.5	

Start Time: 1252 AM (PM)	Stop Time: 1332 AM / PM

Traverse Point Number	Min/pt 5 / Clock Time	Pump Vacuum (in. Hg)	Stack Temp, Ts (°F)	Bath Temp, (°F)	Orifice Setting ΔH (in. H_2O)	Initial Volume 526.51 / Gas Sample Volume V_m Circle one: (L) (ft^3)	Gas Sample Temperature at Dry Gas Meter: Inlet $T_{m\,in}$ (°F)	Outlet $T_{m\,out}$ (°F)	Probe Temp. T_p (°F)			Notes
2-2	5	2	N/A	64	1.2	~~53~~ 529.90	67	68	N/A			
	10	2		63	1.2	533.17	66	66				
	15	2		62	1.2	536.45	66	66				
	20	2		63	1.2	539.73	67	66				
	25	2		64	1.1	542.99	68	67				
	30	2		64	1.1	546.23	68	67				
	35	2		64	1.1	549.47	69	67				
	40	2		64	1.1	552.72	70	67				
												%BWO = 36.2
Average												
Total					1.15	26.21	69					

SOLVAY2016_6_0001113

Location: STACK Run: 3

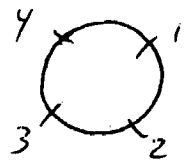
Moisture Determination Field Data Sheet

Client: SOLVAY	Project Number: 7356-1
Plant: SOLVAY	Unit: EP-5
Date: 1-11-95	Inlet/outlet/stack
Meter Operator: SF	
Probe Operator: SF	

Sample Box Number: KO	
Pyrometer Number: 66-13	
Meter Box Number: 66-13	
Meter ΔH@: 1.8063	Meter Y_d: 0.9853

Leak Rate Before:	0.000 cc/m cf/m @	15	"Hg
Leak Rate After:	0.001 cc/m cf/m @	15	"Hg

Schematic of Testing Location



First point all the way IN OUT	Method 4	
Area (ft²): 85.9	Port Len. (in.): 12.5	Gas Flow IN OUT
Filter Material: —		

Ambient Temp. (°F): 40	Bar. Press. (in. Hg): 23.75
Assumed Moisture (%): —	

Heater Box Setting: —	Probe Heater Setting: —
Probe Length: 5'	Probe Number: —
Probe Material: SS	

IGS Bag ID Number: R3	
% O_2: 8.9	% CO_2: 14.0
H_2O (ml): 233	Silica Gel (gm): 8
Total V_{lc}: 241	

Start Time: 1426 AM / PM	Stop Time: 1506 AM / PM

Traverse Point Number	Min/pt Clock Time	Pump Vacuum (in. Hg)	Stack Temp, Ts (°F)	Bath Temp, (°F)	Orifice Setting ΔH (in. H_2O)	Initial Volume 554.30 / Gas Sample Volume V_m Circle one: (L) (ft³)	Gas Sample Temperature at Dry Gas Meter: Inlet $T_{m\,in}$ (°F)	Outlet $T_{m\,out}$ (°F)	Probe Temp. T_p (°F)				Notes
2-2	5	2	N/A	60	1.2	557.75	71	70	N/A				
	10	2		57	1.2	561.03	71	70					
	15	2		57	1.2	564.26	72	71					
	20	2		59	1.1	567.46	73	72					
	25	2		61	1.1	570.67	74	73					
	30	2		63	1.1	573.90	75	73					
	35	3		64	1.1	577.10	75	73					
	40	3		64	1.1	580.30	74	73					
													%BWO = 35.9
Average													
Total					1.17	26.00	73						

SOLVAY2016_6_0001114

Location: STACK Run: 4

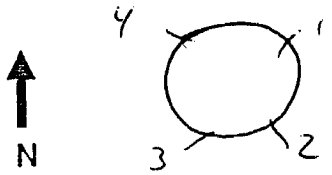
Moisture Determination Field Data Sheet

Client: SOLVAY	Project Number: 7356-1
Plant: SOLVAY	Unit: EP-5
Date: 1-11-95	Inlet/outlet/stack
Meter Operator: SF	
Probe Operator: SF	

Sample Box Number: 10	
Pyrometer Number: 66-13	
Meter Box Number: 66-13	
Meter ΔH@: 1.8063	Meter Yd: 0.9853

Leak Rate Before: 0.000	cc/m	cf/m @ 15	"Hg
Leak Rate After: 0.000	cc/m	cf/m @ 15	"Hg

Schematic of Testing Location



First point all the way IN OUT	Method 4	
Area (ft²): 85.9	Port Len. (in.): 12.5	Gas Flow IN OUT
Filter Material: —		

Ambient Temp. (°F): 40	Bar. Press. (in. Hg): 23.78
Assumed Moisture (%): —	

Heater Box Setting: —	Probe Heater Setting: —
Probe Length: 5'	Probe Number: —
Probe Material: SS	

IGS Bag ID Number: R4	
% O_2: 8.6	% CO_2: 14.2
H_2O (ml): 264	Silica Gel (gm): 8.5
Total V_{lc}: 272.5	

Start Time: 1551 AM / PM	Stop Time: 1630 AM / PM

Traverse Point Number	Min/pt 5 / Clock Time	Pump Vacuum (in. Hg)	Stack Temp, Ts (°F)	Bath Temp, (°F)	Orifice Setting ΔH (in. H_2O)	Initial Volume 580.60 / Gas Sample Volume V_m Circle one: (L) (ft^3)	Gas Sample Temperature at Dry Gas Meter: Inlet $T_{m\,in}$ (°F)	Outlet $T_{m\,out}$ (°F)	Probe Temp. T_p (°F)			Notes
2-2	5	2	N/A	46	1.2	584.01	66	66	N/A			
	10	2		46	1.1	587.05	66	66				
	15	3		46	1.1	590.26	66	66				
	20	3		46	1.1	593.46	66	66				
	25	3		47	1.1	596.65	66	65				
	30	3		50	1.1	599.89	65	65				
	35	3		51	1.1	603.01	65	64				
	40	3		51	1.1	606.17	65	64				
	45	3		52	1.1	609.35	64	64				%BWO = 36.1
Average												
Total	15				1.11	28.75	65					

SOLVAY2016_6_0001115

LOW LOAD

Location: SOLVAY Run: 5

Moisture Determination Field Data Sheet

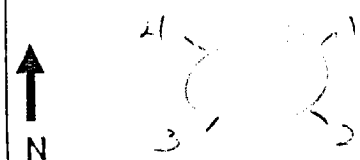
Page 1 of 1

Client SOLVAY MINERALS	Project Number 7256.1
Plant SOLVAY	Unit ESP CALC
Date 1/12/95	Inlet/Outlet/Stack
Meter Operator RON W. LUIKAAKT	
Probe Operator N/A	

Sample Box Number K/O	
Pyrometer Number 66-13	
Meter Box Number 66-13	
Meter ΔH@ 1.8063	Meter Yd 0.9853

Leak Rate Before:	.001 cc/m cf/m @	15	"Hg
Leak Rate After:	.001 cc/m cf/m @	15	"Hg

Schematic of Testing Location



First point all the way IN OUT	Method 4	
Area (ft²) 85.9	Port Len. (in.) 4.75, 12.5	Gas Flow IN OUT
Filter Material N/A		

Ambient Temp. (°F) 45	Bar. Press. (in. Hg) 23.81
Assumed Moisture (%) 36	

Heater Box Setting N/A	Probe Heater Setting N/A
Probe Length 8'	Probe Number N/A
Probe Material METAL	

IGS Bag ID Number R5	
% O_2 9.3	% CO_2 13.0
H_2O (ml) 268	Silica Gel (gm) 8.5
Total V_{lc} 276.5	

Start Time: 9:22 AM / PM	Stop Time: 10:07 AM / PM

Traverse Point Number	Min/pt Clock Time	Pump Vacuum (in. Hg)	Stack Temp, Ts (°F)	Bath Temp, (°F)	Orifice Setting ΔH (in. H_2O)	Initial Volume 609.52 Gas Sample Volume V_m Circle one: (L) (ft³)	Gas Sample Temperature at Dry Gas Meter Inlet $T_{m\,in}$ (°F)	Outlet $T_{m\,out}$ (°F)	Probe Temp. T_p (°F)				Notes
SINGLE	5	2	SEE	37	1.2	613.81	55	54	N/A				
POINT	10	2	VEL	40	1.2	616.06	56	54					
	15	2	DATA	43	1.1	619.28	56	54					
	20	2	SHEET	44	1.1	622.50	56	55					
	25	2		45	1.1	625.68	58	56					
	30	2		48	1.1	628.87	59	57					
	35	2		50	1.1	632.04	61	57					
	40	2		52	1.1	635.23	63	59					
	45	2		53	1.1	638.40	64	60					
													%B_{wo} = 36.0
Average					1.12		57.44						
Total						28.88							

SOLVAY2016_6_0001116

LOW LOAD

Location: SOLVAY Run: 6

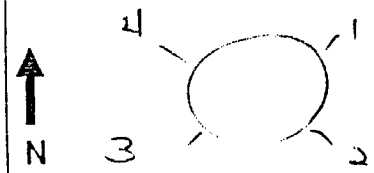
Moisture Determination Field Data Sheet

Client SOLVAY MINERALS	Project Number 73561
Plant SOLVAY	Unit EPS CALC
Date 1/12/95	Inlet/outlet/stack
Meter Operator RON M. LUIKAART	
Probe Operator N/A	

Sample Box Number K/O	
Pyrometer Number 66-13	
Meter Box Number 66-13	
Meter ΔH@ 1.8063	Meter Y_d 0.9853

Leak Rate Before:	.001	cc/m cf/m @	15	"Hg
Leak Rate After:	.001	cc/m cf/m @	15	"Hg

Schematic of Testing Location



First point all the way IN OUT	Method 4	
Area (ft^2) 83.9	Port Len. (in.) 4.75, 12.5	Gas Flow IN OUT
Filter Material N/A		

Ambient Temp. (°F) 45	Bar. Press. (in. Hg) 23.81
Assumed Moisture (%) 36	

Heater Box Setting N/A	Probe Heater Setting N/A
Probe Length 8'	Probe Number N/A
Probe Material METAL	

IGS Bag ID Number R6	
% O_2 9.0	% CO_2 13.4
H_2O (ml) 250	Silica Gel (gm) 8.5
Total V_{lc} 258.5	

Start Time: 10:50 AM / PM	Stop Time: 11:35 AM / PM

Traverse Point Number	Min/pt / Clock Time	Pump Vacuum (in. Hg)	Stack Temp, Ts (°F)	Bath Temp, (°F)	Orifice Setting ΔH (in. H_2O)	Initial Volume 640.11 / Gas Sample Volume V_m Circle one: (L) (ft^3)	Gas Sample Temperature at Dry Gas Meter: Inlet $T_{m\ in}$ (°F)	Outlet $T_{m\ out}$ (°F)	Probe Temp. T_p (°F)			Notes
SINGLE	5	2	SEE	45	~~1.1~~ 1.95 RML	643.30	71	68	N/A			
POINT	10	2	VEL.	49	.95	646.52	73	70				
	15	2	DATA	51	.98	649.42	74	70				
	20	2	SHEET	53	.98	652.52	75	71				
	25	3		55	.95	655.59	76	72				
	30	3		56	.95	658.64	77	73				
	35	3		56	.95	661.69	78	74				
	40	3		56	.95	664.76	78	74				
	45	3		57	.94	667.82	79	74				
												%Bwo = 36.1
Average					.96		73	72				
Total						27.71	~~73.72~~ RML					

SOLVAY2016_6_0001117

Location: SOLVAY Run: 7 LOW LOAD

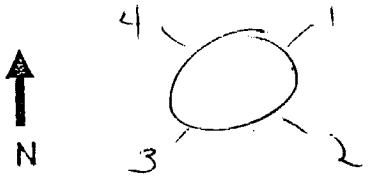
Moisture Determination Field Data Sheet

Client SOLVAY MINERALS	Project Number 7356-1
Plant SOLVAY	Unit EPS CALC.
Date 1/12/95	Inlet/outlet/Stack
Meter Operator RON M. LUIKAART	
Probe Operator N/A	

Sample Box Number K/O	
Pyrometer Number 66-13	
Meter Box Number 66-13	
Meter ΔH@ 1.8063	Meter Y_d 0.9853

Leak Rate Before:	.001	cc/m cf/m @	15	"Hg
Leak Rate After:	.001	cc/m cf/m @	16	"Hg

Schematic of Testing Location



First point all the way IN OUT	Method 4	
Area (ft^2) 85.9	Port Len. (in.) 4.75 12.5	Gas Flow IN OUT
Filter Material N/A		

Ambient Temp. (°F) 50	Bar. Press. (in. Hg) 23.81
Assumed Moisture (%) 36	

Heater Box Setting N/A	Probe Heater Setting N/A
Probe Length 8'	Probe Number N/A
Probe Material METAL	

IGS Bag ID Number R7	
% O_2 8.5	% CO_2 14.0
H_2O (ml) 253	Silica Gel (gm) 8.5
Total V_{lc} 261.5	

Start Time: 1210 AM PM Stop Time: 1255 AM / PM

Traverse Point Number	Min/pt Clock Time	Pump Vacuum (in. Hg)	Stack Temp. Ts (°F)	Bath Temp. (°F)	Orifice Setting ΔH (in. H_2O)	Initial Volume 667.95 / Gas Sample Volume V_m Circle one: (L) (ft^3)	Gas Sample Temperature at Dry Gas Meter: Inlet $T_{m\,in}$ (°F)	Outlet $T_{m\,out}$ (°F)	Probe Temp. T_p (°F)			Notes
SINGLE	5	3	SEE	50	1.1	671.22	79	72	N/A			
POINT	10	3	VEL.	50	1.1	674.42	79	73				
	15	3	DATA	48	1.1	677.63	78	73				
	20	3	SHEET	49	1.0	680.81	79	74				
	25	3		50	1.0	684.01	80	75				
	30	3		50	1.0	687.18	80	75				
	35	3		51	1.0	690.38	81	75				
	40	3		51	1.0	693.54	81	76				
	45	3		51	1.0	696.73	81	76				%BWO = 35.6
Average					1.03		77.06					
Total						28.78						

SOLVAY2016_6_0001118

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Location: STACK Run: 1

Moisture Determination Field Data Sheet

Client Solvay Minerals	Project Number 7356.1
Plant Green River WY	Unit EP 1+2
~~Date 7-13-95~~ 1/17/95 KHJ	Inlet/outlet/stack
Meter Operator S. Ferguson	
Probe Operator	

Ambient Temp. (°F) 40	Bar. Press. (in. Hg) 23.92
Assumed Moisture (%) 20	23.51 EM

Heater Box Setting —	Probe Heater Setting —
Probe Length 4'	Probe Number —
Probe Material SS	

Sample Box Number —	
Pyrometer Number 66.13	
Meter Box Number 66.13	
Meter ΔH@ 1.8063	Meter Y_d .9853

IGS Bag ID Number R1	
% O_2 14.7	% CO_2 8.2
H_2O (ml) 84	Silica Gel (gm) 10.5
Total V_{lc} 94.5	

Schematic of Testing Location

First point all the way IN OUT Method 4		
Area (ft²) 85.9	Port Len. (in.) 6	Gas Flow IN OUT
Filter Material —		

Start Time 0555 AM / PM	Stop Time: 09:40 AM / PM

Leak Rate Before: .005 cc/m cf/m @ 20 "Hg		
Leak Rate After: .003 cc/m cf/m @ 16 "Hg		

Traverse Point Number	Min/pt 5 / Clock Time	Pump Vacuum (in. Hg)	Stack Temp, Ts (°F)	Bath Temp, (°F)	Orifice Setting ΔH (in. H_2O)	Initial Volume 697.305 / Gas Sample Volume V_m Circle one: (L) (ft^3)	Gas Sample Temperature at Dry Gas Meter: Inlet $T_{m\,in}$ (°F)	Outlet $T_{m\,out}$ (°F)	Probe Temp. T_p (°F)			Notes
	5	2	[illegible]	36	.95	700.36	38	38				
	10	2	[illegible]	38	.95	703.29	40	39				
	15	2	Data	40		706.20	42	40				
	20	2		40		709.29	43	41				
	25	2		40		712.28	45	42				
	30	2		41		715.25	47	43				
	35	2		42		718.24	49	45				
	40	2		42		721.24	51	47				
	45	2		43		724.257	53	49				
	~~50~~											%BWO = 16.7
Average												
Total					0.95	26.952	44					

SOLVAY2016_6_0001119

Location: STACK Run: 2

Moisture Determination Field Data Sheet

Page 1 of 1

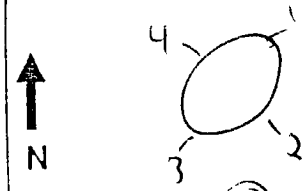
Client Solvay Minerals	Project Number 73561
Plant Green River WY	Unit EP 1+2
~~Date 1-13-95~~	Inlet/outlet/stack
Meter Operator E. McCullick	
Probe Operator	

17/95 KHJ

Sample Box Number —	
Pyrometer Number 66-13	
Meter Box Number 66-13	
Meter ΔH@ 1.8063	Meter Y_d .9853

Leak Rate Before: .008 cc/m cf/m @ 19 "Hg	
Leak Rate After: .005 cc/m cf/m @ 15 "Hg	

Schematic of Testing Location



First point all the way IN OUT	Method 4	
Area (ft^2)	Port Len. (in.) 6	Gas Flow IN OUT
Filter Material		

Ambient Temp. (°F) 35	Bar. Press. (in. Hg) 23.81
Assumed Moisture (%)	

Heater Box Setting —	Probe Heater Setting —
Probe Length —	Probe Number —
Probe Material S.S.	

IGS Bag ID Number R2	
% O_2 ~~14.7~~ 14.8	% CO_2 8.2
H_2O (ml) 87	Silica Gel (gm) 7.9
Total V_{lc} 94.9	

Start Time: 11:00 AM / PM	Stop Time: 11:45 AM / PM

Traverse Point Number	Min/pt 5 / Clock Time	Pump Vacuum (in. Hg)	Stack Temp, Ts (°F)	Bath Temp, (°F)	Orifice Setting ΔH (in. H_2O)	Initial Volume 724.235 / Gas Sample Volume V_m Circle one: (L) (ft^3)	Gas Sample Temperature at Dry Gas Meter: Inlet $T_{m\,in}$ (°F)	Outlet $T_{m\,out}$ (°F)	Probe Temp. T_p (°F)			Notes
	5	2	See	37	.95	727.32	58	57	NA			
	10	2	Flow	40		730.41	58	57				
	15	2	Data	41		733.51	58	57				
	20	2		42		736.60	58	57				
	25	2		43		739.68	58	57				
	30	2		44		742.77	59	57				
	35	2		44		745.86	59	59				
	40	2		44		748.92	60	58				
	45	2		44		752.015	60	58				
												%BWO = 15.8
Average					0.95	29.757	58					
Total												

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SOLVAY2016_6_000120

Location: STACK Run: 3

Moisture Determination Field Data Sheet

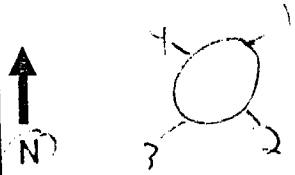
Client Solvay Minerals	Project Number 7356.1
Plant Green Rivers W.Y.	Unit EP 1+2
Date ~~1-13-95~~ 1/17/95 KHJ	Inlet/outlet/stack
Meter Operator [illegible]	
Probe Operator	

Ambient Temp. (°F) 35	Bar. Press. (in. Hg) 23.81
Assumed Moisture (%)	

Heater Box Setting —	Probe Heater Setting —
Probe Length —	Probe Number —
Probe Material SS	

Sample Box Number —	
Pyrometer Number 66-13	
Meter Box Number 66-13	
Meter ΔH@ 1.8063	Meter Y_d .9853

Schematic of Testing Location



IGS Bag ID Number	R3
% O_2 ~~14.8~~ 14.7	% CO_2 ~~8.2~~ 8.1
H_2O (ml) 83	Silica Gel (gm) 8.9
Total V_{lc} 919	

Leak Rate Before: .002 cc/m cf/m @ 15 "Hg	
Leak Rate After: cc/m cf/m @ "Hg	

First point all the way IN/OUT	Method 4	
Area (ft^2)	Port Len. (in.) 6	Gas Flow IN (OUT)
Filter Material		

Start Time: 12:25 AM / (PM)	Stop Time: 1:05 AM / PM

Traverse Point Number	Min/pt Clock Time	Pump Vacuum (in. Hg)	Stack Temp, Ts (°F)	Bath Temp, (°F)	Orifice Setting ΔH (in. H_2O)	Initial Volume 752.300 / Gas Sample Volume V_m Circle one: (L) (ft^3)	Gas Sample Temperature at Dry Gas Meter: Inlet $T_{m\ in}$ (°F)	Outlet $T_{m\ out}$ (°F)	Probe Temp. T_p (°F)			Notes
	5	2	See	53	.95	755.40	62	61	NA			
	10	2	Flow	54		758.51	62	61				
	15	2	Data	55		761.60	61	61				
	20	2		56		764.68	62	61				
	25	2		57		767.77	63	61				
	30	2		58		770.86	63	62				
	35	2		59		773.93	64	62				
	40	2		60		776.89	65	62				
	45	2		60		780.200	65	63				
Average					0.95	27.90	62					
Total												

SOLVAY2016_6_0001121

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Location: STACK Run: 1-4

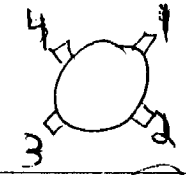
Velocity Determination Field Data Sheet

Page 1 of 1

Client Solvay Minerals	Project Number 7356.1
Plant Green River WY	Unit EPS Calciner
Date 1-11-95	Inlet/Outlet/Stack
Data Recorder E. Hilbert	
Probe Operator S. Ferguson	

Schematic of Testing Location

N



First point all the way IN OUT

Area (ft²)	Port Len (in)	Gas Flow IN OUT
85.9	12.5/4.7	

Ambient Temp. (°F) 40	Bar. Press. (in. Hg) 23.78
IGS Bag ID Number 1-4	
% O_2	% CO_2
% Moisture:	Assumed/Measured
Start Time AM/PM	Stop Time AM/PM

Probe ID 12-8-94-4

Pyrometer Number 66-13	Pitot Cp .84
Pitot Leak Check: ✓ Before	✓ After
Static Pressure (inches H_2O) (+/-) 0.2/-.2/-.2/-.2	

Start 10:38 Start 12:40 Start: 2:26 START: 1538

Traverse Point Number	Veocity Head ΔPs	Stack Temp (°F)		Traverse Point Number	Velocity Head ΔPs	Stack Temp (°F)		Traverse Point Number	Velocity Head ΔPs	Stack Temp (°F)		Traverse Point Number	Velocity Head ΔPs	Stack Temp (°F)		Notes
1-1	.13	346		1-1	.12	350		1-1	.12	346		1-1	.15	348		
2	.14	346		2	.12	349		2	.11	345		2	.13	348		
3	.09	344		3	.10	349		3	.10	343		3	.12	348		
2-1	.15	345		2-1	.13	350		2-1	.12	345		2-1	.17	347		
2	.14	344		2	.14	350		2	.13	344		2	.14	346		
3	.11	343		3	.09	349		3	.10	342		3	.12	347		
3-1	.13	344		3-1	.12	350		3-1	.14	346		3-1	.13	346		
2	.13	345		2	.13	349		2	.13	343		2	.13	346		
3	.10	342		3	.10	348		3	.10	342		3	.11	345		
4-1	.16	345		4-1	.12	349		4-1	.13	345		4-1	.13	345		
2	.14	346		2	.11	348		2	.12	344		2	.13	345		
3	.10	345		3	.09	348		3	.10	342		3	.13	345		
Total																
Average	0.355	345			0.337	349			0.341	344			0.363	346		

SOLVAY2016_6_00012

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Location: SOLVAY EPS CALC. Run: 5,6,7

Velocity Determination Field Data Sheet

Page 1 of 1

Client SOLVAY MINERALS	Project Number 7216-1
Plant SOLVAY	Unit EPS CALC.
Date 1/12/95	Inlet/Outlet/Stack
Data Recorder RON M. LUIKAART	
Probe Operator	

Schematic of Testing Location

N

First point all the way IN OUT

Area (ft²)	Port Len (in)	Gas Flow IN OUT
85.9	4.75	OUT

Ambient Temp. (°F) 45	Bar. Press. (in. Hg) 23.81
IGS Bag ID Number	
% O_2	% CO_2
% Moisture:	Assumed/Measured
Start Time AM/PM	Stop Time AM/PM

Pyrometer Number 66-13	Pitot Cp 0.84
Pitot Leak Check: ✓ Before	✓ After
Static Pressure (inches H_2O) (+/-)	-.3/-.3/-.3

Traverse Point Number	Veocity Head ΔPs	Stack Temp (°F)		Traverse Point Number	Velocity Head ΔPs	Stack Temp (°F)		Traverse Point Number	Velocity Head ΔPs	Stack Temp (°F)		Traverse Point Number	Velocity Head ΔPs	Stack Temp (°F)		Notes
				START 9:25				START				START 10:59				START 12:12				
1-1	.10	337		1-1	.07	333		1-1	.12	330		1-1	.12	317		
2	.12	337		2	.07	333		2	.12	331		2	.10	317		
3	.11 ~~.04~~ RML	337		3	.06	333		3	.11	331		3	.07	316		
2-1	.10	337		2-1	~~.08~~ .05 RML	332	.05 RML	2-1	.12	330		2-1	.12	315		
2	.10	337		2	.06	332		2	.12	330		2	.12	315		
3	.07	337		3	.04	333		3	.09	330		3	.11	315		
3-1	.10	336		3-1	.05	333						3-1	.13	315		
2	.10	336		2	.05	333		3-1	.08	330		2	.12	316		
3	.09	336		3	.04	333		2	.10	331		3	.10	315		
4-1	.10	337		4-1	.08	332		3	.08	332		4-1	.11	315		
2	.11	337		2	.08	332		4-1	.10	333		2	.11	315		
3	.11	337		3	.06	332		2	.11	331		3	.09	315		
					RML			3	.09	332						
Total																
Average	0.322	337							0.321	331			0.328	316		

SOLVAY2016_6_00012

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Location: STACK Run: 1+2

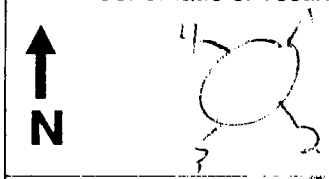
Velocity Determination Field Data Sheet

Page 1 of 2

Client Solvay Minerals	Project Number 7356-1
Plant Green River WY	Unit EP 1+2
Date 1-17-95	Inlet/Outlet/Stack
Data Recorder E. M. Gullick	
Probe Operator R. Luikaart	

Pyrometer Number 66-13	Pitot Cp 0.84
Pitot Leak Check: ✓ Before ✓ After	
Static Pressure (inches H_2O) (+/-) -.8 / -.8	

Schematic of Testing Location



First point all the way IN OUT

Area (ft^2)	Port Len (in)	Gas Flow IN OUT
85.9	12.5/4.75	OUT

Ambient Temp. (°F) 35	Bar. Press. (in. Hg) 23.81
IGS Bag ID Number	
% O_2	% CO_2
% Moisture:	Assumed/Measured
Start Time AM/PM	Stop Time AM/PM

Start - 9:05 am

Traverse Point Number	Veocity Head ΔPs	Stack Temp (°F)		Traverse Point Number	Velocity Head ΔPs	Stack Temp (°F)		Traverse Point Number	Velocity Head ΔPs	Stack Temp (°F)		Traverse Point Number	Velocity Head ΔPs	Stack Temp (°F)		Notes
1-1	1.2	460		4-1	1.2	456		1-1	1.2	458		4-1	1.2	460		
2	1.3	462		2	1.3	455		2	1.2	459		2	1.2	461		
3	1.3	463		3	1.4	454		3	1.3	458		3	1.3	460		
4	1.2	462		4	1.3	455		4	1.2	457		4	1.3	459		
5	1.2	460		5	1.1	454		5	1.1	457		5	1.2	458		
6	.89	458		6	.95	452		6	.92	455		6	.89	456		
2-1	1.2	455						2-1	1.2	459						
2	1.2 ~~.79~~	454						2	1.2	459						
3	1.2	454						3	1.3	460						
4	1.2	455						4	1.1	458						
5	1.1	452						5	1.1	459						
6	.94	451						6	.95	457						
3-1	1.2	455						3-1	1.2	461						
2	1.2	454						2	1.1	459						
3	1.2	453						3	1.2	459						
4	1.2	454						4	1.2	460						
5	1.2	454						5	1.1	458						
6	.89	453						6	.94	455						
Total																
Average	1.080	456							1.071	458						

Start 11:32

SOLVAY2016_6_000124

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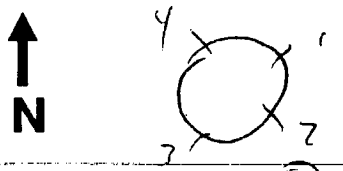
Location: STACK Run: 3

Velocity Determination Field Data Sheet

Client Solvay Minerals	Project Number 7356-1
Plant Green River W.Y.	Unit EP 1+2
Date ~~1-13-95~~ 1/17/96	Inlet/Outlet/Stack
Data Recorder E.M.	
Probe Operator R.L.	

Pyrometer Number 6613	Pitot Cp .84
Pitot Leak Check: ✓ Before	✓ After
Static Pressure (inches H_2O) (+/-) 0.8	

Schematic of Testing Location



First point all the way IN OUT

Area (ft^2)	Port Len (in)	Gas Flow
85.9	12.5 / 4.75	IN OUT

Ambient Temp. (°F) 35	Bar. Press. (in. Hg) 23.81
IGS Bag ID Number	
% O_2	% CO_2
% Moisture:	Assumed/Measured
Start Time AM/PM	Stop Time AM/PM

Shut - 100

Traverse Point Number	Velocity Head ΔPs	Stack Temp (°F)		Traverse Point Number	Velocity Head ΔPs	Stack Temp (°F)		Traverse Point Number	Velocity Head ΔPs	Stack Temp (°F)		Traverse Point Number	Velocity Head ΔPs	Stack Temp (°F)		Notes
1-1	1.3	458		4-1	1.2	460										
2	1.3	458		2	1.2	461										
3	1.2	457		3	1.3	460										
4	1.3	456		4	1.3	459										
5	1.1	456		5	1.2	460										
6	.91	453		6	.90	457										
2-1	1.2	457														
2	1.2	456														
3	1.2	456														
4	1.1	457														
5	1.1	455														
6	.88	454														
3-1	1.2	458														
2	1.1	457														
3	1.2	457														
4	1.1	456														
5	1.1	456														
6	.89	455														
Total																
Average	1.068	457														

SOLVAY2016_6_0001281

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Method 18 - Adsorbing Tubes
Field Data Sheet

Location: EP5 Calciner Run: 1

Page 1 of 1

Client Solvay Minerals	Project Number 7356.1
Plant W.Y.	Unit EP5 Calciner
Date 1-11-95	Inlet/Outlet Stack
Meter Operator [illegible]	
Meter Box Number 71-V7	
Yd 1.0145	

Leak Rate Before .003 cf/m @ 5.0 "Hg	
~~Leak Rate After cf/m @ "Hg~~	

Cross-Section of Test Location

N / UP

Area (ft^3)	Port Len (in.)	Gas Flow IN OUT of page
85.9	12.5	

Ambient Temp. (°F) ~~23.78~~ 40	
Bar. Press. 23.78 (in. Hg / mbar)	
Probe Length 3'	
Probe Material SS	
IGS Bag ID No. R1	

Tube No:	Type:
Tube No:	Type:
Tube No:	Type:

Start Time: 10:55 AM/PM Stop Time: 11:55 AM/PM

Min/pt Clock Time	Pump Vacuum (in. Hg)	Orifice Setting (in H_2O)	Flow Rate L/m	Initial Volume 0392.45 Gas Sample Volume V_m (L)	Gas Sample Temperature at Dry Gas Meter T_m (°F)	Bath Temp °F	Notes
5	1	1.0	.5	394.00	60	40	
10	1	1.0	.5	395.38	59	39	
15	1	1.0	.5	396.75	59	39	
20	1	1.0	.5	398.20	58	38	
25	1	1.0	.5	400.70	56	39	
30	1	1.0	.5	401.10	54	38	
35	1	1.0	.5	402.51	53	38	
40	1	1.0	.5	404.95	53	39	
45	1	1.0	.5	405.48	52	38	
50	1	1.0	.5	406.76	53	39	
55	1	1.0	.5	408.15	53	39	
60	1	1.0	.5	409.89	53	38	
Total					663	1164	
Average			0.5	17.44	47		

SOLVAY2016 6 000126

DS 018T Organic Tubes
SNVS/KVSP.R2-2/7/94

Clean Air Engineering

Method 18 - Adsorbing Tubes
Field Data Sheet

Location: STACK Run: 2

Client Solvay Minerals	Project Number 73564
Plant WY	Unit EPS Calciner
Date 1-11-99	Inlet/Outlet/Stack
Meter Operator	
Meter Box Number 71-V7	
Yd 1.0145	

Leak Rate Before .004 cf/m @ 5 "Hg	
~~Leak Rate After cf/m @ "Hg~~	

Cross-Section of Test Location

N / UP

Area (ft^3)	Port Len (in.)	Gas Flow IN OUT of page
85.9	12.5	

Ambient Temp. (°F) 40	
Bar. Press. 23.78 (in. Hg / mbar)	
Probe Length 3'	
Probe Material SS.	
IGS Bag ID No. R2	

Tube No:	Type:
Tube No:	Type:
Tube No:	Type:

Start Time: 12:52 AM/PM Stop Time: 1:52 AM/PM

Min/pt Clock Time	Pump Vacuum (in. Hg)	Orifice Setting (in H_2O)	Flow Rate L/m	Initial Volume 0494.10 / Gas Sample Volume V_m (L)	Gas Sample Temperature at Dry Gas Meter T_m (°F)	Bath Temp °F	Notes
5	.10	1.0	.5	495.95	58	40	
10	.10	1.0	.5	497.46	56	39	
15	1	1.0	.5	498.92	55	40	
20	1	1.0	.5	500.32	56	39	
25	1	1.0	.5	501.82	57	40	
30	1	1.0	.5	503.30	57	40	
35	1	1.0	.5	504.65	56	40	
40	1	1.0	.5	506.09	58	40	
45	1	1.0	.5	507.48	58	40	
50	1	1.0	.5	508.92	59	41	
55	1	1.0	.5	510.33	59	41	
60	1	1.0	.5	511.67	60	40	
Total					689	480	
Average			0.5	17.57	49		

SOLVAY2016_6_0001127

DS 018T Organic Tubes
CNVS/KVSP.R2-2/7/94

Clean Air Engineering

Method 18 - Adsorbing Tubes
Field Data Sheet

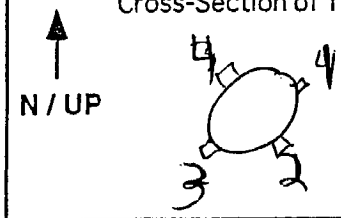
Location: STACK Run: 3

Page 1 of 1

Client Solvay Minerals	Project Number 7356-1
Plant Green River WY	Unit EPS Calciner
Date 1-11-95	Inlet/Outlet/Stack
Meter Operator E. M. Gaffick	
Meter Box Number 71-V7	
Yd 1.0145	

Leak Rate Before 004 cf/m @ 5 "Hg	
~~Leak Rate After cf/m @ "Hg~~	

Cross-Section of Test Location



Area (ft^3)	Port Len (in.)	Gas Flow IN OUT of page
85.9	12.9	

Ambient Temp. (°F) 40	
Bar. Press. 23.78	(in. Hg / mbar)
Probe Length 3'	
Probe Material SS	
IGS Bag ID No. R3	

Tube No:	Type:
Tube No:	Type:
Tube No:	Type:

Start Time: 2:30 AM/PM Stop Time: AM/PM

Min/pt / Clock Time	Pump Vacuum (in. Hg)	Orifice Setting (in H_2O)	Flow Rate L/m	Initial Volume 0515.31 / Gas Sample Volume V_m (L)	Gas Sample Temperature at Dry Gas Meter T_m (°F)	Bath Temp °F	Notes
5	1	1.0	.5	0516.49	52	42	
10	1	1.0	.5	517.75	52	41	
15	1	1.0	.5	518.96	51	40	
20	1	1.0	.5	520.09	52	40	
25	1	1.0	.5	521.32	51	40	
30	1	1.0	.5	522.57 in	50	40	
35	1	1.0	.5	523.75	51	39	
40	1	1.0	.5	525.01	51	40	
45	1	1.0	.5	526.25	51	40	
50	1	1.0	.5	527.48	50	40	
55	1	1.0	.5	528.75	50	39	
60	1	1.0	.5	529.99	51	40	
Total					612	481	
Average			0.5	14.68	46		

DS 018T Organic Tubes
CNVS/KVSP.R2-2/7/94

Clean Air Engineering

SOLVAY2016_6_000128

Method 18 - Adsorbing Tubes
Field Data Sheet

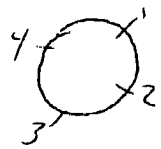
Location: STACK Run: 4

Client Solvay Minerals	Project Number 7356-1
Plant Green River, UT.	Unit E15 Calciner
Date 1-11-95	Inlet/Outlet/Stack
Meter Operator E.M. Guffick	
Meter Box Number 71-V7	
Yd 1.0145	

Leak Rate Before .005 cf/m @ 5 "Hg	
~~Leak Rate After cf/m @ "Hg~~	

Cross-Section of Test Location

N / UP



Area (ft³)	Port Len (in.)	Gas Flow IN OUT of page
25.9	12.5	

Ambient Temp. (°F) 40	
Bar. Press. 23.75	(in. Hg / mbar)
Probe Length 3'	
Probe Material SS	
IGS Bag ID No. R4	

Tube No:	Type:
Tube No:	Type:
Tube No:	Type:

Start Time: 3:56 AM/PM Stop Time: 4:56 AM/PM

Min/pt Clock Time	Pump Vacuum (in. Hg)	Orifice Setting (in H_2O)	Flow Rate L/m	Initial Volume 0535.15 Gas Sample Volume V_m (L)	Gas Sample Temperature at Dry Gas Meter T_m (°F)	Bath Temp °F	Notes
5	1	1.0	.5	536.80	48	42	
10	1	1.0	.5	538.41	48	41	
15	1	1.0	.5	539.90	49	40	
20	1	1.0	.5	541.40	48	40	
25	1	1.0	.5	542.93	49	40	
30	1	1.0	.5	544.62	50	40	
35	1	1.0	.5	546.40	50	40	
40	1	1.0	.5	548.11	51	41	
45	1	1.0	.5	549.88	50	40	
50	1	1.0	.5	551.52	49	40	
55	1	1.0	.5	553.28	50	40	
60	1	1.0	.5	554.98	51	41	
Total					593	485	
Average			0.5	19.83	45		

DS 018T Organic Tubes
CNVS/KVSP.R2-2/7/94

Clean Air Engineering

SOLVAY2016_6_0001129

Orsat Readings

Client SOLVAY MINERALS	Project Number 7356-1
Plant GREEN RIVER, WY	Unit EP-1,2 / CRUSHER
Date 1/17/95	Fuel Type COAL
Orsat ID DEPT 85	Leak Check? ✓

$F_o = \frac{20.9 - \%O_2}{\%CO_2}$

F_o = 1.083 to 1.230 (for bituminous coal)

Run Number	Location	Bag ID	Trial	Percent CO_2	Percent $CO_2 + O_2$	Percent O_2	F_o	Sample Time	Analysis Time	Analyst
1	EP-1,2		1	8.3	23.0	14.7			11:10	JK
			2	8.1	22.8	14.7				
			3	8.2	22.8	14.6				
			Avg.	8.2		14.7				
2	EP-1,2		1	8.2	23.0	14.8			13:20	SR
			2	8.2	23.0	14.8				
			3	8.1	23.0	14.9				
			Avg.	8.2		14.8				
3	EP-1,2		1	8.0	22.8	14.8			13:45	SR
			2	8.1	22.8	14.7				
			3	8.2	22.8	14.6				
			Avg.	8.1		14.7				
			1							
			2							
			3							
			Avg.							
CRUSHER		BAGHOUSE	1	0.0	20.9	20.9			1830	SR
			2	0.0	20.9	20.9				
			3	0.0	20.9	20.9				
			Avg.	0.0		20.9				
			1							
			2							
			3							
			Avg.							
			1							
			2							
			3							
			Avg.							
			1							
			2							
			3							
			Avg.							

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FIELD DATA PRINTOUTS

E

Field Data Printout

Location: EP 5 Calciner Stack
Test Run: 1
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/11/95
Meter ΔH@: 1.8063
Meter Y_d: 0.9853
Pitot C_p: 0.84
Static P: -0.2
Leak Rate Before: 0.001 cfm @ 15"Hg
Leak Rate After: 0.000 cfm @ 15"Hg

Method: M2, M4
Testing Type: Velocity, Moisture
Area (ft^2): 85.90

Bar. Press. (in. Hg): 23.78
Actual Moisture (%): 36.9
O_2 (dry volume %): 10.4
CO_2 (dry volume %): 12.2
Start Time (approx.): 11:08
Stop Time (approx.): 11:48
H_2O (condensate, ml): 272.0
H_2O (silica, g): 26.5

Traverse Point	Pitot ΔP_s (in. H_2O)	Stack T_s (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in.}$ H_2O)	Run Time	Sample ΔH (in. H_2O)	Metered (ft^3)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (ft^3)
				0.0		496.03			
1-01	0.13	346	0.36	5.0	1.80	500.13	61	61	4.10
1-02	0.14	346	0.37	10.0	1.80	504.31	62	61	4.18
1-03	0.09	344	0.30	15.0	1.80	508.25	62	61	3.94
2-01	0.15	345	0.39	20.0	1.50	512.12	63	61	3.87
2-02	0.14	344	0.37	25.0	1.30	515.68	64	61	3.56
2-03	0.11	343	0.33	30.0	1.30	519.20	64	61	3.52
3-01	0.13	344	0.36	35.0	1.30	522.72	65	61	3.52
3-02	0.13	345	0.36	40.0	1.30	526.26	66	62	3.54
3-03	0.10	342	0.32						
4-01	0.16	345	0.40						
4-02	0.14	346	0.37						
4-03	0.10	345	0.32						
Final	0.35	345		40.0	1.51	30.23	62		

Revision 0

Field Data Printout

Location: EP 5 Calciner Stack
Test Run: 2
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/11/95
Meter ΔH@: 1.8063
Meter Y_d: 0.9853
Pitot C_p: 0.84
Static P: -0.2
Leak Rate Before: 0.001 cfm @ 15"Hg
Leak Rate After: 0.002 cfm @ 15"Hg

Method: M2, M4
Testing Type: Velocity, Moisture
Area (ft^2): 85.90

Bar. Press. (in. Hg): 23.78
Actual Moisture (%): 36.1
O_2 (dry volume %): 8.9
CO_2 (dry volume %): 13.8
Start Time (approx.): 12:52
Stop Time (approx.): 13:32
H_2O (condensate, ml): 240.0
H_2O (silica, g): 7.5

Traverse Point	Pitot ΔP_s (in. H_2O)	Stack T_s (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in.}$ H_2O)	Run Time	Sample ΔH (in. H_2O)	Metered (ft^3)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (ft^3)
				0.0		526.51			
1-01	0.12	350	0.35	5.0	1.20	529.90	67	68	3.39
1-02	0.12	349	0.35	10.0	1.20	533.17	66	66	3.27
1-03	0.10	349	0.32	15.0	1.20	536.45	66	66	3.28
2-01	0.13	350	0.36	20.0	1.20	539.73	67	66	3.28
2-02	0.14	350	0.37	25.0	1.10	542.99	68	67	3.26
2-03	0.09	349	0.30	30.0	1.10	546.23	68	67	3.24
3-01	0.12	350	0.35	35.0	1.10	549.47	69	67	3.24
3-02	0.13	349	0.36	40.0	1.10	552.72	70	67	3.25
3-03	0.10	348	0.32						
4-01	0.12	349	0.35						
4-02	0.11	348	0.33						
4-03	0.09	348	0.30						
Final	0.34	349		40.0	1.15	26.21	67		

Field Data Printout

Location: EP 5 Calciner Stack
Test Run: 3
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/11/95
Meter ΔH@: 1.8063
Meter Y_d: 0.9853
Pitot C_p: 0.84
Static P: -0.2
Leak Rate Before: 0.000 cfm @ 15"Hg
Leak Rate After: 0.001 cfm @ 15"Hg

Method: M2, M4
Testing Type: Velocity, Moisture
Bar. Press. (in. Hg): 23.78
Actual Moisture (%): 35.9

Area (ft^2): 85.90

O_2 (dry volume %): 8.9
CO_2 (dry volume %): 14.0
Start Time (approx.): 14:26
Stop Time (approx.): 15:06
H_2O (condensate, ml): 233.0
H_2O (silica, g): 8.0

Traverse Point	Pitot ΔP_s (in. H_2O)	Stack T_s (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in.}$ H_2O)	Run Time	Sample ΔH (in. H_2O)	Metered (ft^3)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (ft^3)
				0.0		554.30			
1-01	0.12	346	0.35	5.0	1.20	557.75	71	70	3.45
1-02	0.11	345	0.33	10.0	1.20	561.03	71	70	3.28
1-03	0.10	343	0.32	15.0	1.20	564.26	72	71	3.23
2-01	0.12	345	0.35	20.0	1.10	567.46	73	72	3.20
2-02	0.13	344	0.36	25.0	1.10	570.67	74	73	3.21
2-03	0.10	342	0.32	30.0	1.10	573.90	75	73	3.23
3-01	0.14	346	0.37	35.0	1.10	577.10	75	73	3.20
3-02	0.13	343	0.36	40.0	1.10	580.30	74	73	3.20
3-03	0.10	342	0.32						
4-01	0.13	345	0.36						
4-02	0.12	344	0.35						
4-03	0.10	342	0.32						
Final	0.34	344		40.0	1.14	26.00	73		

Field Data Printout

Location: EP 5 Calciner Stack
Test Run: 4
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/11/95
Meter ΔH@: 1.8063
Meter Y_d: 0.9853
Pitot C_p: 0.84
Static P: -0.2
Leak Rate Before: 0.000 cfm @ 15"Hg
Leak Rate After: 0.000 cfm @ 15"Hg

Method: M2, M4
Testing Type: Velocity, Moisture
Area (ft²): 85.90

Bar. Press. (in. Hg): 23.78
Actual Moisture (%): 36.1
O_2 (dry volume %): 8.6
CO_2 (dry volume %): 14.2
Start Time (approx.): 15:51
Stop Time (approx.): 16:36
H_2O (condensate, ml): 264.0
H_2O (silica, g): 8.5

Traverse Point	Pitot ΔP_s (in. H_2O)	Stack T_s (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in.}$ H_2O)	Run Time	Sample ΔH (in. H_2O)	Metered (ft³)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (ft³)
				0.0		580.60			
1-01	0.15	348	0.39	5.0	1.20	584.01	66	66	3.41
1-02	0.13	348	0.36	10.0	1.10	587.05	66	66	3.04
1-03	0.12	348	0.35	15.0	1.10	590.26	66	66	3.21
2-01	0.17	347	0.41	20.0	1.10	593.46	66	66	3.20
2-02	0.14	346	0.37	25.0	1.10	596.65	66	65	3.19
2-03	0.12	347	0.35	30.0	1.10	599.89	65	65	3.24
3-01	0.13	346	0.36	35.0	1.10	603.01	65	64	3.12
3-02	0.13	346	0.36	40.0	1.10	606.17	65	64	3.16
3-03	0.11	345	0.33	45.0	1.10	609.35	64	64	3.18
4-01	0.13	345	0.36						
4-02	0.13	345	0.36						
4-03	0.13	345	0.36						
Final	0.36	346		45.0	1.11	28.75	65		

Field Data Printout

Location: EP 5 Calciner Stack
Test Run: 5
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/12/95
Meter ΔH@: 1.8063
Meter Y_d: 0.9853
Pitot C_p: 0.84
Static P: -0.3
Leak Rate Before: 0.001 cfm @ 15"Hg
Leak Rate After: 0.001 cfm @ 15"Hg

Method: M2, M4
Testing Type: Velocity, Moisture
Area (ft^2): 85.90

Bar. Press. (in. Hg): 23.81
Actual Moisture (%): 36.0
O_2 (dry volume %): 9.3
CO_2 (dry volume %): 13.0
Start Time (approx.): 09:22
Stop Time (approx.): 10:07
H_2O (condensate, ml): 268.0
H_2O (silica, g): 8.5

Traverse Point	Pitot ΔP_s (in. H_2O)	Stack T_s (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in.}$ H_2O)	Run Time	Sample ΔH (in. H_2O)	Metered (ft^3)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (ft^3)
				0.0		609.52			
1-01	0.10	337	0.32	5.0	1.20	612.81	55	54	3.29
1-02	0.12	337	0.35	10.0	1.20	616.06	56	54	3.25
1-03	0.11	337	0.33	15.0	1.10	619.28	56	54	3.22
2-01	0.12	337	0.35	20.0	1.10	622.50	56	55	3.22
2-02	0.12	337	0.35	25.0	1.10	625.68	58	56	3.18
2-03	0.07	337	0.26	30.0	1.10	628.87	59	57	3.19
3-01	0.10	336	0.32	35.0	1.10	632.04	61	57	3.17
3-02	0.10	336	0.32	40.0	1.10	635.23	63	59	3.19
3-03	0.09	336	0.30	45.0	1.10	638.40	64	60	3.17
4-01	0.10	337	0.32						
4-02	0.11	337	0.33						
4-03	0.11	337	0.33						
Final	0.32	337		45.0	1.12	28.88	57		

Revision 0

Field Data Printout

Location: EP 5 Calciner Stack
Test Run: 6
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/12/95
Meter ΔH@: 1.8063
Meter Y_d: 0.9853
Pitot C_p: 0.84
Static P: -0.3
Leak Rate Before: 0.001 cfm @ 15"Hg
Leak Rate After: 0.001 cfm @ 15"Hg

Method: M2, M4
Testing Type: Velocity, Moisture
Area (ft^2): 85.90

Bar. Press. (in. Hg): 23.81
Actual Moisture (%): 36.1
O_2 (dry volume %): 9.0
CO_2 (dry volume %): 13.4
Start Time (approx.): 10:50
Stop Time (approx.): 11:35
H_2O (condensate, ml): 250.0
H_2O (silica, g): 8.5

Traverse Point	Pitot ΔP_s (in. H_2O)	Stack T_s (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in.}$ H_2O)	Run Time	Sample ΔH (in. H_2O)	Metered (ft^3)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (ft^3)
				0.0		640.11			
1-01	0.12	330	0.35	5.0	0.95	643.30	71	68	3.19
1-02	0.12	331	0.35	10.0	0.95	646.52	73	70	3.22
1-03	0.11	331	0.33	15.0	0.98	649.42	74	70	2.90
2-01	0.12	330	0.35	20.0	0.98	652.52	75	71	3.10
2-02	0.12	330	0.35	25.0	0.95	655.59	76	72	3.07
2-03	0.09	330	0.30	30.0	0.95	658.64	77	73	3.05
3-01	0.08	330	0.28	35.0	0.95	661.69	78	74	3.05
3-02	0.10	331	0.32	40.0	0.95	664.76	78	74	3.07
3-03	0.08	332	0.28	45.0	0.94	667.82	79	74	3.06
4-01	0.10	333	0.32						
4-02	0.11	331	0.33						
4-03	0.09	332	0.30						
Final	0.32	331		45.0	0.96	27.71	74		

Field Data Printout

Location: EP 5 Calciner Stack
Test Run: 7
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/12/95
Meter ΔH@: 1.8063
Meter Y_d: 0.9853
Pitot C_p: 0.84
Static P: -0.3
Leak Rate Before: 0.001 cfm @ 15"Hg
Leak Rate After: 0.001 cfm @ 16"Hg

Method: M2, M4
Testing Type: Velocity, Moisture
Area (ft^2): 85.90

Bar. Press. (in. Hg): 23.81
Actual Moisture (%): 35.6

O_2 (dry volume %): 8.9
CO_2 (dry volume %): 14.0
Start Time (approx.): 12:10
Stop Time (approx.): 12:55
H_2O (condensate, ml): 253.0
H_2O (silica, g): 8.5

Traverse Point	Pitot ΔP_s (in. H_2O)	Stack T_s (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in.}$ H_2O)	Run Time	Sample ΔH (in. H_2O)	Metered (ft^3)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (ft^3)
				0.0		667.95			
1-01	0.12	317	0.35	5.0	1.10	671.22	79	72	3.27
1-02	0.10	317	0.32	10.0	1.10	674.42	79	73	3.20
1-03	0.07	316	0.26	15.0	1.10	677.63	78	73	3.21
2-01	0.12	315	0.35	20.0	1.00	680.81	79	74	3.18
2-02	0.12	315	0.35	25.0	1.00	684.01	80	75	3.20
2-03	0.11	315	0.33	30.0	1.00	687.18	80	75	3.17
3-01	0.13	315	0.36	35.0	1.00	690.38	81	75	3.20
3-02	0.12	316	0.35	40.0	1.00	693.54	81	76	3.16
3-03	0.10	315	0.32	45.0	1.00	696.73	81	76	3.19
4-01	0.11	315	0.33						
4-02	0.11	315	0.33						
4-03	0.09	315	0.30						
Final	0.33	316		45.0	1.03	28.78	77		

Revision 0

Field Data Printout

Location: EP 5 Calciner Stack Method: 18 Bar. Press. (in. Hg): 23.78
Test Run: 1 Collection Medium: Various
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/11/95

Meter Y_d: 1.0145 Start Time (approx.): 10:55
Stop Time (approx.): 11:55

Leak Rate Before: 0.003 cfm @ 5"Hg
Leak Rate After:

Run Time	Sample ΔH (in. H_2O)	Metered (L)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (L)
0.0		392.45			
5.0	1.00	394.00	60		1.55
10.0	1.00	395.38	59		1.38
15.0	1.00	396.75	59		1.37
20.0	1.00	398.20	58		1.45
25.0	1.00	400.70	56		2.50
30.0	1.00	401.10	54		0.40
35.0	1.00	402.51	53		1.41
40.0	1.00	404.95	53		2.44
45.0	1.00	405.48	52		0.53
50.0	1.00	406.70	53		1.22
55.0	1.00	408.15	53		1.45
60.0	1.00	409.89	53		1.74
60.0	1.00	17.44	55		

Field Data Printout

Location: EP 5 Calciner Stack
Method: 18
Bar. Press. (in. Hg): 23.78
Test Run: 2
Collection Medium: Various
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/11/95

Meter Y_d: 1.0145

Start Time (approx.): 12:52
Stop Time (approx.): 13:52

Leak Rate Before: 0.004 cfm @ 5"Hg
Leak Rate After:

Run Time	Sample ΔH (in. H_2O)	Metered (L)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (L)
0.0		494.10			
5.0	1.00	495.95	58		1.85
10.0	1.00	497.16	56		1.21
15.0	1.00	498.92	55		1.76
20.0	1.00	500.32	56		1.40
25.0	1.00	501.82	57		1.50
30.0	1.00	503.30	57		1.48
35.0	1.00	504.65	56		1.35
40.0	1.00	506.09	58		1.44
45.0	1.00	507.48	58		1.39
50.0	1.00	508.92	59		1.44
55.0	1.00	510.33	59		1.41
60.0	1.00	511.67	60		1.34
60.0	1.00	17.57	57		

Field Data Printout

Location: EP 5 Calciner Stack Method: 18 Bar. Press. (in. Hg): 23.78
Test Run: 3 Collection Medium: Various
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/11/95

Meter Y_d: 1.0145 Start Time (approx.): 14:30
Stop Time (approx.): 15:30

Leak Rate Before: 0.004 cfm @ 5"Hg
Leak Rate After:

Run Time	Sample ΔH (in. H_2O)	Metered (L)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (L)
0.0		515.31			
5.0	1.00	516.49	52		1.18
10.0	1.00	517.75	52		1.26
15.0	1.00	518.96	51		1.21
20.0	1.00	520.09	52		1.13
25.0	1.00	521.32	51		1.23
30.0	1.00	522.57	50		1.25
35.0	1.00	523.75	51		1.18
40.0	1.00	525.01	51		1.26
45.0	1.00	526.25	51		1.24
50.0	1.00	527.48	50		1.23
55.0	1.00	528.75	50		1.27
60.0	1.00	529.99	51		1.24
60.0	1.00	14.68	51		

Field Data Printout

Location: EP 5 Calciner Stack
Method: 18
Bar. Press. (in. Hg): 23.78
Test Run: 4
Collection Medium: Various
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/11/95

Meter Y_d: 1.0145

Start Time (approx.): 15:56
Stop Time (approx.): 16:56

Leak Rate Before: 0.005 cfm @ 5"Hg
Leak Rate After:

Run Time	Sample ΔH (in. H_2O)	Metered (L)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (L)
0.0		535.15			
5.0	1.00	536.80	48		1.65
10.0	1.00	538.41	48		1.61
15.0	1.00	539.90	49		1.49
20.0	1.00	541.40	48		1.50
25.0	1.00	542.93	49		1.53
30.0	1.00	544.62	50		1.69
35.0	1.00	546.40	50		1.78
40.0	1.00	548.11	51		1.71
45.0	1.00	549.88	50		1.77
50.0	1.00	551.52	49		1.64
55.0	1.00	553.28	50		1.76
60.0	1.00	554.98	51		1.70
60.0	1.00	19.83	49		

Field Data Printout

Location: EP 5 Calciner Stack Method: 18 Bar. Press. (in. Hg): 23.81
Test Run: 5 Collection Medium: Various
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/12/95

Meter Y_d: 1.0145

Start Time (approx.): 09:22
Stop Time (approx.): 10:22

Leak Rate Before: 0.010 cfm @ 6"Hg
Leak Rate After:

Run Time	Sample ΔH (in. H_2O)	Metered (L)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (L)
0.0		606.33			
5.0	1.00	607.50	53		1.17
10.0	1.00	609.19	52		1.69
15.0	1.00	610.55	52		1.36
20.0	1.00	611.99	53		1.44
25.0	1.00	613.35	55		1.36
30.0	1.00	614.69	57		1.34
35.0	1.00	616.05	60		1.36
40.0	1.00	617.48	62		1.43
45.0	1.00	619.02	64		1.54
50.0	1.00	620.61	65		1.59
55.0	1.00	622.14	64		1.53
60.0	1.00	623.64	66		1.50
60.0	1.00	17.31	59		

Field Data Printout

Location: EP 5 Calciner Stack
Method: 18
Bar. Press. (in. Hg): 23.81
Test Run: 6
Collection Medium: Various
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/12/95

Meter Y_d: 1.0145

Start Time (approx.): 10:50
Stop Time (approx.): 11:50

Leak Rate Before: 0.009 cfm @ 6"Hg
Leak Rate After:

Run Time	Sample ΔH (in. H_2O)	Metered (L)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (L)
0.0		627.25			
5.0	1.00	628.75	68		1.50
10.0	1.00	630.28	70		1.53
15.0	1.00	631.69	72		1.41
20.0	1.00	633.15	74		1.46
25.0	1.00	634.58	75		1.43
30.0	1.00	635.97	76		1.39
35.0	1.00	637.32	77		1.35
40.0	1.00	638.80	79		1.48
45.0	1.00	640.23	80		1.43
50.0	1.00	641.56	81		1.33
55.0	1.00	642.98	80		1.42
60.0	1.00	644.40	81		1.42
60.0	1.00	17.15	76		

Field Data Printout

Location: EP 5 Calciner Stack Method: 18 Bar. Press. (in. Hg): 23.81
Test Run: 7 Collection Medium: Various
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/12/95

Meter Y_d: 1.0145

Start Time (approx.): 21:10
Stop Time (approx.): 13:10

Leak Rate Before:
Leak Rate After:

Run Time	Sample ΔH (in. H_2O)	Metered (L)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (L)
0.0		646.64			
5.0	1.00	648.28	78		1.64
10.0	1.00	649.85	77		1.57
15.0	1.00	651.48	77		1.63
20.0	1.00	653.09	78		1.61
25.0	1.00	654.61	78		1.52
30.0	1.00	656.22	79		1.61
35.0	1.00	657.72	78		1.50
40.0	1.00	659.22	79		1.50
45.0	1.00	660.81	80		1.59
50.0	1.00	662.40	81		1.59
55.0	1.00	663.91	81		1.51
60.0	1.00	665.58	82		1.67
60.0	1.00	18.94	79		

Field Data Printout

Location: EP 5 Calciner
Test Run: 1
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/11/95
Meter Y_d: 0.9837
Static P: N/A
Leak Rate Before: 0.00 LPM @ 15 "Hg
Leak Rate After: 0.00 LPM @ 15 "Hg

Method: SW846-0030
Testing Type: VOCs
Area (ft^2): N/A

Bar. Press. (in. Hg): 23.78
O_2 (dry volume %)[1]: 10.4
CO_2 (dry volume %)[1]: 12.2
Start Time (approx.): 10:55
Stop Time (approx.): 11:15

Run Time	Sample ΔH (in. H_2O)	Metered (liters)	Dry Gas Meter T_m (°F)	Volume (calculated) (liters)
0.0		0.00		
5.0	0.20	0.26	61	0.26
10.0	0.20	0.51	61	0.25
15.0	0.40	0.75	61	0.24
20.0	0.60	1.01	62	0.26
20.0	0.35	1.01	61	

[1] Oxygen and carbon dioxide concentrations were obtained from the Velocity and Moisture Parameters.

Field Data Printout

Location: EP 5 Calciner
Method: SW846-0030
Bar. Press. (in. Hg): 23.78
Test Run: 2
Testing Type: VOCs
O_2 (dry volume %)[1]: 8.9
Client: Solvay Minerals, Inc.
CO_2 (dry volume %)[1]: 13.8
Project No: 7356-2
Start Time (approx.): 12:52
Test Date: 1/11/95
Stop Time (approx.): 13:12
Meter Y_d: 0.9837
Area (ft^2): N/A
Static P: N/A
Leak Rate Before: 0.00 LPM @ 15 "Hg
Leak Rate After: 0.00 LPM @ 15 "Hg

Run Time	Sample ΔH (in. H_2O)	Metered (liters)	Dry Gas Meter T_m (°F)	Volume (calculated) (liters)
0.0		0.00		
5.0	1.00	0.24	60	0.24
10.0	1.00	0.50	60	0.26
15.0	1.00	0.74	61	0.24
20.0	1.00	1.00	61	0.26
20.0	1.00	1.00	61	

[1] Oxygen and carbon dioxide concentrations were obtained from the Velocity and Moisture Parameters.

Field Data Printout

Location: EP 5 Calciner
Test Run: 3
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/11/95
Meter Y_d: 0.9837
Static P: N/A
Leak Rate Before: 0.00 LPM @ 15 "Hg
Leak Rate After: 0.00 LPM @ 15 "Hg

Method: SW846-0030
Testing Type: VOCs
Area (ft^2): N/A

Bar. Press. (in. Hg): 23.78
O_2 (dry volume %)[1]: 8.9
CO_2 (dry volume %)[1]: 14.0
Start Time (approx.): 14:30
Stop Time (approx.): 14:50

Run Time	Sample ΔH (in. H_2O)	Metered (liters)	Dry Gas Meter T_m (°F)	Volume (calculated) (liters)
0.0		0.00		
5.0	0.80	0.24	65	0.24
10.0	0.80	0.40	65	0.16
15.0	0.80	0.75	66	0.35
20.0	0.80	1.00	68	0.25
20.0	0.80	1.00	66	

[1] Oxygen and carbon dioxide concentrations were obtained from the Velocity and Moisture Parameters.

Field Data Printout

Location: EP 5 Calciner
Test Run: 4
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/11/95
Meter Y_d: 0.9837
Static P: N/A
Leak Rate Before: 0.00 LPM @ 15 "Hg
Leak Rate After: 0.00 LPM @ 15 "Hg

Method: SW846-0030
Testing Type: VOCs
Area (ft^2): N/A

Bar. Press. (in. Hg): 23.78
O_2 (dry volume %)[1]: 8.6
CO_2 (dry volume %)[1]: 14.2
Start Time (approx.): 15:56
Stop Time (approx.): 16:16

Run Time	Sample ΔH (in. H_2O)	Metered (liters)	Dry Gas Meter T_m (°F)	Volume (calculated) (liters)
0.0		0.00		
5.0	0.80	0.25	62	0.25
10.0	0.80	0.51	62	0.26
15.0	0.80	0.74	62	0.23
20.0	0.80	1.01	62	0.27
20.0	0.80	1.01	62	

[1] Oxygen and carbon dioxide concentrations were obtained from the Velocity and Moisture Parameters.

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 11, 1995

Calibration Bias Run 0

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
10:15:31									
10:15:46	0.0	0.0	7.8	0.0	0.0	0.0	0.0	0.0	0.0
10:16:01	0.0	0.0	6.4	0.0	0.0	0.0	0.0	0.0	0.0
10:16:16	0.0	0.0	4.9	0.0	0.0	0.0	0.0	0.0	0.0
10:16:31	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0
10:16:46	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0
10:17:01	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
10:17:16	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
10:17:31	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0
10:17:46	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0
10:18:01	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0
10:18:16	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
10:18:31	0.0	0.0	296.9	0.0	0.0	0.0	0.0	0.0	0.0
10:18:46	0.0	0.0	833.0	0.0	0.0	0.0	0.0	0.0	0.0
10:19:01	0.0	0.0	847.9	0.0	0.0	0.0	0.0	0.0	0.0
10:19:16	0.0	0.0	852.0	0.0	0.0	0.0	0.0	0.0	0.0
10:19:31	0.0	0.0	850.3	0.0	0.0	0.0	0.0	0.0	0.0
10:19:46	0.0	0.0	850.4	0.0	0.0	0.0	0.0	0.0	0.0
10:20:01	0.0	0.0	850.1	0.0	0.0	0.0	0.0	0.0	0.0
10:20:16	0.0	0.0	851.0	0.0	0.0	0.0	0.0	0.0	0.0
10:20:31	0.0	0.0	849.8	0.0	0.0	0.0	0.0	0.0	0.0
10:20:46	0.0	0.0	849.9	0.0	0.0	0.0	0.0	0.0	0.0
10:21:01	0.0	0.0	833.9	0.0	0.0	0.0	0.0	0.0	0.0
10:21:16	0.0	0.0	286.4	0.0	0.0	0.0	0.0	0.0	0.0
10:21:31	0.0	0.0	257.7	0.0	0.0	0.0	0.0	0.0	0.0
10:21:46	0.0	0.0	254.9	0.0	0.0	0.0	0.0	0.0	0.0
10:22:01	0.0	0.0	253.4	0.0	0.0	0.0	0.0	0.0	0.0
10:22:16	0.0	0.0	252.5	0.0	0.0	0.0	0.0	0.0	0.0
10:22:31	0.0	0.0	252.0	0.0	0.0	0.0	0.0	0.0	0.0
10:22:46	0.0	0.0	251.5	0.0	0.0	0.0	0.0	0.0	0.0
10:23:01	0.0	0.0	251.2	0.0	0.0	0.0	0.0	0.0	0.0
10:23:16	0.0	0.0	250.7	0.0	0.0	0.0	0.0	0.0	0.0
10:23:31	0.0	0.0	250.5	0.0	0.0	0.0	0.0	0.0	0.0
10:23:46	0.0	0.0	377.6	0.0	0.0	0.0	0.0	0.0	0.0
10:24:01	0.0	0.0	542.8	0.0	0.0	0.0	0.0	0.0	0.0
10:24:16	0.0	0.0	545.8	0.0	0.0	0.0	0.0	0.0	0.0
10:24:31	0.0	0.0	546.6	0.0	0.0	0.0	0.0	0.0	0.0
10:24:46	0.0	0.0	547.0	0.0	0.0	0.0	0.0	0.0	0.0
10:25:01	0.0	0.0	547.0	0.0	0.0	0.0	0.0	0.0	0.0
10:25:16	0.0	0.0	547.0	0.0	0.0	0.0	0.0	0.0	0.0
10:25:31	0.0	0.0	546.5	0.0	0.0	0.0	0.0	0.0	0.0
10:25:46	0.0	0.0	546.3	0.0	0.0	0.0	0.0	0.0	0.0
10:26:01	0.0	0.0	546.4	0.0	0.0	0.0	0.0	0.0	0.0
10:26:16	0.0	0.0	546.6	0.0	0.0	0.0	0.0	0.0	0.0
10:26:31	0.0	0.0	546.4	0.0	0.0	0.0	0.0	0.0	0.0
10:26:46	0.0	0.0	545.9	0.0	0.0	0.0	0.0	0.0	0.0

Zero cal. gas	0.7
Low cal. gas	251.1
Mid. cal. gas	546.5
High cal. gas	850.3

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 11, 1995

Run 1

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
10:45									
10:46	0.0	0.0	266.8	0.0	0.0	0.0	0.0	0.0	0.0
10:47	0.0	0.0	287.3	0.0	0.0	0.0	0.0	0.0	0.0
10:48	0.0	0.0	292.4	0.0	0.0	0.0	0.0	0.0	0.0
10:49	0.0	0.0	301.3	0.0	0.0	0.0	0.0	0.0	0.0
10:50	0.0	0.0	294.7	0.0	0.0	0.0	0.0	0.0	0.0
10:51	0.0	0.0	290.1	0.0	0.0	0.0	0.0	0.0	0.0
10:52	0.0	0.0	274.8	0.0	0.0	0.0	0.0	0.0	0.0
10:53	0.0	0.0	265.6	0.0	0.0	0.0	0.0	0.0	0.0
10:54	0.0	0.0	263.6	0.0	0.0	0.0	0.0	0.0	0.0
10:55	0.0	0.0	255.6	0.0	0.0	0.0	0.0	0.0	0.0
10:56	0.0	0.0	244.1	0.0	0.0	0.0	0.0	0.0	0.0
10:57	0.0	0.0	247.7	0.0	0.0	0.0	0.0	0.0	0.0
10:58	0.0	0.0	245.2	0.0	0.0	0.0	0.0	0.0	0.0
10:59	0.0	0.0	244.5	0.0	0.0	0.0	0.0	0.0	0.0
11:00	0.0	0.0	246.1	0.0	0.0	0.0	0.0	0.0	0.0
11:01	0.0	0.0	238.6	0.0	0.0	0.0	0.0	0.0	0.0
11:02	0.0	0.0	237.7	0.0	0.0	0.0	0.0	0.0	0.0
11:03	0.0	0.0	239.8	0.0	0.0	0.0	0.0	0.0	0.0
11:04	0.0	0.0	245.0	0.0	0.0	0.0	0.0	0.0	0.0
11:05	0.0	0.0	249.4	0.0	0.0	0.0	0.0	0.0	0.0
11:06	0.0	0.0	242.9	0.0	0.0	0.0	0.0	0.0	0.0
11:07	0.0	0.0	243.1	0.0	0.0	0.0	0.0	0.0	0.0
11:08	0.0	0.0	235.7	0.0	0.0	0.0	0.0	0.0	0.0
11:09	0.0	0.0	248.7	0.0	0.0	0.0	0.0	0.0	0.0
11:10	0.0	0.0	253.5	0.0	0.0	0.0	0.0	0.0	0.0
11:11	0.0	0.0	247.1	0.0	0.0	0.0	0.0	0.0	0.0
11:12	0.0	0.0	257.0	0.0	0.0	0.0	0.0	0.0	0.0
11:13	0.0	0.0	263.7	0.0	0.0	0.0	0.0	0.0	0.0
11:14	0.0	0.0	270.9	0.0	0.0	0.0	0.0	0.0	0.0
11:15	0.0	0.0	272.7	0.0	0.0	0.0	0.0	0.0	0.0
11:16	0.0	0.0	274.6	0.0	0.0	0.0	0.0	0.0	0.0
11:17	0.0	0.0	283.2	0.0	0.0	0.0	0.0	0.0	0.0
11:18	0.0	0.0	286.3	0.0	0.0	0.0	0.0	0.0	0.0
11:19	0.0	0.0	286.0	0.0	0.0	0.0	0.0	0.0	0.0
11:20	0.0	0.0	281.6	0.0	0.0	0.0	0.0	0.0	0.0
11:21	0.0	0.0	289.0	0.0	0.0	0.0	0.0	0.0	0.0
11:22	0.0	0.0	302.3	0.0	0.0	0.0	0.0	0.0	0.0
11:23	0.0	0.0	311.3	0.0	0.0	0.0	0.0	0.0	0.0
11:24	0.0	0.0	317.9	0.0	0.0	0.0	0.0	0.0	0.0
11:25	0.0	0.0	308.5	0.0	0.0	0.0	0.0	0.0	0.0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 11, 1995

Run 1

Time	NOx	SO2	THC	O2	CO2	CO	SO2 In	O2 In	CO2 In
	ppm	ppm	ppm	%	%	ppm	ppm	%	%
11:26	0.0	0.0	309.0	0.0	0.0	0.0	0.0	0.0	0.0
11:27	0.0	0.0	285.5	0.0	0.0	0.0	0.0	0.0	0.0
11:28	0.0	0.0	283.4	0.0	0.0	0.0	0.0	0.0	0.0
11:29	0.0	0.0	281.9	0.0	0.0	0.0	0.0	0.0	0.0
11:30	0.0	0.0	267.8	0.0	0.0	0.0	0.0	0.0	0.0
11:31	0.0	0.0	267.5	0.0	0.0	0.0	0.0	0.0	0.0
11:32	0.0	0.0	264.1	0.0	0.0	0.0	0.0	0.0	0.0
11:33	0.0	0.0	251.3	0.0	0.0	0.0	0.0	0.0	0.0
11:34	0.0	0.0	244.1	0.0	0.0	0.0	0.0	0.0	0.0
11:35	0.0	0.0	240.2	0.0	0.0	0.0	0.0	0.0	0.0
11:36	0.0	0.0	238.4	0.0	0.0	0.0	0.0	0.0	0.0
11:37	0.0	0.0	232.5	0.0	0.0	0.0	0.0	0.0	0.0
11:38	0.0	0.0	226.7	0.0	0.0	0.0	0.0	0.0	0.0
11:39	0.0	0.0	227.7	0.0	0.0	0.0	0.0	0.0	0.0
11:40	0.0	0.0	226.3	0.0	0.0	0.0	0.0	0.0	0.0
11:41	0.0	0.0	226.9	0.0	0.0	0.0	0.0	0.0	0.0
11:42	0.0	0.0	223.5	0.0	0.0	0.0	0.0	0.0	0.0
11:43	0.0	0.0	211.9	0.0	0.0	0.0	0.0	0.0	0.0
11:44	0.0	0.0	214.6	0.0	0.0	0.0	0.0	0.0	0.0
11:45	0.0	0.0	222.2	0.0	0.0	0.0	0.0	0.0	0.0
Average			260.9						

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 11, 1995

Calibration Bias Run 1

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
11:49:06									
11:49:21	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0
11:49:36	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0
11:49:51	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0
11:50:06	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0
11:50:21	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0
11:50:36	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
11:50:51	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11:51:06	0.0	0.0	-0.2	0.0	0.0	0.0	0.0	0.0	0.0
11:51:21	0.0	0.0	-0.5	0.0	0.0	0.0	0.0	0.0	0.0
11:51:36	0.0	0.0	-0.5	0.0	0.0	0.0	0.0	0.0	0.0
11:51:51	0.0	0.0	-0.5	0.0	0.0	0.0	0.0	0.0	0.0
11:52:06	0.0	0.0	45.3	0.0	0.0	0.0	0.0	0.0	0.0
11:52:21	0.0	0.0	522.7	0.0	0.0	0.0	0.0	0.0	0.0
11:52:36	0.0	0.0	539.5	0.0	0.0	0.0	0.0	0.0	0.0
11:52:51	0.0	0.0	543.0	0.0	0.0	0.0	0.0	0.0	0.0
11:53:06	0.0	0.0	545.1	0.0	0.0	0.0	0.0	0.0	0.0
11:53:21	0.0	0.0	546.4	0.0	0.0	0.0	0.0	0.0	0.0
11:53:36	0.0	0.0	547.6	0.0	0.0	0.0	0.0	0.0	0.0
11:53:51	0.0	0.0	548.4	0.0	0.0	0.0	0.0	0.0	0.0
11:54:06	0.0	0.0	549.3	0.0	0.0	0.0	0.0	0.0	0.0
11:54:21	0.0	0.0	549.6	0.0	0.0	0.0	0.0	0.0	0.0
11:54:36	0.0	0.0	546.5	0.0	0.0	0.0	0.0	0.0	0.0
11:54:51	0.0	0.0	548.5	0.0	0.0	0.0	0.0	0.0	0.0
11:55:06	0.0	0.0	548.2	0.0	0.0	0.0	0.0	0.0	0.0
11:55:21	0.0	0.0	548.8	0.0	0.0	0.0	0.0	0.0	0.0
11:55:36	0.0	0.0	549.3	0.0	0.0	0.0	0.0	0.0	0.0

Zero cal. gas	-0.5
Mid. cal. gas	548.5

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 11, 1995

Run 2

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
12:50									
12:51	0.0	0.0	294.3	0.0	0.0	0.0	0.0	0.0	0.0
12:52	0.0	0.0	300.1	0.0	0.0	0.0	0.0	0.0	0.0
12:53	0.0	0.0	305.0	0.0	0.0	0.0	0.0	0.0	0.0
12:54	0.0	0.0	308.5	0.0	0.0	0.0	0.0	0.0	0.0
12:55	0.0	0.0	310.0	0.0	0.0	0.0	0.0	0.0	0.0
12:56	0.0	0.0	310.9	0.0	0.0	0.0	0.0	0.0	0.0
12:57	0.0	0.0	323.5	0.0	0.0	0.0	0.0	0.0	0.0
12:58	0.0	0.0	330.2	0.0	0.0	0.0	0.0	0.0	0.0
12:59	0.0	0.0	328.7	0.0	0.0	0.0	0.0	0.0	0.0
13:00	0.0	0.0	330.2	0.0	0.0	0.0	0.0	0.0	0.0
13:01	0.0	0.0	335.1	0.0	0.0	0.0	0.0	0.0	0.0
13:02	0.0	0.0	334.4	0.0	0.0	0.0	0.0	0.0	0.0
13:03	0.0	0.0	338.0	0.0	0.0	0.0	0.0	0.0	0.0
13:04	0.0	0.0	337.7	0.0	0.0	0.0	0.0	0.0	0.0
13:05	0.0	0.0	319.8	0.0	0.0	0.0	0.0	0.0	0.0
13:06	0.0	0.0	316.9	0.0	0.0	0.0	0.0	0.0	0.0
13:07	0.0	0.0	313.7	0.0	0.0	0.0	0.0	0.0	0.0
13:08	0.0	0.0	306.5	0.0	0.0	0.0	0.0	0.0	0.0
13:09	0.0	0.0	297.6	0.0	0.0	0.0	0.0	0.0	0.0
13:10	0.0	0.0	287.1	0.0	0.0	0.0	0.0	0.0	0.0
13:11	0.0	0.0	292.6	0.0	0.0	0.0	0.0	0.0	0.0
13:12	0.0	0.0	295.8	0.0	0.0	0.0	0.0	0.0	0.0
13:13	0.0	0.0	295.1	0.0	0.0	0.0	0.0	0.0	0.0
13:14	0.0	0.0	288.7	0.0	0.0	0.0	0.0	0.0	0.0
13:15	0.0	0.0	281.2	0.0	0.0	0.0	0.0	0.0	0.0
13:16	0.0	0.0	286.6	0.0	0.0	0.0	0.0	0.0	0.0
13:17	0.0	0.0	289.5	0.0	0.0	0.0	0.0	0.0	0.0
13:18	0.0	0.0	286.3	0.0	0.0	0.0	0.0	0.0	0.0
13:19	0.0	0.0	284.7	0.0	0.0	0.0	0.0	0.0	0.0
13:20	0.0	0.0	276.0	0.0	0.0	0.0	0.0	0.0	0.0
13:21	0.0	0.0	286.2	0.0	0.0	0.0	0.0	0.0	0.0
13:22	0.0	0.0	290.0	0.0	0.0	0.0	0.0	0.0	0.0
13:23	0.0	0.0	287.5	0.0	0.0	0.0	0.0	0.0	0.0
13:24	0.0	0.0	285.2	0.0	0.0	0.0	0.0	0.0	0.0
13:25	0.0	0.0	278.7	0.0	0.0	0.0	0.0	0.0	0.0
13:26	0.0	0.0	281.4	0.0	0.0	0.0	0.0	0.0	0.0
13:27	0.0	0.0	286.1	0.0	0.0	0.0	0.0	0.0	0.0
13:28	0.0	0.0	289.1	0.0	0.0	0.0	0.0	0.0	0.0
13:29	0.0	0.0	286.6	0.0	0.0	0.0	0.0	0.0	0.0
13:30	0.0	0.0	295.5	0.0	0.0	0.0	0.0	0.0	0.0
13:31	0.0	0.0	290.2	0.0	0.0	0.0	0.0	0.0	0.0
13:32	0.0	0.0	279.7	0.0	0.0	0.0	0.0	0.0	0.0
13:33	0.0	0.0	281.6	0.0	0.0	0.0	0.0	0.0	0.0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 11, 1995

Run 2

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
13:34	0.0	0.0	281.2	0.0	0.0	0.0	0.0	0.0	0.0
13:35	0.0	0.0	280.9	0.0	0.0	0.0	0.0	0.0	0.0
13:36	0.0	0.0	278.5	0.0	0.0	0.0	0.0	0.0	0.0
13:37	0.0	0.0	278.9	0.0	0.0	0.0	0.0	0.0	0.0
13:38	0.0	0.0	286.7	0.0	0.0	0.0	0.0	0.0	0.0
13:39	0.0	0.0	284.3	0.0	0.0	0.0	0.0	0.0	0.0
13:40	0.0	0.0	289.1	0.0	0.0	0.0	0.0	0.0	0.0
13:41	0.0	0.0	291.8	0.0	0.0	0.0	0.0	0.0	0.0
13:42	0.0	0.0	290.9	0.0	0.0	0.0	0.0	0.0	0.0
13:43	0.0	0.0	288.8	0.0	0.0	0.0	0.0	0.0	0.0
13:44	0.0	0.0	288.2	0.0	0.0	0.0	0.0	0.0	0.0
13:45	0.0	0.0	287.8	0.0	0.0	0.0	0.0	0.0	0.0
13:46	0.0	0.0	299.5	0.0	0.0	0.0	0.0	0.0	0.0
13:47	0.0	0.0	310.2	0.0	0.0	0.0	0.0	0.0	0.0
13:48	0.0	0.0	317.4	0.0	0.0	0.0	0.0	0.0	0.0
13:49	0.0	0.0	313.7	0.0	0.0	0.0	0.0	0.0	0.0
13:50	0.0	0.0	310.4	0.0	0.0	0.0	0.0	0.0	0.0
Average			298.3						

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 11, 1995

Calibration Bias Run 2

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
14:08:21									
14:08:36	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0
14:08:51	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
14:09:06	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0
14:09:21	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
14:09:36	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
14:09:51	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14:10:06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14:10:21	0.0	0.0	36.4	0.0	0.0	0.0	0.0	0.0	0.0
14:10:36	0.0	0.0	527.9	0.0	0.0	0.0	0.0	0.0	0.0
14:10:51	0.0	0.0	547.2	0.0	0.0	0.0	0.0	0.0	0.0
14:11:06	0.0	0.0	549.3	0.0	0.0	0.0	0.0	0.0	0.0
14:11:21	0.0	0.0	550.6	0.0	0.0	0.0	0.0	0.0	0.0
14:11:36	0.0	0.0	550.0	0.0	0.0	0.0	0.0	0.0	0.0
14:11:51	0.0	0.0	550.8	0.0	0.0	0.0	0.0	0.0	0.0
14:12:06	0.0	0.0	551.4	0.0	0.0	0.0	0.0	0.0	0.0
14:12:21	0.0	0.0	551.7	0.0	0.0	0.0	0.0	0.0	0.0
14:12:36	0.0	0.0	551.6	0.0	0.0	0.0	0.0	0.0	0.0
14:12:51	0.0	0.0	552.0	0.0	0.0	0.0	0.0	0.0	0.0

Zero cal. gas	0.1
Mid. cal gas	550.5

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 11, 1995

Run 3

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
14:25									
14:26	0.0	0.0	271.0	0.0	0.0	0.0	0.0	0.0	0.0
14:27	0.0	0.0	281.2	0.0	0.0	0.0	0.0	0.0	0.0
14:28	0.0	0.0	281.1	0.0	0.0	0.0	0.0	0.0	0.0
14:29	0.0	0.0	286.5	0.0	0.0	0.0	0.0	0.0	0.0
14:30	0.0	0.0	285.7	0.0	0.0	0.0	0.0	0.0	0.0
14:31	0.0	0.0	290.6	0.0	0.0	0.0	0.0	0.0	0.0
14:32	0.0	0.0	289.3	0.0	0.0	0.0	0.0	0.0	0.0
14:33	0.0	0.0	291.1	0.0	0.0	0.0	0.0	0.0	0.0
14:34	0.0	0.0	289.0	0.0	0.0	0.0	0.0	0.0	0.0
14:35	0.0	0.0	285.7	0.0	0.0	0.0	0.0	0.0	0.0
14:36	0.0	0.0	291.8	0.0	0.0	0.0	0.0	0.0	0.0
14:37	0.0	0.0	289.6	0.0	0.0	0.0	0.0	0.0	0.0
14:38	0.0	0.0	290.8	0.0	0.0	0.0	0.0	0.0	0.0
14:39	0.0	0.0	291.2	0.0	0.0	0.0	0.0	0.0	0.0
14:40	0.0	0.0	291.3	0.0	0.0	0.0	0.0	0.0	0.0
14:41	0.0	0.0	288.0	0.0	0.0	0.0	0.0	0.0	0.0
14:42	0.0	0.0	287.1	0.0	0.0	0.0	0.0	0.0	0.0
14:43	0.0	0.0	281.4	0.0	0.0	0.0	0.0	0.0	0.0
14:44	0.0	0.0	276.9	0.0	0.0	0.0	0.0	0.0	0.0
14:45	0.0	0.0	281.4	0.0	0.0	0.0	0.0	0.0	0.0
14:46	0.0	0.0	293.3	0.0	0.0	0.0	0.0	0.0	0.0
14:47	0.0	0.0	299.5	0.0	0.0	0.0	0.0	0.0	0.0
14:48	0.0	0.0	297.3	0.0	0.0	0.0	0.0	0.0	0.0
14:49	0.0	0.0	288.6	0.0	0.0	0.0	0.0	0.0	0.0
14:50	0.0	0.0	282.3	0.0	0.0	0.0	0.0	0.0	0.0
14:51	0.0	0.0	289.2	0.0	0.0	0.0	0.0	0.0	0.0
14:52	0.0	0.0	291.4	0.0	0.0	0.0	0.0	0.0	0.0
14:53	0.0	0.0	293.8	0.0	0.0	0.0	0.0	0.0	0.0
14:54	0.0	0.0	295.4	0.0	0.0	0.0	0.0	0.0	0.0
14:55	0.0	0.0	299.7	0.0	0.0	0.0	0.0	0.0	0.0
14:56	0.0	0.0	298.9	0.0	0.0	0.0	0.0	0.0	0.0
14:57	0.0	0.0	308.4	0.0	0.0	0.0	0.0	0.0	0.0
14:58	0.0	0.0	302.8	0.0	0.0	0.0	0.0	0.0	0.0
14:59	0.0	0.0	299.3	0.0	0.0	0.0	0.0	0.0	0.0
15:00	0.0	0.0	295.2	0.0	0.0	0.0	0.0	0.0	0.0
15:01	0.0	0.0	297.9	0.0	0.0	0.0	0.0	0.0	0.0
15:02	0.0	0.0	296.5	0.0	0.0	0.0	0.0	0.0	0.0
15:03	0.0	0.0	305.0	0.0	0.0	0.0	0.0	0.0	0.0
15:04	0.0	0.0	298.4	0.0	0.0	0.0	0.0	0.0	0.0
15:05	0.0	0.0	303.1	0.0	0.0	0.0	0.0	0.0	0.0
15:06	0.0	0.0	307.0	0.0	0.0	0.0	0.0	0.0	0.0
15:07	0.0	0.0	296.1	0.0	0.0	0.0	0.0	0.0	0.0
15:08	0.0	0.0	292.6	0.0	0.0	0.0	0.0	0.0	0.0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 11, 1995

Run 3

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
15:09	0.0	0.0	298.5	0.0	0.0	0.0	0.0	0.0	0.0
15:10	0.0	0.0	294.9	0.0	0.0	0.0	0.0	0.0	0.0
15:11	0.0	0.0	298.2	0.0	0.0	0.0	0.0	0.0	0.0
15:12	0.0	0.0	301.9	0.0	0.0	0.0	0.0	0.0	0.0
15:13	0.0	0.0	299.8	0.0	0.0	0.0	0.0	0.0	0.0
15:14	0.0	0.0	291.9	0.0	0.0	0.0	0.0	0.0	0.0
15:15	0.0	0.0	303.6	0.0	0.0	0.0	0.0	0.0	0.0
15:16	0.0	0.0	306.2	0.0	0.0	0.0	0.0	0.0	0.0
15:17	0.0	0.0	295.7	0.0	0.0	0.0	0.0	0.0	0.0
15:18	0.0	0.0	304.7	0.0	0.0	0.0	0.0	0.0	0.0
15:19	0.0	0.0	298.1	0.0	0.0	0.0	0.0	0.0	0.0
15:20	0.0	0.0	304.0	0.0	0.0	0.0	0.0	0.0	0.0
15:21	0.0	0.0	308.2	0.0	0.0	0.0	0.0	0.0	0.0
15:22	0.0	0.0	308.0	0.0	0.0	0.0	0.0	0.0	0.0
15:23	0.0	0.0	296.8	0.0	0.0	0.0	0.0	0.0	0.0
15:24	0.0	0.0	301.1	0.0	0.0	0.0	0.0	0.0	0.0
15:25	0.0	0.0	294.9	0.0	0.0	0.0	0.0	0.0	0.0
Average			294.3						

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 11, 1995

Calibration Bias Run 3

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
15:33:15									
15:33:30	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
15:33:45	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
15:34:00	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
15:34:15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15:34:30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15:34:45	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15:35:00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15:35:15	0.0	0.0	412.0	0.0	0.0	0.0	0.0	0.0	0.0
15:35:30	0.0	0.0	549.4	0.0	0.0	0.0	0.0	0.0	0.0
15:35:45	0.0	0.0	551.0	0.0	0.0	0.0	0.0	0.0	0.0
15:36:00	0.0	0.0	552.4	0.0	0.0	0.0	0.0	0.0	0.0
15:36:15	0.0	0.0	553.9	0.0	0.0	0.0	0.0	0.0	0.0
15:36:30	0.0	0.0	555.4	0.0	0.0	0.0	0.0	0.0	0.0
15:36:45	0.0	0.0	556.1	0.0	0.0	0.0	0.0	0.0	0.0
15:37:00	0.0	0.0	556.9	0.0	0.0	0.0	0.0	0.0	0.0
15:37:15	0.0	0.0	557.4	0.0	0.0	0.0	0.0	0.0	0.0
15:37:30	0.0	0.0	557.8	0.0	0.0	0.0	0.0	0.0	0.0
15:37:45	0.0	0.0	558.5	0.0	0.0	0.0	0.0	0.0	0.0
15:38:00	0.0	0.0	558.8	0.0	0.0	0.0	0.0	0.0	0.0
15:38:15	0.0	0.0	557.9	0.0	0.0	0.0	0.0	0.0	0.0
15:38:30	0.0	0.0	558.0	0.0	0.0	0.0	0.0	0.0	0.0

Zero cal. gas	0.0
Mid. cal. gas	556.8

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 11, 1995

Run 4

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
15:51									
15:52	0.0	0.0	216.8	0.0	0.0	0.0	0.0	0.0	0.0
15:53	0.0	0.0	228.0	0.0	0.0	0.0	0.0	0.0	0.0
15:54	0.0	0.0	232.3	0.0	0.0	0.0	0.0	0.0	0.0
15:55	0.0	0.0	236.0	0.0	0.0	0.0	0.0	0.0	0.0
15:56	0.0	0.0	232.4	0.0	0.0	0.0	0.0	0.0	0.0
15:57	0.0	0.0	239.1	0.0	0.0	0.0	0.0	0.0	0.0
15:58	0.0	0.0	235.8	0.0	0.0	0.0	0.0	0.0	0.0
15:59	0.0	0.0	233.2	0.0	0.0	0.0	0.0	0.0	0.0
16:00	0.0	0.0	236.1	0.0	0.0	0.0	0.0	0.0	0.0
16:01	0.0	0.0	239.1	0.0	0.0	0.0	0.0	0.0	0.0
16:02	0.0	0.0	236.7	0.0	0.0	0.0	0.0	0.0	0.0
16:03	0.0	0.0	247.0	0.0	0.0	0.0	0.0	0.0	0.0
16:04	0.0	0.0	254.1	0.0	0.0	0.0	0.0	0.0	0.0
16:05	0.0	0.0	254.9	0.0	0.0	0.0	0.0	0.0	0.0
16:06	0.0	0.0	259.3	0.0	0.0	0.0	0.0	0.0	0.0
16:07	0.0	0.0	271.1	0.0	0.0	0.0	0.0	0.0	0.0
16:08	0.0	0.0	274.7	0.0	0.0	0.0	0.0	0.0	0.0
16:09	0.0	0.0	288.3	0.0	0.0	0.0	0.0	0.0	0.0
16:10	0.0	0.0	305.9	0.0	0.0	0.0	0.0	0.0	0.0
16:11	0.0	0.0	307.0	0.0	0.0	0.0	0.0	0.0	0.0
16:12	0.0	0.0	308.9	0.0	0.0	0.0	0.0	0.0	0.0
16:13	0.0	0.0	295.7	0.0	0.0	0.0	0.0	0.0	0.0
16:14	0.0	0.0	263.1	0.0	0.0	0.0	0.0	0.0	0.0
16:15	0.0	0.0	241.9	0.0	0.0	0.0	0.0	0.0	0.0
16:16	0.0	0.0	247.9	0.0	0.0	0.0	0.0	0.0	0.0
16:17	0.0	0.0	247.9	0.0	0.0	0.0	0.0	0.0	0.0
16:18	0.0	0.0	248.7	0.0	0.0	0.0	0.0	0.0	0.0
16:19	0.0	0.0	240.3	0.0	0.0	0.0	0.0	0.0	0.0
16:20	0.0	0.0	238.8	0.0	0.0	0.0	0.0	0.0	0.0
16:21	0.0	0.0	244.5	0.0	0.0	0.0	0.0	0.0	0.0
16:22	0.0	0.0	250.6	0.0	0.0	0.0	0.0	0.0	0.0
16:23	0.0	0.0	258.8	0.0	0.0	0.0	0.0	0.0	0.0
16:24	0.0	0.0	238.3	0.0	0.0	0.0	0.0	0.0	0.0
16:25	0.0	0.0	261.1	0.0	0.0	0.0	0.0	0.0	0.0
16:26	0.0	0.0	269.6	0.0	0.0	0.0	0.0	0.0	0.0
16:27	0.0	0.0	284.4	0.0	0.0	0.0	0.0	0.0	0.0
16:28	0.0	0.0	295.1	0.0	0.0	0.0	0.0	0.0	0.0
16:29	0.0	0.0	299.6	0.0	0.0	0.0	0.0	0.0	0.0
16:30	0.0	0.0	315.4	0.0	0.0	0.0	0.0	0.0	0.0
16:31	0.0	0.0	318.8	0.0	0.0	0.0	0.0	0.0	0.0
16:32	0.0	0.0	330.4	0.0	0.0	0.0	0.0	0.0	0.0
16:33	0.0	0.0	344.2	0.0	0.0	0.0	0.0	0.0	0.0
16:34	0.0	0.0	339.9	0.0	0.0	0.0	0.0	0.0	0.0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 11, 1995

Run 4

Time	NOx	SO2	THC	O2	CO2	CO	SO2 In	O2 In	CO2 In
	ppm	ppm	ppm	%	%	ppm	ppm	%	%
16:35	0.0	0.0	312.7	0.0	0.0	0.0	0.0	0.0	0.0
16:36	0.0	0.0	296.5	0.0	0.0	0.0	0.0	0.0	0.0
16:37	0.0	0.0	286.9	0.0	0.0	0.0	0.0	0.0	0.0
16:38	0.0	0.0	272.7	0.0	0.0	0.0	0.0	0.0	0.0
16:39	0.0	0.0	261.4	0.0	0.0	0.0	0.0	0.0	0.0
16:40	0.0	0.0	247.0	0.0	0.0	0.0	0.0	0.0	0.0
16:41	0.0	0.0	228.6	0.0	0.0	0.0	0.0	0.0	0.0
16:42	0.0	0.0	218.8	0.0	0.0	0.0	0.0	0.0	0.0
16:43	0.0	0.0	218.2	0.0	0.0	0.0	0.0	0.0	0.0
16:44	0.0	0.0	213.6	0.0	0.0	0.0	0.0	0.0	0.0
16:45	0.0	0.0	216.3	0.0	0.0	0.0	0.0	0.0	0.0
16:46	0.0	0.0	216.9	0.0	0.0	0.0	0.0	0.0	0.0
16:47	0.0	0.0	211.5	0.0	0.0	0.0	0.0	0.0	0.0
16:48	0.0	0.0	208.8	0.0	0.0	0.0	0.0	0.0	0.0
16:49	0.0	0.0	200.8	0.0	0.0	0.0	0.0	0.0	0.0
16:50	0.0	0.0	200.2	0.0	0.0	0.0	0.0	0.0	0.0
16:51	0.0	0.0	203.2	0.0	0.0	0.0	0.0	0.0	0.0
Average			257.1						

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 11, 1995

Calibration Bias Run 4

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
16:59:00									
16:59:15	0.0	0.0	-0.9	0.0	0.0	0.0	0.0	0.0	0.0
16:59:30	0.0	0.0	-1.6	0.0	0.0	0.0	0.0	0.0	0.0
16:59:45	0.0	0.0	-1.8	0.0	0.0	0.0	0.0	0.0	0.0
17:00:00	0.0	0.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0
17:00:15	0.0	0.0	-1.7	0.0	0.0	0.0	0.0	0.0	0.0
17:00:30	0.0	0.0	-2.0	0.0	0.0	0.0	0.0	0.0	0.0
17:00:45	0.0	0.0	-1.9	0.0	0.0	0.0	0.0	0.0	0.0
17:01:00	0.0	0.0	26.3	0.0	0.0	0.0	0.0	0.0	0.0
17:01:15	0.0	0.0	510.7	0.0	0.0	0.0	0.0	0.0	0.0
17:01:30	0.0	0.0	532.0	0.0	0.0	0.0	0.0	0.0	0.0
17:01:45	0.0	0.0	537.2	0.0	0.0	0.0	0.0	0.0	0.0
17:02:00	0.0	0.0	541.5	0.0	0.0	0.0	0.0	0.0	0.0
17:02:15	0.0	0.0	543.9	0.0	0.0	0.0	0.0	0.0	0.0
17:02:30	0.0	0.0	548.6	0.0	0.0	0.0	0.0	0.0	0.0
17:02:45	0.0	0.0	547.9	0.0	0.0	0.0	0.0	0.0	0.0
17:03:00	0.0	0.0	545.6	0.0	0.0	0.0	0.0	0.0	0.0
17:03:15	0.0	0.0	545.8	0.0	0.0	0.0	0.0	0.0	0.0
17:03:30	0.0	0.0	546.7	0.0	0.0	0.0	0.0	0.0	0.0
17:03:45	0.0	0.0	546.9	0.0	0.0	0.0	0.0	0.0	0.0
17:04:00	0.0	0.0	547.2	0.0	0.0	0.0	0.0	0.0	0.0

Zero cal. gas	-1.9
Mid. cal gas	546.9

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 12, 1995

Calibration Bias Run 0

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
08:23:55									
08:24:10	0.0	0.0	-1.9	0.0	0.0	0.0	0.0	0.0	0.0
08:24:25	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
08:24:40	0.0	0.0	-0.4	0.0	0.0	0.0	0.0	0.0	0.0
08:24:55	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
08:25:10	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0
08:25:25	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0
08:25:40	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0
08:25:55	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0
08:26:10	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0
08:26:25	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0
08:26:40	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0
08:26:55	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0
08:27:10	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0
08:27:25	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0
08:27:40	0.0	0.0	413.8	0.0	0.0	0.0	0.0	0.0	0.0
08:27:55	0.0	0.0	920.5	0.0	0.0	0.0	0.0	0.0	0.0
08:28:10	0.0	0.0	841.7	0.0	0.0	0.0	0.0	0.0	0.0
08:28:25	0.0	0.0	844.7	0.0	0.0	0.0	0.0	0.0	0.0
08:28:40	0.0	0.0	846.9	0.0	0.0	0.0	0.0	0.0	0.0
08:28:55	0.0	0.0	848.5	0.0	0.0	0.0	0.0	0.0	0.0
08:29:10	0.0	0.0	850.0	0.0	0.0	0.0	0.0	0.0	0.0
08:29:25	0.0	0.0	851.4	0.0	0.0	0.0	0.0	0.0	0.0
08:29:40	0.0	0.0	850.8	0.0	0.0	0.0	0.0	0.0	0.0
08:29:55	0.0	0.0	850.7	0.0	0.0	0.0	0.0	0.0	0.0
08:30:10	0.0	0.0	850.4	0.0	0.0	0.0	0.0	0.0	0.0
08:30:25	0.0	0.0	849.7	0.0	0.0	0.0	0.0	0.0	0.0
08:30:40	0.0	0.0	849.8	0.0	0.0	0.0	0.0	0.0	0.0
08:30:55	0.0	0.0	850.7	0.0	0.0	0.0	0.0	0.0	0.0
08:31:10	0.0	0.0	851.2	0.0	0.0	0.0	0.0	0.0	0.0
08:31:25	0.0	0.0	850.6	0.0	0.0	0.0	0.0	0.0	0.0
08:31:40	0.0	0.0	563.7	0.0	0.0	0.0	0.0	0.0	0.0
08:31:55	0.0	0.0	263.9	0.0	0.0	0.0	0.0	0.0	0.0
08:32:10	0.0	0.0	258.6	0.0	0.0	0.0	0.0	0.0	0.0
08:32:25	0.0	0.0	256.7	0.0	0.0	0.0	0.0	0.0	0.0
08:32:40	0.0	0.0	255.3	0.0	0.0	0.0	0.0	0.0	0.0
08:32:55	0.0	0.0	254.7	0.0	0.0	0.0	0.0	0.0	0.0
08:33:10	0.0	0.0	254.6	0.0	0.0	0.0	0.0	0.0	0.0
08:33:25	0.0	0.0	254.0	0.0	0.0	0.0	0.0	0.0	0.0
08:33:40	0.0	0.0	253.6	0.0	0.0	0.0	0.0	0.0	0.0
08:33:55	0.0	0.0	254.1	0.0	0.0	0.0	0.0	0.0	0.0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 12, 1995

Calibration Bias Run 0

Time	NOx	SO2	THC	O2	CO2	CO	SO2 In	O2 In	CO2 In
	ppm	ppm	ppm	%	%	ppm	ppm	%	%
08:34:10	0.0	0.0	254.2	0.0	0.0	0.0	0.0	0.0	0.0
08:34:25	0.0	0.0	253.7	0.0	0.0	0.0	0.0	0.0	0.0
08:34:40	0.0	0.0	253.7	0.0	0.0	0.0	0.0	0.0	0.0
08:34:55	0.0	0.0	319.6	0.0	0.0	0.0	0.0	0.0	0.0
08:35:10	0.0	0.0	544.3	0.0	0.0	0.0	0.0	0.0	0.0
08:35:25	0.0	0.0	548.3	0.0	0.0	0.0	0.0	0.0	0.0
08:35:40	0.0	0.0	549.6	0.0	0.0	0.0	0.0	0.0	0.0
08:35:55	0.0	0.0	549.9	0.0	0.0	0.0	0.0	0.0	0.0
08:36:10	0.0	0.0	550.5	0.0	0.0	0.0	0.0	0.0	0.0
08:36:25	0.0	0.0	550.7	0.0	0.0	0.0	0.0	0.0	0.0
08:36:40	0.0	0.0	551.2	0.0	0.0	0.0	0.0	0.0	0.0
08:36:55	0.0	0.0	551.4	0.0	0.0	0.0	0.0	0.0	0.0
08:37:10	0.0	0.0	551.5	0.0	0.0	0.0	0.0	0.0	0.0
08:37:25	0.0	0.0	551.2	0.0	0.0	0.0	0.0	0.0	0.0
08:37:40	0.0	0.0	551.6	0.0	0.0	0.0	0.0	0.0	0.0
08:37:55	0.0	0.0	551.8	0.0	0.0	0.0	0.0	0.0	0.0

Zero cal. gas	1.8
Low cal. gas	254.4
Mid. cal. gas	551.4
High cal. gas	850.6

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 12, 1995

Run 5

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
09:15									
09:16	0.0	0.0	260.3	0.0	0.0	0.0	0.0	0.0	0.0
09:17	0.0	0.0	254.0	0.0	0.0	0.0	0.0	0.0	0.0
09:18	0.0	0.0	245.9	0.0	0.0	0.0	0.0	0.0	0.0
09:19	0.0	0.0	241.8	0.0	0.0	0.0	0.0	0.0	0.0
09:20	0.0	0.0	248.9	0.0	0.0	0.0	0.0	0.0	0.0
09:21	0.0	0.0	256.2	0.0	0.0	0.0	0.0	0.0	0.0
09:22	0.0	0.0	253.4	0.0	0.0	0.0	0.0	0.0	0.0
09:23	0.0	0.0	254.7	0.0	0.0	0.0	0.0	0.0	0.0
09:24	0.0	0.0	247.4	0.0	0.0	0.0	0.0	0.0	0.0
09:25	0.0	0.0	250.5	0.0	0.0	0.0	0.0	0.0	0.0
09:26	0.0	0.0	246.9	0.0	0.0	0.0	0.0	0.0	0.0
09:27	0.0	0.0	252.4	0.0	0.0	0.0	0.0	0.0	0.0
09:28	0.0	0.0	260.5	0.0	0.0	0.0	0.0	0.0	0.0
09:29	0.0	0.0	261.1	0.0	0.0	0.0	0.0	0.0	0.0
09:30	0.0	0.0	258.2	0.0	0.0	0.0	0.0	0.0	0.0
09:31	0.0	0.0	255.2	0.0	0.0	0.0	0.0	0.0	0.0
09:32	0.0	0.0	256.4	0.0	0.0	0.0	0.0	0.0	0.0
09:33	0.0	0.0	264.7	0.0	0.0	0.0	0.0	0.0	0.0
09:34	0.0	0.0	265.1	0.0	0.0	0.0	0.0	0.0	0.0
09:35	0.0	0.0	257.5	0.0	0.0	0.0	0.0	0.0	0.0
09:36	0.0	0.0	276.8	0.0	0.0	0.0	0.0	0.0	0.0
09:37	0.0	0.0	278.0	0.0	0.0	0.0	0.0	0.0	0.0
09:38	0.0	0.0	277.4	0.0	0.0	0.0	0.0	0.0	0.0
09:39	0.0	0.0	276.8	0.0	0.0	0.0	0.0	0.0	0.0
09:40	0.0	0.0	279.6	0.0	0.0	0.0	0.0	0.0	0.0
09:41	0.0	0.0	282.0	0.0	0.0	0.0	0.0	0.0	0.0
09:42	0.0	0.0	261.4	0.0	0.0	0.0	0.0	0.0	0.0
09:43	0.0	0.0	275.0	0.0	0.0	0.0	0.0	0.0	0.0
09:44	0.0	0.0	281.6	0.0	0.0	0.0	0.0	0.0	0.0
09:45	0.0	0.0	292.0	0.0	0.0	0.0	0.0	0.0	0.0
09:46	0.0	0.0	287.0	0.0	0.0	0.0	0.0	0.0	0.0
09:47	0.0	0.0	287.0	0.0	0.0	0.0	0.0	0.0	0.0
09:48	0.0	0.0	283.9	0.0	0.0	0.0	0.0	0.0	0.0
09:49	0.0	0.0	270.6	0.0	0.0	0.0	0.0	0.0	0.0
09:50	0.0	0.0	272.6	0.0	0.0	0.0	0.0	0.0	0.0
09:51	0.0	0.0	275.9	0.0	0.0	0.0	0.0	0.0	0.0
09:52	0.0	0.0	276.8	0.0	0.0	0.0	0.0	0.0	0.0
09:53	0.0	0.0	273.7	0.0	0.0	0.0	0.0	0.0	0.0
09:54	0.0	0.0	274.4	0.0	0.0	0.0	0.0	0.0	0.0
09:55	0.0	0.0	260.1	0.0	0.0	0.0	0.0	0.0	0.0
09:56	0.0	0.0	260.2	0.0	0.0	0.0	0.0	0.0	0.0
09:57	0.0	0.0	269.5	0.0	0.0	0.0	0.0	0.0	0.0
09:58	0.0	0.0	274.6	0.0	0.0	0.0	0.0	0.0	0.0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 12, 1995

Run 5

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
09:59	0.0	0.0	281.0	0.0	0.0	0.0	0.0	0.0	0.0
10:00	0.0	0.0	270.4	0.0	0.0	0.0	0.0	0.0	0.0
10:01	0.0	0.0	270.9	0.0	0.0	0.0	0.0	0.0	0.0
10:02	0.0	0.0	274.2	0.0	0.0	0.0	0.0	0.0	0.0
10:03	0.0	0.0	257.5	0.0	0.0	0.0	0.0	0.0	0.0
10:04	0.0	0.0	270.7	0.0	0.0	0.0	0.0	0.0	0.0
10:05	0.0	0.0	282.2	0.0	0.0	0.0	0.0	0.0	0.0
10:06	0.0	0.0	278.5	0.0	0.0	0.0	0.0	0.0	0.0
10:07	0.0	0.0	275.1	0.0	0.0	0.0	0.0	0.0	0.0
10:08	0.0	0.0	261.2	0.0	0.0	0.0	0.0	0.0	0.0
10:09	0.0	0.0	272.0	0.0	0.0	0.0	0.0	0.0	0.0
10:10	0.0	0.0	283.4	0.0	0.0	0.0	0.0	0.0	0.0
10:11	0.0	0.0	290.5	0.0	0.0	0.0	0.0	0.0	0.0
10:12	0.0	0.0	287.6	0.0	0.0	0.0	0.0	0.0	0.0
10:13	0.0	0.0	283.5	0.0	0.0	0.0	0.0	0.0	0.0
10:14	0.0	0.0	285.6	0.0	0.0	0.0	0.0	0.0	0.0
10:15	0.0	0.0	285.0	0.0	0.0	0.0	0.0	0.0	0.0
Average			269.1						

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 12, 1995

Calibration Bias Run 5

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
10:20:24									
10:20:39	0.0	0.0	6.5	0.0	0.0	0.0	0.0	0.0	0.0
10:20:54	0.0	0.0	6.1	0.0	0.0	0.0	0.0	0.0	0.0
10:21:09	0.0	0.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0
10:21:24	0.0	0.0	5.5	0.0	0.0	0.0	0.0	0.0	0.0
10:21:39	0.0	0.0	5.2	0.0	0.0	0.0	0.0	0.0	0.0
10:21:54	0.0	0.0	4.9	0.0	0.0	0.0	0.0	0.0	0.0
10:22:09	0.0	0.0	4.9	0.0	0.0	0.0	0.0	0.0	0.0
10:22:24	0.0	0.0	4.8	0.0	0.0	0.0	0.0	0.0	0.0
10:22:39	0.0	0.0	23.5	0.0	0.0	0.0	0.0	0.0	0.0
10:22:54	0.0	0.0	511.7	0.0	0.0	0.0	0.0	0.0	0.0
10:23:09	0.0	0.0	539.2	0.0	0.0	0.0	0.0	0.0	0.0
10:23:24	0.0	0.0	543.5	0.0	0.0	0.0	0.0	0.0	0.0
10:23:39	0.0	0.0	545.6	0.0	0.0	0.0	0.0	0.0	0.0
10:23:54	0.0	0.0	547.1	0.0	0.0	0.0	0.0	0.0	0.0
10:24:09	0.0	0.0	548.0	0.0	0.0	0.0	0.0	0.0	0.0
10:24:24	0.0	0.0	548.7	0.0	0.0	0.0	0.0	0.0	0.0
10:24:39	0.0	0.0	549.4	0.0	0.0	0.0	0.0	0.0	0.0
10:24:54	0.0	0.0	550.2	0.0	0.0	0.0	0.0	0.0	0.0
10:25:09	0.0	0.0	550.3	0.0	0.0	0.0	0.0	0.0	0.0
10:25:24	0.0	0.0	550.6	0.0	0.0	0.0	0.0	0.0	0.0
10:25:39	0.0	0.0	550.8	0.0	0.0	0.0	0.0	0.0	0.0
10:25:54	0.0	0.0	551.5	0.0	0.0	0.0	0.0	0.0	0.0

Zero cal. gas	4.9
Mid. cal. gas	550.6

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 12, 1995

Run 6

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
10:46									
10:47	0.0	0.0	287.7	0.0	0.0	0.0	0.0	0.0	0.0
10:48	0.0	0.0	279.6	0.0	0.0	0.0	0.0	0.0	0.0
10:49	0.0	0.0	273.3	0.0	0.0	0.0	0.0	0.0	0.0
10:50	0.0	0.0	273.3	0.0	0.0	0.0	0.0	0.0	0.0
10:51	0.0	0.0	266.4	0.0	0.0	0.0	0.0	0.0	0.0
10:52	0.0	0.0	265.0	0.0	0.0	0.0	0.0	0.0	0.0
10:53	0.0	0.0	263.2	0.0	0.0	0.0	0.0	0.0	0.0
10:54	0.0	0.0	251.0	0.0	0.0	0.0	0.0	0.0	0.0
10:55	0.0	0.0	246.2	0.0	0.0	0.0	0.0	0.0	0.0
10:56	0.0	0.0	243.5	0.0	0.0	0.0	0.0	0.0	0.0
10:57	0.0	0.0	248.3	0.0	0.0	0.0	0.0	0.0	0.0
10:58	0.0	0.0	249.2	0.0	0.0	0.0	0.0	0.0	0.0
10:59	0.0	0.0	252.1	0.0	0.0	0.0	0.0	0.0	0.0
11:00	0.0	0.0	240.5	0.0	0.0	0.0	0.0	0.0	0.0
11:01	0.0	0.0	234.8	0.0	0.0	0.0	0.0	0.0	0.0
11:02	0.0	0.0	238.4	0.0	0.0	0.0	0.0	0.0	0.0
11:03	0.0	0.0	250.7	0.0	0.0	0.0	0.0	0.0	0.0
11:04	0.0	0.0	247.7	0.0	0.0	0.0	0.0	0.0	0.0
11:05	0.0	0.0	241.9	0.0	0.0	0.0	0.0	0.0	0.0
11:06	0.0	0.0	242.1	0.0	0.0	0.0	0.0	0.0	0.0
11:07	0.0	0.0	239.4	0.0	0.0	0.0	0.0	0.0	0.0
11:08	0.0	0.0	238.6	0.0	0.0	0.0	0.0	0.0	0.0
11:09	0.0	0.0	245.1	0.0	0.0	0.0	0.0	0.0	0.0
11:10	0.0	0.0	246.7	0.0	0.0	0.0	0.0	0.0	0.0
11:11	0.0	0.0	244.3	0.0	0.0	0.0	0.0	0.0	0.0
11:12	0.0	0.0	252.4	0.0	0.0	0.0	0.0	0.0	0.0
11:13	0.0	0.0	252.3	0.0	0.0	0.0	0.0	0.0	0.0
11:14	0.0	0.0	253.0	0.0	0.0	0.0	0.0	0.0	0.0
11:15	0.0	0.0	258.7	0.0	0.0	0.0	0.0	0.0	0.0
11:16	0.0	0.0	249.9	0.0	0.0	0.0	0.0	0.0	0.0
11:17	0.0	0.0	258.9	0.0	0.0	0.0	0.0	0.0	0.0
11:18	0.0	0.0	255.9	0.0	0.0	0.0	0.0	0.0	0.0
11:19	0.0	0.0	252.3	0.0	0.0	0.0	0.0	0.0	0.0
11:20	0.0	0.0	255.8	0.0	0.0	0.0	0.0	0.0	0.0
11:21	0.0	0.0	257.4	0.0	0.0	0.0	0.0	0.0	0.0
11:22	0.0	0.0	264.3	0.0	0.0	0.0	0.0	0.0	0.0
11:23	0.0	0.0	267.5	0.0	0.0	0.0	0.0	0.0	0.0
11:24	0.0	0.0	270.8	0.0	0.0	0.0	0.0	0.0	0.0
11:25	0.0	0.0	271.7	0.0	0.0	0.0	0.0	0.0	0.0
11:26	0.0	0.0	267.3	0.0	0.0	0.0	0.0	0.0	0.0
11:27	0.0	0.0	260.7	0.0	0.0	0.0	0.0	0.0	0.0
11:28	0.0	0.0	257.6	0.0	0.0	0.0	0.0	0.0	0.0
11:29	0.0	0.0	243.4	0.0	0.0	0.0	0.0	0.0	0.0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 12, 1995

Run 6

Time	NOx	SO2	THC	O2	CO2	CO	SO2 In	O2 In	CO2 In
	ppm	ppm	ppm	%	%	ppm	ppm	%	%
11:30	0.0	0.0	247.2	0.0	0.0	0.0	0.0	0.0	0.0
11:31	0.0	0.0	246.6	0.0	0.0	0.0	0.0	0.0	0.0
11:32	0.0	0.0	252.8	0.0	0.0	0.0	0.0	0.0	0.0
11:33	0.0	0.0	255.3	0.0	0.0	0.0	0.0	0.0	0.0
11:34	0.0	0.0	263.6	0.0	0.0	0.0	0.0	0.0	0.0
11:35	0.0	0.0	271.0	0.0	0.0	0.0	0.0	0.0	0.0
11:36	0.0	0.0	273.6	0.0	0.0	0.0	0.0	0.0	0.0
11:37	0.0	0.0	268.6	0.0	0.0	0.0	0.0	0.0	0.0
11:38	0.0	0.0	274.1	0.0	0.0	0.0	0.0	0.0	0.0
11:39	0.0	0.0	276.9	0.0	0.0	0.0	0.0	0.0	0.0
11:40	0.0	0.0	284.7	0.0	0.0	0.0	0.0	0.0	0.0
11:41	0.0	0.0	291.1	0.0	0.0	0.0	0.0	0.0	0.0
11:42	0.0	0.0	277.4	0.0	0.0	0.0	0.0	0.0	0.0
11:43	0.0	0.0	286.0	0.0	0.0	0.0	0.0	0.0	0.0
11:44	0.0	0.0	288.9	0.0	0.0	0.0	0.0	0.0	0.0
11:45	0.0	0.0	304.7	0.0	0.0	0.0	0.0	0.0	0.0
11:46	0.0	0.0	303.7	0.0	0.0	0.0	0.0	0.0	0.0
Average			260.4						

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 12, 1995

Calibration Bias Run 6

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
11:51:14									
11:51:29	0.0	0.0	7.2	0.0	0.0	0.0	0.0	0.0	0.0
11:51:44	0.0	0.0	7.1	0.0	0.0	0.0	0.0	0.0	0.0
11:51:59	0.0	0.0	6.9	0.0	0.0	0.0	0.0	0.0	0.0
11:52:14	0.0	0.0	6.8	0.0	0.0	0.0	0.0	0.0	0.0
11:52:29	0.0	0.0	6.6	0.0	0.0	0.0	0.0	0.0	0.0
11:52:44	0.0	0.0	6.4	0.0	0.0	0.0	0.0	0.0	0.0
11:52:59	0.0	0.0	6.2	0.0	0.0	0.0	0.0	0.0	0.0
11:53:14	0.0	0.0	5.9	0.0	0.0	0.0	0.0	0.0	0.0
11:53:29	0.0	0.0	23.0	0.0	0.0	0.0	0.0	0.0	0.0
11:53:44	0.0	0.0	504.7	0.0	0.0	0.0	0.0	0.0	0.0
11:53:59	0.0	0.0	531.8	0.0	0.0	0.0	0.0	0.0	0.0
11:54:14	0.0	0.0	535.1	0.0	0.0	0.0	0.0	0.0	0.0
11:54:29	0.0	0.0	539.1	0.0	0.0	0.0	0.0	0.0	0.0
11:54:44	0.0	0.0	542.5	0.0	0.0	0.0	0.0	0.0	0.0
11:54:59	0.0	0.0	543.6	0.0	0.0	0.0	0.0	0.0	0.0
11:55:14	0.0	0.0	545.5	0.0	0.0	0.0	0.0	0.0	0.0
11:55:29	0.0	0.0	548.4	0.0	0.0	0.0	0.0	0.0	0.0
11:55:44	0.0	0.0	546.6	0.0	0.0	0.0	0.0	0.0	0.0
11:55:59	0.0	0.0	547.0	0.0	0.0	0.0	0.0	0.0	0.0
11:56:14	0.0	0.0	545.2	0.0	0.0	0.0	0.0	0.0	0.0
11:56:29	0.0	0.0	544.8	0.0	0.0	0.0	0.0	0.0	0.0
11:56:44	0.0	0.0	546.5	0.0	0.0	0.0	0.0	0.0	0.0
11:56:59	0.0	0.0	546.4	0.0	0.0	0.0	0.0	0.0	0.0
11:57:14	0.0	0.0	545.1	0.0	0.0	0.0	0.0	0.0	0.0
11:57:29	0.0	0.0	544.8	0.0	0.0	0.0	0.0	0.0	0.0

Zero cal. gas	6.2
Mid. cal. gas	546.0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 12, 1995

Run 7

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
12:09									
12:10	0.0	0.0	289.3	0.0	0.0	0.0	0.0	0.0	0.0
12:11	0.0	0.0	289.2	0.0	0.0	0.0	0.0	0.0	0.0
12:12	0.0	0.0	292.6	0.0	0.0	0.0	0.0	0.0	0.0
12:13	0.0	0.0	290.4	0.0	0.0	0.0	0.0	0.0	0.0
12:14	0.0	0.0	281.2	0.0	0.0	0.0	0.0	0.0	0.0
12:15	0.0	0.0	280.8	0.0	0.0	0.0	0.0	0.0	0.0
12:16	0.0	0.0	283.8	0.0	0.0	0.0	0.0	0.0	0.0
12:17	0.0	0.0	284.7	0.0	0.0	0.0	0.0	0.0	0.0
12:18	0.0	0.0	243.8	0.0	0.0	0.0	0.0	0.0	0.0
12:19	0.0	0.0	253.7	0.0	0.0	0.0	0.0	0.0	0.0
12:20	0.0	0.0	261.2	0.0	0.0	0.0	0.0	0.0	0.0
12:21	0.0	0.0	264.4	0.0	0.0	0.0	0.0	0.0	0.0
12:22	0.0	0.0	273.8	0.0	0.0	0.0	0.0	0.0	0.0
12:23	0.0	0.0	274.5	0.0	0.0	0.0	0.0	0.0	0.0
12:24	0.0	0.0	286.3	0.0	0.0	0.0	0.0	0.0	0.0
12:25	0.0	0.0	293.2	0.0	0.0	0.0	0.0	0.0	0.0
12:26	0.0	0.0	281.1	0.0	0.0	0.0	0.0	0.0	0.0
12:27	0.0	0.0	294.5	0.0	0.0	0.0	0.0	0.0	0.0
12:28	0.0	0.0	289.3	0.0	0.0	0.0	0.0	0.0	0.0
12:29	0.0	0.0	292.1	0.0	0.0	0.0	0.0	0.0	0.0
12:30	0.0	0.0	291.6	0.0	0.0	0.0	0.0	0.0	0.0
12:31	0.0	0.0	286.0	0.0	0.0	0.0	0.0	0.0	0.0
12:32	0.0	0.0	292.8	0.0	0.0	0.0	0.0	0.0	0.0
12:33	0.0	0.0	299.1	0.0	0.0	0.0	0.0	0.0	0.0
12:34	0.0	0.0	288.9	0.0	0.0	0.0	0.0	0.0	0.0
12:35	0.0	0.0	289.9	0.0	0.0	0.0	0.0	0.0	0.0
12:36	0.0	0.0	294.3	0.0	0.0	0.0	0.0	0.0	0.0
12:37	0.0	0.0	296.8	0.0	0.0	0.0	0.0	0.0	0.0
12:38	0.0	0.0	290.2	0.0	0.0	0.0	0.0	0.0	0.0
12:39	0.0	0.0	292.6	0.0	0.0	0.0	0.0	0.0	0.0
12:40	0.0	0.0	289.4	0.0	0.0	0.0	0.0	0.0	0.0
12:41	0.0	0.0	285.3	0.0	0.0	0.0	0.0	0.0	0.0
12:42	0.0	0.0	274.7	0.0	0.0	0.0	0.0	0.0	0.0
12:43	0.0	0.0	281.4	0.0	0.0	0.0	0.0	0.0	0.0
12:44	0.0	0.0	284.3	0.0	0.0	0.0	0.0	0.0	0.0
12:45	0.0	0.0	277.0	0.0	0.0	0.0	0.0	0.0	0.0
12:46	0.0	0.0	272.2	0.0	0.0	0.0	0.0	0.0	0.0
12:47	0.0	0.0	270.5	0.0	0.0	0.0	0.0	0.0	0.0
12:48	0.0	0.0	273.7	0.0	0.0	0.0	0.0	0.0	0.0
12:49	0.0	0.0	283.8	0.0	0.0	0.0	0.0	0.0	0.0
12:50	0.0	0.0	277.5	0.0	0.0	0.0	0.0	0.0	0.0
12:51	0.0	0.0	270.5	0.0	0.0	0.0	0.0	0.0	0.0
12:52	0.0	0.0	270.3	0.0	0.0	0.0	0.0	0.0	0.0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 12, 1995

Run 7

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
12:53	0.0	0.0	266.4	0.0	0.0	0.0	0.0	0.0	0.0
12:54	0.0	0.0	273.5	0.0	0.0	0.0	0.0	0.0	0.0
12:55	0.0	0.0	284.2	0.0	0.0	0.0	0.0	0.0	0.0
12:56	0.0	0.0	281.6	0.0	0.0	0.0	0.0	0.0	0.0
12:57	0.0	0.0	283.9	0.0	0.0	0.0	0.0	0.0	0.0
12:58	0.0	0.0	286.4	0.0	0.0	0.0	0.0	0.0	0.0
12:59	0.0	0.0	299.7	0.0	0.0	0.0	0.0	0.0	0.0
13:00	0.0	0.0	293.6	0.0	0.0	0.0	0.0	0.0	0.0
13:01	0.0	0.0	296.7	0.0	0.0	0.0	0.0	0.0	0.0
13:02	0.0	0.0	306.9	0.0	0.0	0.0	0.0	0.0	0.0
13:03	0.0	0.0	315.7	0.0	0.0	0.0	0.0	0.0	0.0
13:04	0.0	0.0	331.7	0.0	0.0	0.0	0.0	0.0	0.0
13:05	0.0	0.0	338.2	0.0	0.0	0.0	0.0	0.0	0.0
13:06	0.0	0.0	333.3	0.0	0.0	0.0	0.0	0.0	0.0
13:07	0.0	0.0	336.5	0.0	0.0	0.0	0.0	0.0	0.0
13:08	0.0	0.0	335.6	0.0	0.0	0.0	0.0	0.0	0.0
13:09	0.0	0.0	338.9	0.0	0.0	0.0	0.0	0.0	0.0
Average			288.9						

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 5 Calciner Stack
January 12, 1995

Calibration Bias Run 7

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
13:13:05									
13:13:20	0.0	0.0	10.7	0.0	0.0	0.0	0.0	0.0	0.0
13:13:35	0.0	0.0	10.2	0.0	0.0	0.0	0.0	0.0	0.0
13:13:50	0.0	0.0	9.8	0.0	0.0	0.0	0.0	0.0	0.0
13:14:05	0.0	0.0	9.5	0.0	0.0	0.0	0.0	0.0	0.0
13:14:20	0.0	0.0	9.3	0.0	0.0	0.0	0.0	0.0	0.0
13:14:35	0.0	0.0	9.2	0.0	0.0	0.0	0.0	0.0	0.0
13:14:50	0.0	0.0	8.9	0.0	0.0	0.0	0.0	0.0	0.0
13:15:05	0.0	0.0	8.6	0.0	0.0	0.0	0.0	0.0	0.0
13:15:20	0.0	0.0	8.4	0.0	0.0	0.0	0.0	0.0	0.0
13:15:35	0.0	0.0	197.3	0.0	0.0	0.0	0.0	0.0	0.0
13:15:50	0.0	0.0	535.2	0.0	0.0	0.0	0.0	0.0	0.0
13:16:05	0.0	0.0	543.6	0.0	0.0	0.0	0.0	0.0	0.0
13:16:20	0.0	0.0	546.6	0.0	0.0	0.0	0.0	0.0	0.0
13:16:35	0.0	0.0	548.2	0.0	0.0	0.0	0.0	0.0	0.0
13:16:50	0.0	0.0	549.4	0.0	0.0	0.0	0.0	0.0	0.0
13:17:05	0.0	0.0	550.4	0.0	0.0	0.0	0.0	0.0	0.0
13:17:20	0.0	0.0	550.9	0.0	0.0	0.0	0.0	0.0	0.0
13:17:35	0.0	0.0	551.4	0.0	0.0	0.0	0.0	0.0	0.0
13:17:50	0.0	0.0	551.7	0.0	0.0	0.0	0.0	0.0	0.0
13:18:05	0.0	0.0	551.8	0.0	0.0	0.0	0.0	0.0	0.0
13:18:20	0.0	0.0	552.2	0.0	0.0	0.0	0.0	0.0	0.0
13:18:35	0.0	0.0	547.5	0.0	0.0	0.0	0.0	0.0	0.0

Zero cal. gas	8.6
Mid. cal. gas	551.9

Field Data Printout

Location: EP 1&2 Calciner Stack
Test Run: 1
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/17/95
Meter ΔH@: 1.8063
Meter Y_d: 0.9853
Pitot C_p: 0.84
Static P: -0.8
Leak Rate Before: 0.005 cfm @ 20"Hg
Leak Rate After: 0.003 cfm @ 16"Hg

Method: M2, M4
Testing Type: Velocity, Moisture
Area (ft^2): 113.10

Bar. Press. (in. Hg): 23.81
Actual Moisture (%): 16.7
O_2 (dry volume %): 14.7
CO_2 (dry volume %): 8.2
Start Time (approx.): 08:55
Stop Time (approx.): 09:40
H_2O (condensate, ml): 84.0
H_2O (silica, g): 10.5

Traverse Point	Pitot ΔP_s (in. H_2O)	Stack T_s (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in.}$ H_2O)	Run Time	Sample ΔH (in. H_2O)	Metered (ft^3)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (ft^3)
				0.0		697.31			
1-01	1.20	460	1.10	5.0	0.95	700.36	38	38	3.06
1-02	1.30	462	1.14	10.0	0.95	703.29	40	39	2.93
1-03	1.30	463	1.14	15.0	0.95	706.20	42	40	2.91
1-04	1.20	462	1.10	20.0	0.95	709.29	43	41	3.09
1-05	1.20	460	1.10	25.0	0.95	712.28	45	42	2.99
1-06	0.89	458	0.94	30.0	0.95	715.25	47	43	2.97
2-01	1.20	455	1.10	35.0	0.95	718.24	49	45	2.99
2-02	1.20	454	1.10	40.0	0.95	721.24	51	47	3.00
2-03	1.20	454	1.10	45.0	0.95	724.26	53	49	3.02
2-04	1.20	455	1.10						
2-05	1.10	452	1.05						
2-06	0.94	451	0.97						
3-01	1.20	455	1.10						
3-02	1.20	454	1.10						
3-03	1.20	453	1.10						
3-04	1.20	454	1.10						
3-05	1.20	454	1.10						
3-06	0.89	453	0.94						
4-01	1.20	456	1.10						
4-02	1.30	455	1.14						
4-03	1.40	454	1.18						
4-04	1.30	455	1.14						
4-05	1.10	454	1.05						
4-06	0.95	452	0.97						
Final	1.08	456		45.0	0.95	26.95	44		

Revision 0

Field Data Printout

Location: EP 1&2 Calciner Stack
Test Run: 2
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/17/95
Meter ΔH@: 1.8063
Meter Y_d: 0.9853
Pitot C_p: 0.84
Static P: -0.8
Leak Rate Before: 0.008 cfm @ 19"Hg
Leak Rate After: 0.005 cfm @ 15"Hg

Method: M2, M4
Testing Type: Velocity, Moisture
Area (ft^2): 113.10

Bar. Press. (in. Hg): 23.81
Actual Moisture (%): 16.7
O_2 (dry volume %): 14.8
CO_2 (dry volume %): 8.2
Start Time (approx.): 11:00
Stop Time (approx.): 11:45
H_2O (condensate, ml): 87.0
H_2O (silica, g): 7.9

Traverse Point	Pitot ΔP_s (in. H_2O)	Stack T_s (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in.}$ H_2O)	Run Time	Sample ΔH (in. H_2O)	Metered (ft^3)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (ft^3)
				0.0		724.26			
1-01	1.20	458	1.10	5.0	0.95	727.32	58	57	3.06
1-02	1.20	459	1.10	10.0	0.95	730.41	58	57	3.09
1-03	1.30	458	1.14	15.0	0.95	733.51	58	57	3.10
1-04	1.20	457	1.10	20.0	0.95	736.60	58	57	3.09
1-05	1.10	457	1.05	25.0	0.95	739.68	58	57	3.08
1-06	0.92	455	0.96	30.0	0.95	742.77	59	57	3.09
2-01	1.20	459	1.10	35.0	0.95	745.86	59	59	3.09
2-02	1.20	459	1.10	40.0	0.95	748.92	60	58	3.06
2-03	1.30	460	1.14	45.0	0.95	752.02	60	58	3.10
2-04	1.10	458	1.05						
2-05	1.10	459	1.05						
2-06	0.95	457	0.97						
3-01	1.20	461	1.10						
3-02	1.10	459	1.05						
3-03	1.20	459	1.10						
3-04	1.20	460	1.10						
3-05	1.10	458	1.05						
3-06	0.94	455	0.97						
4-01	1.20	460	1.10						
4-02	1.20	461	1.10						
4-03	1.30	460	1.14						
4-04	1.30	459	1.14						
4-05	1.20	458	1.10						
4-06	0.89	456	0.94						
Final	1.07	458		45.0	0.95	27.76	58		

Field Data Printout

Location: EP 1&2 Calciner Stack
Test Run: 3
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/17/95
Meter ΔH@: 1.8063
Meter Y_d: 0.9853
Pitot C_p: 0.84
Static P: -0.8
Leak Rate Before: 0.002 cfm @ 15"Hg
Leak Rate After:

Method: M2, M4
Testing Type: Velocity, Moisture
Area (ft^2): 113.10

Bar. Press. (in. Hg): 23.81
Actual Moisture (%): 16.3
O_2 (dry volume %): 14.7
CO_2 (dry volume %): 8.1
Start Time (approx.): 12:25
Stop Time (approx.): 13:05
H_2O (condensate, ml): 83.0
H_2O (silica, g): 8.9

Traverse Point	Pitot ΔP_s (in. H_2O)	Stack T_s (°F)	$\sqrt{\Delta P_s}$ (calculated) ($\sqrt{in.}$ H_2O)	Run Time	Sample ΔH (in. H_2O)	Metered (ft^3)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (ft^3)
				0.0		752.30			
1-01	1.30	458	1.14	5.0	0.95	755.40	62	61	3.10
1-02	1.30	458	1.14	10.0	0.95	758.51	62	61	3.11
1-03	1.21	457	1.10	15.0	0.95	761.60	61	61	3.09
1-04	1.30	456	1.14	20.0	0.95	764.68	62	61	3.08
1-05	1.10	456	1.05	25.0	0.95	767.77	63	61	3.09
1-06	0.91	453	0.95	30.0	0.95	770.86	63	62	3.09
2-01	1.20	457	1.10	35.0	0.95	773.93	64	62	3.07
2-02	1.20	456	1.10	40.0	0.95	776.89	65	62	2.96
2-03	1.20	456	1.10	45.0	0.95	780.20	65	63	3.31
2-04	1.10	457	1.05						
2-05	1.10	455	1.05						
2-06	0.88	454	0.94						
3-01	1.20	458	1.10						
3-02	1.10	457	1.05						
3-03	1.20	457	1.10						
3-04	1.10	456	1.05						
3-05	1.10	456	1.05						
3-06	0.89	455	0.94						
4-01	1.20	460	1.10						
4-02	1.20	461	1.10						
4-03	1.30	460	1.14						
4-04	1.30	459	1.14						
4-05	1.20	460	1.10						
4-06	0.90	457	0.95						
Final	1.07	457		45.0	0.95	27.90	62		

Field Data Printout

Location: EP 1&2 Calciner Stack Method: 18 Bar. Press. (in. Hg): 23.81
Test Run: 3 Collection Medium: Various
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/17/95

Meter Y_d: 1.0145 Start Time (approx.): 12:25
Stop Time (approx.): 13:25

Leak Rate Before: 0.008 cfm @ 10"Hg
Leak Rate After:

Run Time	Sample ΔH (in. H_2O)	Metered (L)	Dry Gas Meter $T_{m\ in}$ (°F)	Dry Gas Meter $T_{m\ out}$ (°F)	Volume (calculated) (L)
0.0		742.50			
5.0	1.00	743.93	51		1.43
10.0	1.00	745.45	52		1.52
15.0	1.00	746.87	52		1.42
20.0	1.00	748.23	52		1.36
25.0	1.00	749.60	53		1.37
30.0	1.00	751.01	53		1.41
35.0	1.00	752.45	54		1.44
40.0	1.00	753.85	55		1.40
45.0	1.00	755.25	55		1.40
50.0	1.00	756.58	55		1.33
55.0	1.00	758.00	55		1.42
60.0	1.00	759.36	55		1.36
60.0	1.00	16.86	54		

Field Data Printout

Location: EP 1&2 Calcir
Method: SW846-0030
Test Run: 1
Testing Type: VOCs
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/17/95
Meter Y_d: 0.9837
Area (ft^2): N/A
Static P: N/A
Leak Rate Before: 0.00 LPM @ 15 "Hg
Leak Rate After: 0.00 LPM @ 15 "Hg

Bar. Press. (in. Hg): 23.81
O_2 (dry volume %)[1]: 14.7
CO_2 (dry volume %)[1]: 8.2
Start Time (approx.): 08:55
Stop Time (approx.): 09:15

Run Time	Sample ΔH (in. H_2O)	Metered (liters)	Dry Gas Meter T_m (°F)	Volume (calculated) (liters)
0.0		0.00		
5.0	1.40	0.26	40	0.26
10.0	1.40	0.51	41	0.25
15.0	1.50	0.75	42	0.24
20.0	1.50	1.01	43	0.26
20.0	1.45	1.01	42	

[1] Oxygen and carbon dioxide concentrations were obtained from the Velocity and Moisture Parameters.

Field Data Printout

Location: EP 1&2 Calcir
Method: SW846-0030
Bar. Press. (in. Hg): 23.81
Test Run: 2
Testing Type: VOCs
O_2 (dry volume %)[1]: 14.8
Client: Solvay Minerals, Inc.
CO_2 (dry volume %)[1]: 8.2
Project No: 7356-2
Start Time (approx.): 11:00
Test Date: 1/17/95
Stop Time (approx.): 11:20
Meter Y_d: 0.9837
Area (ft^2): N/A
Static P: N/A
Leak Rate Before: 0.00 LPM @ 15 "Hg
Leak Rate After: 0.00 LPM @ 15 "Hg

Run Time	Sample ΔH (in. H_2O)	Metered (liters)	Dry Gas Meter T_m (°F)	Volume (calculated) (liters)
0.0		0.00		
5.0	1.30	0.25	49	0.25
10.0	1.40	0.51	49	0.26
15.0	1.40	0.76	50	0.25
20.0	1.40	1.02	51	0.26
20.0	1.38	1.02	50	

[1] Oxygen and carbon dioxide concentrations were obtained from the Velocity and Moisture Parameters.

Field Data Printout

Location: EP 1&2 Calcir
Test Run: 3
Client: Solvay Minerals, Inc.
Project No: 7356-2
Test Date: 1/17/95
Meter Y_d: 0.9837
Static P: N/A
Leak Rate Before: 0.00 LPM @ 15 "Hg
Leak Rate After: 0.00 LPM @ 15 "Hg

Method: SW846-0030
Testing Type: VOCs
Area (ft^2): N/A

Bar. Press. (in. Hg): 23.81
O_2 (dry volume %)[1]: 14.7
CO_2 (dry volume %)[1]: 8.1
Start Time (approx.): 12:25
Stop Time (approx.): 12:45

Run Time	Sample ΔH (in. H_2O)	Metered (liters)	Dry Gas Meter T_m (°F)	Volume (calculated) (liters)
0.0		0.00		
5.0	1.30	0.24	49	0.24
10.0	1.30	0.50	50	0.26
15.0	1.40	0.74	50	0.24
20.0	1.40	1.01	50	0.27
20.0	1.35	1.01	50	

[1] Oxygen and carbon dioxide concentrations were obtained from the Velocity and Moisture Parameters.

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 1&2 Calciner Stack
January 17, 1995

Run 1

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
08:53									
08:54	0.0	0.0	30.2	0.0	0.0	0.0	0.0	0.0	0.0
08:55	0.0	0.0	30.2	0.0	0.0	0.0	0.0	0.0	0.0
08:56	0.0	0.0	30.2	0.0	0.0	0.0	0.0	0.0	0.0
08:57	0.0	0.0	30.7	0.0	0.0	0.0	0.0	0.0	0.0
08:58	0.0	0.0	30.4	0.0	0.0	0.0	0.0	0.0	0.0
08:59	0.0	0.0	29.7	0.0	0.0	0.0	0.0	0.0	0.0
09:00	0.0	0.0	30.1	0.0	0.0	0.0	0.0	0.0	0.0
09:01	0.0	0.0	30.4	0.0	0.0	0.0	0.0	0.0	0.0
09:02	0.0	0.0	30.6	0.0	0.0	0.0	0.0	0.0	0.0
09:03	0.0	0.0	30.7	0.0	0.0	0.0	0.0	0.0	0.0
09:04	0.0	0.0	30.9	0.0	0.0	0.0	0.0	0.0	0.0
09:05	0.0	0.0	31.0	0.0	0.0	0.0	0.0	0.0	0.0
09:06	0.0	0.0	30.7	0.0	0.0	0.0	0.0	0.0	0.0
09:07	0.0	0.0	30.6	0.0	0.0	0.0	0.0	0.0	0.0
09:08	0.0	0.0	29.9	0.0	0.0	0.0	0.0	0.0	0.0
09:09	0.0	0.0	29.8	0.0	0.0	0.0	0.0	0.0	0.0
09:10	0.0	0.0	29.8	0.0	0.0	0.0	0.0	0.0	0.0
09:11	0.0	0.0	29.5	0.0	0.0	0.0	0.0	0.0	0.0
09:12	0.0	0.0	29.4	0.0	0.0	0.0	0.0	0.0	0.0
09:13	0.0	0.0	29.2	0.0	0.0	0.0	0.0	0.0	0.0
09:14	0.0	0.0	29.4	0.0	0.0	0.0	0.0	0.0	0.0
09:15	0.0	0.0	28.8	0.0	0.0	0.0	0.0	0.0	0.0
09:16	0.0	0.0	29.5	0.0	0.0	0.0	0.0	0.0	0.0
09:17	0.0	0.0	29.3	0.0	0.0	0.0	0.0	0.0	0.0
09:18	0.0	0.0	29.6	0.0	0.0	0.0	0.0	0.0	0.0
09:19	0.0	0.0	29.4	0.0	0.0	0.0	0.0	0.0	0.0
09:20	0.0	0.0	29.3	0.0	0.0	0.0	0.0	0.0	0.0
09:21	0.0	0.0	29.5	0.0	0.0	0.0	0.0	0.0	0.0
09:22	0.0	0.0	29.4	0.0	0.0	0.0	0.0	0.0	0.0
09:23	0.0	0.0	29.0	0.0	0.0	0.0	0.0	0.0	0.0
09:24	0.0	0.0	28.8	0.0	0.0	0.0	0.0	0.0	0.0
09:25	0.0	0.0	28.8	0.0	0.0	0.0	0.0	0.0	0.0
09:26	0.0	0.0	29.0	0.0	0.0	0.0	0.0	0.0	0.0
09:27	0.0	0.0	29.4	0.0	0.0	0.0	0.0	0.0	0.0
09:28	0.0	0.0	29.7	0.0	0.0	0.0	0.0	0.0	0.0
09:29	0.0	0.0	30.3	0.0	0.0	0.0	0.0	0.0	0.0
09:30	0.0	0.0	30.6	0.0	0.0	0.0	0.0	0.0	0.0
09:31	0.0	0.0	30.6	0.0	0.0	0.0	0.0	0.0	0.0
09:32	0.0	0.0	30.6	0.0	0.0	0.0	0.0	0.0	0.0
09:33	0.0	0.0	30.6	0.0	0.0	0.0	0.0	0.0	0.0
09:34	0.0	0.0	30.7	0.0	0.0	0.0	0.0	0.0	0.0
09:35	0.0	0.0	30.5	0.0	0.0	0.0	0.0	0.0	0.0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 1&2 Calciner Stack
January 17, 1995

Run 1

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
09:36	0.0	0.0	30.4	0.0	0.0	0.0	0.0	0.0	0.0
09:37	0.0	0.0	30.4	0.0	0.0	0.0	0.0	0.0	0.0
09:38	0.0	0.0	30.3	0.0	0.0	0.0	0.0	0.0	0.0
09:39	0.0	0.0	30.1	0.0	0.0	0.0	0.0	0.0	0.0
09:40	0.0	0.0	30.3	0.0	0.0	0.0	0.0	0.0	0.0
09:41	0.0	0.0	30.2	0.0	0.0	0.0	0.0	0.0	0.0
09:42	0.0	0.0	30.7	0.0	0.0	0.0	0.0	0.0	0.0
09:43	0.0	0.0	30.7	0.0	0.0	0.0	0.0	0.0	0.0
09:44	0.0	0.0	30.8	0.0	0.0	0.0	0.0	0.0	0.0
09:45	0.0	0.0	30.7	0.0	0.0	0.0	0.0	0.0	0.0
09:46	0.0	0.0	31.3	0.0	0.0	0.0	0.0	0.0	0.0
09:47	0.0	0.0	31.0	0.0	0.0	0.0	0.0	0.0	0.0
09:48	0.0	0.0	31.2	0.0	0.0	0.0	0.0	0.0	0.0
09:49	0.0	0.0	31.5	0.0	0.0	0.0	0.0	0.0	0.0
09:50	0.0	0.0	31.7	0.0	0.0	0.0	0.0	0.0	0.0
09:51	0.0	0.0	31.7	0.0	0.0	0.0	0.0	0.0	0.0
09:52	0.0	0.0	31.7	0.0	0.0	0.0	0.0	0.0	0.0
09:53	0.0	0.0	31.2	0.0	0.0	0.0	0.0	0.0	0.0
Average			30.2						

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 1&2 Calciner Stack
January 17, 1995

Calibration Bias Run 1

Time	NOx ppm	SO2 ppm	THC ppm	O2 %	CO2 %	CO ppm	SO2 In ppm	O2 In %	CO2 In %
10:07:08									
10:07:23	0.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0
10:07:38	0.0	0.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0
10:07:53	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0
10:08:08	0.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0
10:08:23	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0
10:08:38	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0
10:08:53	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0
10:09:08	0.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0
10:09:23	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0
10:09:38	0.0	0.0	15.6	0.0	0.0	0.0	0.0	0.0	0.0
10:09:53	0.0	0.0	51.5	0.0	0.0	0.0	0.0	0.0	0.0
10:10:08	0.0	0.0	52.8	0.0	0.0	0.0	0.0	0.0	0.0
10:10:23	0.0	0.0	53.3	0.0	0.0	0.0	0.0	0.0	0.0
10:10:38	0.0	0.0	53.6	0.0	0.0	0.0	0.0	0.0	0.0
10:10:53	0.0	0.0	54.4	0.0	0.0	0.0	0.0	0.0	0.0
10:11:08	0.0	0.0	54.8	0.0	0.0	0.0	0.0	0.0	0.0
10:11:23	0.0	0.0	55.0	0.0	0.0	0.0	0.0	0.0	0.0
10:11:38	0.0	0.0	55.3	0.0	0.0	0.0	0.0	0.0	0.0
10:11:53	0.0	0.0	55.9	0.0	0.0	0.0	0.0	0.0	0.0
10:12:08	0.0	0.0	55.9	0.0	0.0	0.0	0.0	0.0	0.0
10:12:23	0.0	0.0	55.7	0.0	0.0	0.0	0.0	0.0	0.0
10:12:38	0.0	0.0	55.6	0.0	0.0	0.0	0.0	0.0	0.0
10:12:53	0.0	0.0	55.6	0.0	0.0	0.0	0.0	0.0	0.0
10:13:08	0.0	0.0	55.5	0.0	0.0	0.0	0.0	0.0	0.0
10:13:23	0.0	0.0	55.5	0.0	0.0	0.0	0.0	0.0	0.0
10:13:38	0.0	0.0	55.6	0.0	0.0	0.0	0.0	0.0	0.0
10:13:53	0.0	0.0	55.6	0.0	0.0	0.0	0.0	0.0	0.0
10:14:08	0.0	0.0	55.7	0.0	0.0	0.0	0.0	0.0	0.0
10:14:23	0.0	0.0	55.6	0.0	0.0	0.0	0.0	0.0	0.0
10:14:38	0.0	0.0	55.7	0.0	0.0	0.0	0.0	0.0	0.0
10:14:53	0.0	0.0	55.7	0.0	0.0	0.0	0.0	0.0	0.0
10:15:08	0.0	0.0	55.8	0.0	0.0	0.0	0.0	0.0	0.0
10:15:23	0.0	0.0	30.8	0.0	0.0	0.0	0.0	0.0	0.0
10:15:38	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0
10:15:53	0.0	0.0	1.8	0.0	0.0	0.0	0.0	0.0	0.0
10:16:08	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0
10:16:23	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0
10:16:38	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0
10:16:53	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0

SOLVAY MINERALS, INC.
CAE Project No: 7356-2
EP 1&2 Calciner Stack
January 17, 1995

Calibration Bias Run 1

Time	NOx	SO2	THC	O2	CO2	CO	SO2 In	O2 In	CO2 In
	ppm	ppm	ppm	%	%	ppm	ppm	%	%
10:17:08	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0
10:17:23	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0
10:17:38	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0
10:17:53	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0
10:18:08	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0
10:18:23	0.0	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0
10:18:38	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0

Zero cal. gas	1.0
Mid. cal. gas	55.6

F

LABORATORY DATA

F

Results for Bag Samples

Client:D65-Solvay Minerals

CAE Job # 65-7356-

Date: 1/30/95

Carbon Monoxide (CO) Results for Unit # EP-5

Run-1 - 2563.1 ppm V C

Run-2 - 2643.7 ppm V C

Run-3 - 5.0 ppm V C

Run-4 - 1220.5 ppm V C

Run-5 - 18.0 ppm V C

Run-6 - 6.0 ppm V C

Run-7 - 3255.4 ppm V C

Carbon Monoxide (CO) Results for Unit # EP-1,2

Run-1 - 340.9 ppm V C

Run-2 - 62.4 ppm V C

Run-3 - 45.0 ppm V C

Compiled By: Thomas E Grossman On: 1/30/95

Approved By: B. On: 2/2/95

Disk/File: 7356DSM

CERTIFICATE OF ANALYSIS

CUSTOMER: Solvay

DATE RECEIVED: Jan. 17-18, 1995

SAMPLE TYPE: Tedlar bags

JOB/P.O.NUMBER: 65-7356

PARAMETERS: Methane & Ethane

DATE REPORTED: Jan. 19, 1995

MARKS: 7356-01-03,28-31

Laboratory Number	Sample Identification	Methane (ppmv)	Ethane (ppmv)
	EP5		
7356-28	Run 1	493	<3.45
7356-29	Run 2	498	<3.45
7356-01	Run 3	12.5	<3.45
7356-02	Run 4	241	<3.45
7356-30	Run 5	<3.67	<3.45
7356-31	Run 6	59.3	<3.45
7356-03	Run 7	532	<3.45
	EP1,2		
7356-32	Run 1	6.86	<3.45
7356-33	Run 2	8.23	<3.45
7356-34	Run 3	3.74	<3.45

Analyst: Gary Zapel
Analytical Chemist

Reviewed by: Patrick Clark, P.E.
Manager, VOC Services

CERTIFICATE OF ANALYSIS

CUSTOMER: Solvay **DATE RECEIVED:** Jan. 17, 1995

SAMPLE TYPE: Charcoal tubes & condensate **JOB/P.O.NUMBER:** 65-7356

PARAMETERS: Listed below, results expressed as total milligrams/sample **DATE REPORTED:** Feb. 6, 1995

MARKS: 7356-04-27,35-43

EP5
Field blank

Laboratory Number	7356-12		7356-13	
Tube Section	Primary Front	Primary Back	Secondary Front	Secondary Back
1,3 Butadiene	<0.0070	<0.0070	<0.0070	<0.0035
Hexane	<0.0009	<0.0009	<0.0009	0.0038
Methylene chloride	<0.0152	<0.0152	<0.0152	<0.0076
1-1-1 Trichloroethane	<0.0064	<0.0064	<0.0064	<0.0032
Benzene	<0.0035	<0.0035	<0.0035	<0.0017
Acrylonitrile	<0.0954	<0.0954	<0.0954	<0.0477
Toluene	0.0103	0.0103	0.0075	0.0249
Ethylbenzene	<0.0018	<0.0018	<0.0018	<0.0009
Xylene	<0.0046	<0.0046	<0.0046	<0.0023
Styrene	<0.0026	<0.0026	<0.0026	<0.0013

Run 1

Laboratory Number	7356-14		7356-15	
Tube Section	Primary Front	Primary Back	Secondary Front	Secondary Back
1,3 Butadiene	0.1737	<0.0035	<0.0070	<0.0035
Hexane	0.0309	<0.0005	<0.0009	<0.0005
Methylene chloride	<0.0152	<0.0076	<0.0152	<0.0076
1-1-1 Trichloroethane	<0.0064	<0.0032	<0.0064	<0.0032
Benzene	0.2819	<0.0017	<0.0035	<0.0017
Acrylonitrile	<0.0954	<0.0477	<0.0954	<0.0477
Toluene	0.0589	<0.0004	<0.0008	<0.0004
Ethylbenzene	<0.0018	<0.0009	<0.0018	<0.0009
Xylene	0.0357	<0.0023	<0.0046	<0.0023
Styrene	<0.0026	<0.0013	<0.0026	<0.0013

Analyst: Gary Zapel
Gary Zapel
Analytical Chemist

Reviewed by: Patrick Clark, P.E.
Manager, VOC Services

CERTIFICATE OF ANALYSIS

CUSTOMER: Solvay **DATE RECEIVED:** Jan. 17, 1995

SAMPLE TYPE: Charcoal tubes & condensate **JOB/P.O.NUMBER:** 65-7356

PARAMETERS: Listed below, results expressed as total milligrams/sample **DATE REPORTED:** Feb. 6, 1995

MARKS: 7356-04-27,35-43

EP5

Run 2

Laboratory Number	7356-16		7356-17	
Tube Section	Primary Front	Primary Back	Secondary Front	Secondary Back
1,3 Butadiene	<0.0070	<0.0035	<0.0070	<0.0035
Hexane	0.0351	<0.0005	<0.0009	<0.0005
Methylene chloride	0.0399	<0.0076	<0.0152	<0.0076
1-1-1 Trichloroethane	<0.0064	<0.0032	<0.0064	<0.0032
Benzene	0.2676	<0.0017	<0.0035	<0.0017
Acrylonitrile	<0.0954	<0.0477	<0.0954	<0.0477
Toluene	0.0633	<0.0004	<0.0008	<0.0004
Ethylbenzene	0.0252	<0.0009	<0.0018	<0.0009
Xylene	0.0693	<0.0023	<0.0046	<0.0023
Styrene	0.0235	<0.0013	<0.0026	<0.0013

Run 3

Laboratory Number	7356-18		7356-19	
Tube Section	Primary Front	Primary Back	Secondary Front	Secondary Back
1,3 Butadiene	<0.0070	<0.0035	<0.0070	<0.0035
Hexane	0.0320	<0.0005	<0.0009	<0.0005
Methylene chloride	0.0234	<0.0076	<0.0152	<0.0076
1-1-1 Trichloroethane	<0.0064	<0.0032	<0.0064	<0.0032
Benzene	0.2928	<0.0017	<0.0035	<0.0017
Acrylonitrile	<0.0954	<0.0477	<0.0954	<0.0477
Toluene	0.0719	<0.0004	<0.0008	<0.0004
Ethylbenzene	0.0235	<0.0009	<0.0018	<0.0009
Xylene	0.0775	<0.0023	<0.0046	<0.0023
Styrene	0.0256	<0.0013	<0.0026	<0.0013

Analyst: Gary Zapel
Gary Zapel
Analytical Chemist

Reviewed by:
Patrick Clark, P.E.
Manager, VOC Services

CERTIFICATE OF ANALYSIS

CUSTOMER: Solvay **DATE RECEIVED:** Jan. 17, 1995

SAMPLE TYPE: Charcoal tubes & condensate **JOB/P.O.NUMBER:** 65-7356

PARAMETERS: Listed below, results expressed as total milligrams/sample **DATE REPORTED:** Feb. 6, 1995

MARKS: 7356-04-27,35-43

EP5

Run 4

Laboratory Number	7356-20		7356-21	
Tube Section	Primary Front	Primary Back	Secondary Front	Secondary Back
1,3 Butadiene	<0.0070	<0.0035	<0.0070	<0.0035
Hexane	<0.0009	<0.0005	<0.0009	<0.0005
Methylene chloride	0.0259	<0.0076	<0.0152	<0.0076
1-1-1 Trichloroethane	<0.0064	<0.0032	<0.0064	<0.0032
Benzene	0.1151	<0.0017	<0.0035	<0.0017
Acrylonitrile	<0.0954	<0.0477	<0.0954	<0.0477
Toluene	0.0351	<0.0004	<0.0008	0.0067
Ethylbenzene	0.0167	<0.0009	<0.0018	<0.0009
Xylene	0.0455	<0.0023	<0.0046	<0.0023
Styrene	0.0111	<0.0013	<0.0026	<0.0013

Run 5

Laboratory Number	7356-22		7356-23	
Tube Section	Primary Front	Primary Back	Secondary Front	Secondary Back
1,3 Butadiene	0.3029	<0.0035	<0.0070	<0.0035
Hexane	0.0268	<0.0005	<0.0009	<0.0005
Methylene chloride	0.0446	0.0141	<0.0152	0.0175
1-1-1 Trichloroethane	<0.0064	<0.0032	<0.0064	<0.0032
Benzene	0.2650	<0.0017	<0.0035	<0.0017
Acrylonitrile	<0.0954	<0.0477	<0.0954	<0.0477
Toluene	0.0641	0.0125	0.0039	0.0234
Ethylbenzene	0.0212	<0.0009	<0.0018	<0.0009
Xylene	0.0593	<0.0023	<0.0046	<0.0023
Styrene	0.0182	<0.0013	<0.0026	<0.0013

Analyst: Gary Zapel
Gary Zapel
Analytical Chemist

Reviewed by:
Patrick Clark, P.E.
Manager, VOC Services

CERTIFICATE OF ANALYSIS

CUSTOMER: Solvay

DATE RECEIVED: Jan. 17, 1995

SAMPLE TYPE: Charcoal tubes & condensate

JOB/P.O.NUMBER: 65-7356

PARAMETERS: Listed below, results expressed as total milligrams/sample

DATE REPORTED: Feb. 6, 1995

MARKS: 7356-04-27,35-43

EP5

Run 6

Laboratory Number	7356-24		7356-25	
Tube Section	Primary Front	Primary Back	Secondary Front	Secondary Back
1,3 Butadiene	0.3188	<0.0035	<0.0070	<0.0035
Hexane	0.0240	<0.0005	<0.0009	<0.0005
Methylene chloride	0.0321	<0.0076	<0.0152	0.0172
1-1-1 Trichloroethane	<0.0064	<0.0032	<0.0064	<0.0032
Benzene	0.2104	<0.0017	<0.0035	<0.0017
Acrylonitrile	<0.0954	<0.0477	<0.0954	<0.0477
Toluene	0.0533	0.0045	0.0051	0.0140
Ethylbenzene	0.0259	<0.0009	<0.0018	<0.0009
Xylene	0.0631	<0.0023	<0.0046	<0.0023
Styrene	0.0198	<0.0013	<0.0026	<0.0013

Run 7

Laboratory Number	7356-26		7356-27	
Tube Section	Primary Front	Primary Back	Secondary Front	Secondary Back
1,3 Butadiene	0.5439	<0.0035	<0.0070	<0.0035
Hexane	0.0407	<0.0005	<0.0009	<0.0005
Methylene chloride	0.0819	0.0164	<0.0152	<0.0076
1-1-1 Trichloroethane	<0.0064	<0.0032	<0.0064	<0.0032
Benzene	0.3564	<0.0017	<0.0035	<0.0017
Acrylonitrile	<0.0954	<0.0477	<0.0954	<0.0477
Toluene	0.1074	0.0150	0.0182	0.0134
Ethylbenzene	0.0447	<0.0009	<0.0018	<0.0009
Xylene	0.1080	<0.0023	<0.0046	<0.0023
Styrene	0.0380	<0.0013	<0.0026	<0.0013

Analyst: Gary Zapel
Gary Zapel
Analytical Chemist

Reviewed by: Patrick Clark, P.E.
Manager, VOC Services

CERTIFICATE OF ANALYSIS

CUSTOMER: Solvay **DATE RECEIVED:** Jan. 17, 1995

SAMPLE TYPE: Charcoal tubes & condensate **JOB/P.O.NUMBER:** 65-7356

PARAMETERS: Listed below, results expressed as total milligrams/sample **DATE REPORTED:** Feb. 6, 1995

MARKS: 7356-04-27,35-43
page 5 of 8

EP1,2

Run 1

Laboratory Number	7356-38		7356-39	
Tube Section	Primary Front	Primary Back	Secondary Front	Secondary Back
1,3 Butadiene	0.0576	<0.0035	<0.0070	<0.0035
Hexane	0.0071	<0.0005	<0.0009	<0.0005
Methylene chloride	0.0228	<0.0076	<0.0152	<0.0076
1-1-1 Trichloroethane	<0.0064	<0.0032	<0.0064	<0.0032
Benzene	0.0186	<0.0017	<0.0035	<0.0017
Acrylonitrile	<0.0954	<0.0477	<0.0954	<0.0477
Toluene	0.0170	<0.0004	<0.0008	<0.0004
Ethylbenzene	<0.0018	<0.0009	<0.0018	<0.0009
Xylene	0.0253	<0.0023	<0.0046	<0.0023
Styrene	<0.0026	<0.0013	<0.0026	<0.0013

Run 2

Laboratory Number	7356-40		7356-41	
Tube Section	Primary Front	Primary Back	Secondary Front	Secondary Back
1,3 Butadiene	<0.0070	<0.0035	<0.0070	<0.0035
Hexane	0.0104	<0.0005	<0.0009	<0.0005
Methylene chloride	0.0282	<0.0076	<0.0152	<0.0076
1-1-1 Trichloroethane	<0.0064	<0.0032	<0.0064	<0.0032
Benzene	0.0246	<0.0017	<0.0035	<0.0017
Acrylonitrile	<0.0954	<0.0477	<0.0954	<0.0477
Toluene	0.0289	<0.0004	<0.0008	<0.0004
Ethylbenzene	<0.0018	<0.0009	<0.0018	<0.0009
Xylene	0.0376	<0.0023	<0.0046	<0.0023
Styrene	<0.0026	<0.0013	<0.0026	<0.0013

Analyst: Gary Zapel
Analytical Chemist

Reviewed by: Patrick Clark, P.E.
Manager, VOC Services

CERTIFICATE OF ANALYSIS

CUSTOMER: Solvay **DATE RECEIVED:** Jan. 17, 1995

SAMPLE TYPE: Charcoal tubes & condensate **JOB/P.O.NUMBER:** 65-7356

PARAMETERS: Listed below, results expressed as total milligrams/sample **DATE REPORTED:** Feb. 6, 1995

MARKS: 7356-04-27,35-43

EP1,2
Run 3

Laboratory Number	7356-42		7356-43	
Tube Section	Primary Front	Primary Back	Secondary Front	Secondary Back
1,3 Butadiene	0.0191	<0.0035	<0.0070	<0.0035
Hexane	0.0078	<0.0005	<0.0009	<0.0005
Methylene chloride	0.0266	<0.0076	<0.0152	<0.0076
1-1-1 Trichloroethane	<0.0064	<0.0032	<0.0064	<0.0032
Benzene	0.0180	<0.0017	<0.0035	<0.0017
Acrylonitrile	<0.0954	<0.0477	<0.0954	<0.0477
Toluene	0.0200	<0.0004	<0.0008	<0.0004
Ethylbenzene	<0.0018	<0.0009	<0.0018	<0.0009
Xylene	0.0278	<0.0023	<0.0046	<0.0023
Styrene	<0.0026	<0.0013	<0.0026	<0.0013

Analyst: Gary Zapel
Gary Zapel
Analytical Chemist

Reviewed by: Patrick Clark, P.E.
Patrick Clark, P.E.
Manager, VOC Services

CERTIFICATE OF ANALYSIS

CUSTOMER: Solvay **DATE RECEIVED:** Jan. 17, 1995

SAMPLE TYPE: Charcoal tubes & condensate **JOB/P.O.NUMBER:** 65-7356

PARAMETERS: Listed below, results expressed as total milligrams/sample **DATE REPORTED:** Feb. 6, 1995

MARKS: 7356-04-27,35-43
page 7 of 8 EP5

Laboratory Number	7356-04	7356-05	7356-06	7356-07
Run number	Blank	1	2	3
1,3 Butadiene	<0.2383	<0.2383	<0.2383	<0.2418
Hexane	<0.0309	<0.0309	<0.0309	<0.0313
Methylene chloride	<0.5155	<0.5155	<0.5155	<0.5231
1-1-1 Trichloroethane	<0.2193	<0.2193	<0.2193	<0.2225
Benzene	<0.1180	<0.1180	<0.1180	<0.1197
Acrylonitrile	<3.2450	<3.2450	<3.2450	<3.2928
Toluene	<0.0287	<0.0287	<0.0287	<0.0291
Ethylbenzene	<0.0615	<0.0615	<0.0615	<0.0624
Xylene	<0.1552	<0.1552	<0.1552	<0.1574
Styrene	<0.0885	<0.0885	<0.0885	<0.0898

Laboratory Number	7356-08	7356-09	7356-10	7356-11
Run number	4	5	6	7
1,3 Butadiene	<0.2418	<0.2383	<0.2313	<0.2418
Hexane	<0.0313	<0.0309	<0.0299	<0.0313
Methylene chloride	<0.5231	<0.5155	<0.5004	<0.5231
1-1-1 Trichloroethane	<0.2225	<0.2193	<0.2128	<0.2225
Benzene	<0.1197	<0.1180	<0.1145	<0.1197
Acrylonitrile	<3.2928	<3.2450	<3.1496	<3.2928
Toluene	<0.0291	<0.0287	<0.0278	<0.0291
Ethylbenzene	<0.0624	<0.0615	<0.0597	<0.0624
Xylene	<0.1574	<0.1552	<0.1506	<0.1574
Styrene	<0.0898	<0.0885	<0.0859	<0.0898

Analyst: Gary Zapel
Analytical Chemist

Reviewed by: Patrick Clark, P.E.
Manager, VOC Services

CERTIFICATE OF ANALYSIS

CUSTOMER: Solvay

DATE RECEIVED: Jan. 17, 1995

SAMPLE TYPE: Charcoal tubes & condensate

JOB/P.O.NUMBER: 65-7356

PARAMETERS: Listed below, results expressed as total milligrams/sample

DATE REPORTED: Feb. 6, 1995

MARKS: 7356-04-27,35-43
page 8 of 8

EP1,2

Laboratory Number	7356-35	7356-36	7356-37
Run number	1	2	3
1,3 Butadiene	<0.2348	<0.2348	<0.2348
Hexane	<0.0304	<0.0304	<0.0304
Methylene chloride	<0.5080	<0.5080	<0.5080
1-1-1 Trichloroethane	<0.2160	<0.2160	<0.2160
Benzene	<0.1163	<0.1163	<0.1163
Acrylonitrile	<3.1973	<3.1973	<3.1973
Toluene	<0.0283	<0.0283	<0.0283
Ethylbenzene	<0.0606	<0.0606	<0.0606
Xylene	<0.1529	<0.1529	<0.1529
Styrene	<0.0872	<0.0872	<0.0872

Analyst: Gary Zapel
Gary Zapel
Analytical Chemist

Reviewed by:
Patrick Clark, P.E.
Manager, VOC Services

Case Narrative
Triangle Laboratories of RTP, Inc.
801 Capitola Drive
Durham, NC 27713
Phone: (919) 544-5729
Fax: (919) 544-5491

DATE: January 25, 1995

TLI NO: 31232/31250

OBJECTIVE: Analysis of ten VOST tube pairs for Clean Air Act Volatile Compounds by Method 8240.

METHOD:

Seven field and four blank VOST tube samples were received at Triangle Laboratories of RTP, Inc. on January 17, 1995 at 4^0C. Sample EP5 CALC RUN 1 T/TC was archived as per client request. The samples were stored in a refrigerator at 4^0C prior to analysis. The VOST samples were analyzed in tandem according to the guidelines of Method 8240 and 5040. The internal standards and surrogate standards were added in the amount of 0.25 ug directly to the tubes immediately prior to analysis by GC/MS. The internal standards are bromochloromethane, 1,4-difluorobenzene, and chlorobenzene-d_5 and the surrogate standards reported are 1,2-dichloroethane-d_4, benzene-d_6, and toluene-d_8. The results reported relate only to the items tested.

The GC/MS analysis conditions are listed below:

Purge and trap:	Tekmar LSC-2000
Purge:	11 min.
Desorb Temperature:	250 C
Desorb Time:	3 min.

GC CONDITIONS:

Column:	30 m x .53 mm x 0.3*u* J&W DB624 0 C hold .5 min. to 45 C at 10 C/min, to 90 C at 6 C/min, hold 4 min to 200 at 27.5 C/min.

MS CONDITIONS:

Instrument:	VG-TRIO-1 Lab Base data system
Scan:	35-350 amu at .6s/scan
Interface:	Jet Separator, 200 C

REPORT:

Enclosed with the case narrative are copies of the sample identification index, the project summary sheets, client paperwork, sample log-in sheets, and log book pages. A sample identification index summarizes the client sample name, TLI sample number, and analytical file name for each sample and blank. The project summary lists the amounts for detected analytes and the estimated detection limits will be listed in parentheses when the target analytes are not detected.

The data are reported as quantitation reports, chromatograms, interim reports, and spectra of detected target analytes. The quantitation report header lists the TLI project number, analysis method, instrument sample file name, and client sample name. The client project number, TLI sample number, calibration file, date received, and analysis date are also listed in the quantitation report header. The response factors used for all calculations are from the calibration file listed in the header. All initial and continuing calibration data are located in the back of the data package. The amount is reported in total ug for the VOST tubes. The retention time (RT) will be listed for all internal standards and analytes which are detected. If a target analyte is not detected, it will be flagged with a "U" and a detection limit will be listed. Estimated detection limits are calculated for all analytes which were not found in the samples by using an area of 2000. The estimated detection limits reported are the average detection limits achievable over time on an instrument type. The actual detection limit for a given compound on a given day may vary from the estimate reported. The quantitation limit for all analytes is half of the low point of the initial calibration. Below this point the calibration cannot be considered to be linear. Any amount reported at a level below the quantitation limit will be flagged with a "J" and should be considered estimated. If any compounds are found at a level above the upper calibration range, the analyte will be flagged with an "E" and the amounts reported should be considered estimated. If any compounds are found at a level which saturates the mass spectral detector, the analyte will be flagged with an "SAT" and the amounts reported should be considered underestimated. If any target analytes found in the laboratory blanks are detected in the associated samples, they will be flagged with a "B" on each sample topsheet. All analytes are quantitated against the internal standard preceding them on the target analyte list. Surrogate standards are quantitated against the internal standard with the matching internal standard reference number. For example, toluene-d_8 has 3 in the IS Ref column and would be quantitated against the internal standard which has IS3 listed in the flag column. If an internal standard area is above or below the quality control limits as defined by the continuing calibration, it will be flagged with "High" or "Low" in the flag column.

RESULTS:

The VOST tubes, except sample EP5 CALC RUN 1 T/TC, were analyzed within the advisory fourteen day Method 8240 sampling to analysis holding time. This sample was analyzed outside of holding times at client request. All VOST tubes were analyzed in tandem.

A audit sample was performed before the analysis of each set of field samples for this project. All analytes were within acceptable quality control recoveries.

Several target analytes were identified in the samples at levels above the upper calibration limit of 1.0 ug. These compounds are flagged with an "E" and the amounts reported should be considered estimated.

Several target analytes were identified in the samples at sufficient levels to saturate the mass spectral detector. These compounds are flagged with "SAT" and the amounts reported should be considered underestimated

Please note the percent difference for tert-butyl methyl ether is above quality control criteria in the inital calibration for instrument G on January 6, 1995. Tert-butyl methyl ether was not found in these samples. All other internal standard areas and surrogate standard recoveries were within quality control criteria.

The laboratory blanks contained target analytes at levels below the quantitation limit. The target analytes in the laboratory blanks should not be considered as truly present in the native samples unless found at a level at least five times the amount found in the associated blank. In the event that the amount of a target analyte found in the sample is twenty times the amount found in the associated blank, the contribution from the blank can be considered negligible.

SAMPLE CALCULATIONS:

Response Factor (RF) = $\frac{\text{(area analyte) x (amt IS)}}{\text{(area IS) x (amt analyte)}}$

VOST Amount in ug = $\frac{\text{(area analyte in sample) x (amt IS)}}{\text{(area IS) x (avg ical RF)}}$

Where:
amt IS = amount of internal standard = 0.25 ug
RF = mean response factor from initial calibration

This report should only be reproduced in full. Any reproduction of this report requires permission from Triangle Laboratories of RTP, Inc. The data in this package has been judged to be valid according to the guidelines of Method 8240 and 5040 except as noted above. Should you have any questions, please feel free to contact our Air Quality Senior Project Manager, Nancy Bragg, at (919) 544-8348.

For Triangle Laboratories, Inc.,

Report Preparation:

Nina Woodgate 2/3/95

Nina Woodgate
Report Preparation Chemist

Quality Control:

Selena Armistead 2/3/95

Selena Armistead
Report Preparation Chemist

The total number of pages in this data package is 280.

Triangle Laboratories of RTP
Sample Identification Index for Project: 31232

Client Id:	TLI Id:	File Name:
EP5 CALC RUN 1 T/TC	94-464-1A/B	GO139
EP5 CALC RUN 2 T/TC	94-164-2A/B	FP254
EP5 CALC RUN 3 T/TC	94-164-3A/B	FP255
EP5 CALC RUN 4 T/TC	94-164-4A/B	FP256
EP-1,2 RUN #1 T/TC	94-182-1A/B	FP267
EP-1,2 RUN #2 T/TC	94-182-2A/B	FP268
EP-1,2 RUN #3 T/TC	94-182-3A/B	FP269
FIELD BLANK T/TC	94-164-5A/B	FP253
EP-1,2 FIELD BLANK T/TC	94-182-4A/B	FP266
EP5 CALC TRIP BLANK T/TC	94-164-6A/B	FP252
EP-1,2 TRIP BLANK T/TC	94-182-5A/B	FP265
VOSTBLK011995 T/TC	VOSTBLK01199	FP251
VOSTBLK012095 T/TC	VOSTBLK01209	FP264
VOSTBLK020195 T/TC	VOSTBLK02019	GO138

Triangle Laboratories of RTP
Project Summary for Project 31232

Client ID:	EP5 CALC R UN 1 T/TC	EP5 CALC R UN 2 T/TC	EP5 CALC R UN 3 T/TC	EP5 CALC R UN 4 T/TC	EP-1,2 RUN #1 T/TC	EP-1,2 RUN #2 T/TC	EP-1,2 RUN #3 T/TC
Filename :	GO139	FP254	FP255	FP256	FP267	FP268	FP269
TLI Id :	94-464-1A/B	94-164-2A/B	94-164-3A/B	94-164-4A/B	94-182-1A/B	94-182-2A/B	94-182-3A/B
Matrix :	VOST	VOST	VOST	VOST	VOST	VOST	VOST
Units :	ug	ug	ug	ug	ug	ug	ug
Chloromethane	(0.002)	(0.002)	(0.002)	(0.002)	0.029	0.016	0.016
Vinyl Chloride	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.001)
1,3-Butadiene	7.468	20.241	16.716	5.173	3.979	5.378	3.863
Bromomethane	(0.002)	0.011	0.008	0.007	0.009	0.008	0.006
Vinyl bromide	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
1,1-Dichloroethene	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Iodomethane	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Carbon disulfide	(0.001)	(0.001)	(0.001)	(0.001)	0.043	0.045	0.026
Allyl chloride	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Methylene chloride	(0.001)	(0.001)	0.846	0.027	0.105	0.093	0.028
tert-Butyl methyl ether	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Acrylonitrile	0.746	0.620	0.258	0.150	0.351	0.426	0.304
n-Hexane	0.686	0.888	0.521	0.224	0.194	0.269	0.148
1,1-Dichloroethane	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
1,2-Epoxybutane	(0.050)	(0.005)	(0.006)	(0.005)	(0.006)	(0.005)	(0.005)
Chloroform	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
1,2-Dichloroethane	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Isooctane	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Vinyl acetate	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
2-Butanone	0.290	0.603	0.128	0.107	0.370	0.442	0.292
1,1,1-Trichloroethane	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Carbon tetrachloride	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Benzene	5.271	5.524	4.734	3.077	1.393	1.661	1.158
Trichloroethene	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Ethyl acrylate	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)

5

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Triangle Laboratories of RTP

Project Summary for Project 31232

Client ID:	EP5 CALC R UN 1 T/TC	EP5 CALC R UN 2 T/TC	EP5 CALC R UN 3 T/TC	EP5 CALC R UN 4 T/TC	EP-1,2 RUN #1 T/TC	EP-1,2 RUN #2 T/TC	EP-1,2 RUN #3 T/TC
Filename :	GO139	FP254	FP255	FP256	FP267	FP268	FP269
TLI Id :	94-464-1A/B	94-164-2A/B	94-164-3A/B	94-164-4A/B	94-182-1A/B	94-182-2A/B	94-182-3A/B
Matrix :	VOST	VOST	VOST	VOST	VOST	VOST	VOST
Units :	ug	ug	ug	ug	ug	ug	ug
Dibromomethane	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Methyl methacrylate	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
cis-1,3-Dichloropropene	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
trans-1,3-Dichloropropene	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
1,1,2-Trichloroethane	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Bromoform	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
4-Methyl-2-pentanone	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Toluene	2.121	5.471	4.516	1.756	0.890	1.480	0.992
Tetrachloroethene	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Chlorobenzene	0.009	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Ethylbenzene	0.434	0.880	0.462	0.203	0.089	0.139	0.105
m-/p-Xylene	1.482	3.513	1.638	0.735	0.708	1.139	0.792
o-Xylene	0.194	0.382	0.201	0.093	0.043	0.062	0.048
Styrene	0.683	1.474	0.801	0.373	0.112	0.160	0.121
1,1,2,2-Tetrachloroethane	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
Cumene	0.012	0.014	0.009	0.005	0.005	0.006	0.005

SOLVAY2016_6_00020

Triangle Laboratories of RTP, Inc.
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( )-Estimated Detection Limit

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Triangle Laboratories of RTP
Project Summary for Project 31232

Client ID:	FIELD BLANK T/TC	EP-1,2 FIELD BLANK T/TC	EP5 CALC TRIP BLANK T/TC	EP-1,2 TRIP BLANK T/TC	VOSTBLK011995 T/TC	VOSTBLK012095 T/TC	VOSTBLK020195 T/TC
Filename :	FP253	FP266	FP252	FP265	FP251	FP264	GO138
TLI Id :	94-164-5A/B	94-182-4A/B	94-164-6A/B	94-182-5A/B	VOSTBLK01199	VOSTBLK01209	VOSTBLK02019
Matrix :	VOST	VOST	VOST	VOST	VOST	VOST	VOST
Units :	ug	ug	ug	ug	ug	ug	ug
Chloromethane	(0.002)	0.006	0.004	0.006	(0.002)	(0.002)	(0.003)
Vinyl Chloride	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
1,3-Butadiene	0.005	0.008	0.005	0.004	(0.002)	(0.002)	(0.002)
Bromomethane	0.005	0.009	0.003	0.006	(0.002)	(0.002)	(0.002)
Vinyl bromide	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
1,1-Dichloroethene	0.003	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Iodomethane	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Carbon disulfide	(0.001)	(0.001)	(0.001)	0.001	(0.001)	(0.001)	(0.001)
Allyl chloride	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Methylene chloride	0.010	0.029	0.044	0.034	0.006	0.003	(0.002)
tert-Butyl methyl ether	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Acrylonitrile	(0.006)	(0.006)	(0.005)	(0.005)	(0.006)	(0.007)	(0.013)
n-Hexane	0.004	0.005	0.004	0.080	(0.001)	(0.001)	(0.001)
1,1-Dichloroethane	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
1,2-Epoxybutane	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)	(0.064)
Chloroform	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
1,2-Dichloroethane	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Isooctane	(0.001)	0.004	(0.001)	0.004	(0.001)	(0.001)	(0.001)
Vinyl acetate	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
2-Butanone	(0.018)	(0.017)	(0.017)	0.033	(0.020)	(0.021)	(0.021)
1,1,1-Trichloroethane	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Carbon tetrachloride	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Benzene	(0.001)	0.039	0.013	0.034	(0.001)	(0.001)	(0.001)
Trichloroethene	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Ethyl acrylate	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)

SOTVAX_0019_950802

Triangle Laboratories of RTP

Project Summary for Project 31232

Client ID:	FIELD BLANK T/TC	EP-1,2 FIELD BLANK T/TC	EP5 CALC TRIP BLANK T/TC	EP-1,2 TRIP BLANK T/TC	VOSTBLK011995 T/TC	VOSTBLK012095 T/TC	VOSTBLK020195 T/TC
Filename :	FP253	FP266	FP252	FP265	FP251	FP264	GO138
TLI Id :	94-164-5A/B	94-182-4A/B	94-164-6A/B	94-182-5A/B	VOSTBLK01199	VOSTBLK01209	VOSTBLK02019
Matrix :	VOST	VOST	VOST	VOST	VOST	VOST	VOST
Units :	ug	ug	ug	ug	ug	ug	ug
Dibromomethane	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Methyl methacrylate	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)
cis-1,3-Dichloropropene	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
trans-1,3-Dichloropropene	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
1,1,2-Trichloroethane	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Bromoform	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)
4-Methyl-2-pentanone	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Toluene	0.019	0.019	0.012	0.023	0.003	0.003	(0.001)
Tetrachloroethene	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Chlorobenzene	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Ethylbenzene	(0.001)	(0.001)	(0.001)	0.002	(0.001)	(0.001)	(0.001)
m-/p-Xylene	0.003	0.007	0.003	0.005	(0.001)	(0.001)	(0.001)
o-Xylene	(0.001)	(0.001)	(0.001)	0.002	(0.001)	(0.001)	(0.001)
Styrene	(0.001)	0.005	0.001	0.005	(0.001)	(0.001)	(0.001)
1,1,2,2-Tetrachloroethane	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
Cumene	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)

SOLVAY2016_6_000205

Case Narrative
Triangle Laboratories of RTP, Inc.
801 Capitola Drive
Durham, NC 27713
Phone: (919) 544-5729
Fax: (919) 544-5491

DATE: January 25, 1995
ADDENDUM DATE: February 27, 1995

TLI NO: 31232/31250

OBJECTIVE: Analysis of ten VOST tube pairs for Clean Air Act Volatile Compounds by Method 8240.

METHOD:

Seven field and four blank VOST tube samples were received at Triangle Laboratories of RTP, Inc. on January 17, 1995 at 4^0C. Sample EP5 CALC RUN 1 T/TC was archived as per client request. The samples were stored in a refrigerator at 4^0C prior to analysis. The VOST samples were analyzed in tandem according to the guidelines of Method 8240 and 5040. The internal standards and surrogate standards were added in the amount of 0.25 ug directly to the tubes immediately prior to analysis by GC/MS. The internal standards are bromochloromethane, 1,4-difluorobenzene, and chlorobenzene-d_5 and the surrogate standards reported are 1,2-dichloroethane-d_4, benzene-d_6, and toluene-d_8. The results reported relate only to the items tested.

The GC/MS analysis conditions are listed below:

Purge and trap:	Tekmar LSC-2000
Purge:	11 min.
Desorb Temperature:	250 C
Desorb Time:	3 min.

GC CONDITIONS:

Column:	30 m x .53 mm x 0.3*u* J&W DB624 0 C hold .5 min. to 45 C at 10 C/min, to 90 C at 6 C/min, hold 4 min to 200 at 27.5 C/min.

MS CONDITIONS:

Instrument:	VG-TRIO-1 Lab Base data system
Scan:	35-350 amu at .6s/scan
Interface:	Jet Separator, 200 C

REPORT:

Enclosed with the case narrative are copies of the sample identification index, the project summary sheets, client paperwork, sample log-in sheets, and log book pages. A sample identification index summarizes the client sample name, TLI sample number, and analytical file name for each sample and blank. The project summary lists the amounts for detected analytes and the estimated detection limits will be listed in parentheses when the target analytes are not detected.

The data are reported as quantitation reports, chromatograms, interim reports, and spectra of detected target analytes. The quantitation report header lists the TLI project number, analysis method, instrument sample file name, and client sample name. The client project number, TLI sample number, calibration file, date received, and analysis date are also listed in the quantitation report header. The response factors used for all calculations are from the calibration file listed in the header. All initial and continuing calibration data are located in the back of the data package. The amount is reported in total ug for the VOST tubes. The retention time (RT) will be listed for all internal standards and analytes which are detected. If a target analyte is not detected, it will be flagged with a "U" and a detection limit will be listed. Estimated detection limits are calculated for all analytes which were not found in the samples by using an area of 2000. The estimated detection limits reported are the average detection limits achievable over time on an instrument type. The actual detection limit for a given compound on a given day may vary from the estimate reported. The quantitation limit for all analytes is half of the low point of the initial calibration. Below this point the calibration cannot be considered to be linear. Any amount reported at a level below the quantitation limit will be flagged with a "J" and should be considered estimated. If any compounds are found at a level above the upper calibration range, the analyte will be flagged with an "E" and the amounts reported should be considered estimated. If any compounds are found at a level which saturates the mass spectral detector, the analyte will be flagged with an "SAT" and the amounts reported should be considered underestimated. If any target analytes found in the laboratory blanks are detected in the associated samples, they will be flagged with a "B" on each sample topsheet. All analytes are quantitated against the internal standard preceding them on the target analyte list. Surrogate standards are quantitated against the internal standard with the matching internal standard reference number. For example, toluene-d_8 has 3 in the IS Ref column and would be quantitated against the internal standard which has IS3 listed in the flag column. If an internal standard area is above or below the quality control limits as defined by the continuing calibration, it will be flagged with "High" or "Low" in the flag column.

RESULTS:

The VOST tubes, except sample EP5 CALC RUN 1 T/TC, were analyzed within the advisory fourteen day Method 8240 sampling to analysis holding time. This sample was analyzed outside of holding times at client request. All VOST tubes were analyzed in tandem.

A audit sample was performed before the analysis of each set of field samples for this project. All analytes were within acceptable quality control recoveries.

Several target analytes were identified in the samples at levels above the upper calibration limit of 1.0 ug. These compounds are flagged with an "E" and the amounts reported should be considered estimated.

Several target analytes were identified in the samples at sufficient levels to saturate the mass spectral detector. These compounds are flagged with "SAT" and the amounts reported should be considered underestimated

Please note the percent difference for tert-butyl methyl ether is above quality control criteria in the inital calibration for instrument G on January 6, 1995. Tert-butyl methyl ether was not found in these samples. All other internal standard areas and surrogate standard recoveries were within quality control criteria.

The laboratory blanks contained target analytes at levels below the quantitation limit. The target analytes in the laboratory blanks should not be considered as truly present in the native samples unless found at a level at least five times the amount found in the associated blank. In the event that the amount of a target analyte found in the sample is twenty times the amount found in the associated blank, the contribution from the blank can be considered negligible.

SAMPLE CALCULATIONS:

Response Factor (RF) = $\frac{\text{(area analyte) x (amt IS)}}{\text{(area IS) x (amt analyte)}}$

VOST Amount in ug = $\frac{\text{(area analyte in sample) x (amt IS)}}{\text{(area IS) x (avg ical RF)}}$

Where:
amt IS = amount of internal standard = 0.25 ug
RF = mean response factor from initial calibration

ADDENDUM

The target analyte 1,2-dichloropropane, is reported for this project as requested, however, it was not detected in the samples or blanks.

Triangle Laboratories of RTP, Inc.
Case Narrative

January 22, 1995
31232/31250

This report should only be reproduced in full. Any reproduction of this report requires permission from Triangle Laboratories of RTP, Inc. The data in this package has been judged to be valid according to the guidelines of Method 8240 and 5040 except as noted above. Should you have any questions, please feel free to contact our Air Quality Senior Project Manager, Nancy Bragg, at (919) 544-8348.

For Triangle Laboratories, Inc.,

Report Preparation:

Nina Woodgate 2/27/95

Nina Woodgate
Report Preparation Chemist

Quality Control:

Eileen Winchester 2/27/95

Eileen Winchester
Report Preparation Chemist

The total number of pages in this data package is_____.

REVISED PAGE

Triangle Laboratories of RTP
Sample Identification Index for Project: 31232

Client Id:	TLI Id:	File Name:
EP5 CALC RUN 1 T/TC	94-464-1A/B	GO139
EP5 CALC RUN 2 T/TC	94-164-2A/B	FP254
EP5 CALC RUN 3 T/TC	94-164-3A/B	FP255
EP5 CALC RUN 4 T/TC	94-164-4A/B	FP256
EP-1,2 RUN #1 T/TC	94-182-1A/B	FP267
EP-1,2 RUN #2 T/TC	94-182-2A/B	FP268
EP-1,2 RUN #3 T/TC	94-182-3A/B	FP269
FIELD BLANK T/TC	94-164-5A/B	FP253
EP-1,2 FIELD BLANK T/TC	94-182-4A/B	FP266
EP5 CALC TRIP BLANK T/TC	94-164-6A/B	FP252
EP-1,2 TRIP BLANK T/TC	94-182-5A/B	FP265
VOSTBLK011995 T/TC	VOSTBLK01199	FP251
VOSTBLK012095 T/TC	VOSTBLK01209	FP264
VOSTBLK020195 T/TC	VOSTBLK02019	GO138

Added Page

Triangle Laboratories of RTP

Project Summary for Project 31232

Client ID:	EP5 CALC R UN 1 T/TC	EP5 CALC R UN 2 T/TC	EP5 CALC R UN 3 T/TC	EP5 CALC R UN 4 T/TC	EP-1,2 RUN #1 T/TC	EP-1,2 RUN #2 T/TC	EP-1,2 RUN #3 T/TC
Filename :	GO139	FP254	FP255	FP256	FP267	FP268	FP269
TLI Id :	94-464-1A/B	94-164-2A/B	94-164-3A/B	94-164-4A/B	94-182-1A/B	94-182-2A/B	94-182-3A/B
Matrix :	VOST	VOST	VOST	VOST	VOST	VOST	VOST
Units :	ug	ug	ug	ug	ug	ug	ug
1,2-Dichloropropane	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)

Added Page

SOLVAY2016_6_00011

Triangle Laboratories of RTP
Project Summary for Project 31232

Client ID:	FIELD BLANK T/TC	EP-1,2 FIELD BLANK T/TC	EP5 CALC TRIP BLANK T/TC	EP-1,2 TRIP BLANK T/TC	VOSTBLK011995 T/TC	VOSTBLK012095 T/TC	VOSTBLK020195 T/TC
Filename :	FP253	FP266	FP252	FP265	FP251	FP264	GO138
TLI Id :	94-164-5A/B	94-182-4A/B	94-164-6A/B	94-182-5A/B	VOSTBLK01199	VOSTBLK01209	VOSTBLK02019
Matrix :	VOST	VOST	VOST	VOST	VOST	VOST	VOST
Units :	ug	ug	ug	ug	ug	ug	ug
1,2-Dichloropropane	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)

Added Page

SOLVAY2016_6_000012

CHAIN OF CUSTODY

G

8462

CHAIN OF CUSTODY RECORD

PROJ. NO. 7356-1
DEPT. NO. 65

PROJECT NAME: SOLVAY MINERALS

SAMPLERS: (Signature) Steve Ferguson

LAB NO.	SAMPLE NO.	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS	METHANE	ETHANE	CO				REMARKS
-28		1/11	RUN 1	EP-5 TEDLAR BAG	1	X	X	X				
-29			2	" "	1	X	X	X				
-01			3	" "	1	X	X	X				
-02			4	" "	1	X	X	X				
-30		1/12	5	" "	1	X	X	X				
-31			6	" "	1	X	X	X				
-03			7	" "	1	X	X	X				
		~~1/13~~	~~RUN 1~~	~~EP-1,2 TEDLAR BAG~~								
			~~2~~	SF								
			~~3~~									

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Steve Ferguson	1/15/94				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by:	Date / Time		
		[signature]	1/12 & 1/18/94		

REMARKS:

Clean Air Engineering
500 W. Wood Street
Palatine, IL 60067
708/991-3300

SOLVAY(2016_6_000215

WHITE-PRINT FILE COPY YELLOW-RECORD FILE COPY PINK- RETAIN COPY GOLD-CUSTOMER COPY

7091

CHAIN OF CUSTODY RECORD

PROJ. NO. 7356-1
DEPT. NO. 65
PROJECT NAME: SOLVAY MINERALS
SAMPLERS: (Signature) Steve Ferguson

LAB NO.	SAMPLE NO.	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS TUBES	SEE LIST IN REMARKS SECTION						REMARKS
												ANALYZE CHARCOAL TUBES SEPERATLY
-14		1/11	RUN 1	EP-5 FIRST TUBE (1)	1	X						
-15			" 1	EP-5 SECOND TUBE (2)	1	X						M-18 ANALYSIS:
-16			" 2	" TUBE 1	1	X						ACRYLONTRILE
-17			" 2	" TUBE 2	1	X						BENZENE
-18			" 3	" " 1	1	X						1,3 BUTADIENE
-19			" 3	" " 2	1	X						ETHYLBENZENE
-20			" 4	" " 1	1	X						HEXANE
-21			" 4	" " 2	1	X						1,1,1-TRICHLOROETHANE
-22		1/12	" 5	" " 1	1	X						METHYLENE CHLORIDE
-23			" 5	" " 2	1	X						STYRENE
-24			" 6	" " 1	1	X						TOLUENE
-25			" 6	" " 2	1	X						O-XYLENE
-26			" 7	" " 1	1	X						m/p-XYLENE
-27			" 7	" " 2	1	X						
-28		1/12	Ø	BLANKS TUBES 1 & 2	2	X						

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Steve Ferguson	1/15/94				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by:	Date / Time		
		[signature]	1/17		

REMARKS:

CAE
Clean Air Engineering
500 W. Wood Street
Palatine, IL 60067
708/991-3300

SOLVAY 2016_6_000216

[redacted]E-P[redacted]FIL[redacted]Y [redacted]LOW[redacted]ORD[redacted]CO[redacted]PIN[redacted]TAI[redacted]PY [redacted]D-C[redacted]MER[redacted]Y [redacted]

8144

CHAIN OF CUSTODY RECORD

PROJ. NO. 7356-1
DEPT. NO. 65
PROJECT NAME: SOLVAY MINERALS
SAMPLERS: (Signature) Steve Ferguson

LAB NO.	SAMPLE NO.	DATE	TIME	SAMPLE LOCATION	NO OF CONTAINERS: IMPINGER H_2O CONDENSATE							REMARKS
												IMPINGER CONTENTS PURGED
-05		1/11	RUN 1	EP-5 - IMPINGER H_2O	1							W/ZERO AIR AT 1 LITER/MIN
-06		"	" 2	" "	1							FOR 15 MIN AFTER EACH RUN
-07		"	" 3	" "	1							
-08		"	" 4	" "	1							M-18 ANALYSIS:
-09		1/12	" 5	" "	1							ACRYLONITRILE
-10		"	6	" "	1							BENZENE
-11		"	7	" "	1							1,3 BUTADIENE
-04		1/12	Ø	HPLC FIELD BLANK	1							HEXANE
												ETHYLBENZENE
												1,1,1 TRICHLOROETHANE
												METHYLENE CHLORIDE
												STYRENE
												TOLUENE
												O-XYLENE
												m/p-XYLENE

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Steve Ferguson	1/15/94				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by:	Date / Time		
		[signature]	1/15/95 1m		

REMARKS:

SOLVAY(2016_6_000217

Clean Air Engineering
500 W. Wood Street
Palatine, IL 60067
708/991-3300

WHITE-PRINT FILE COPY YELLOW-RECORD FILE COPY PINK- RETAIN COPY GOLD-CUSTOMER COPY

8459

CHAIN OF CUSTODY RECORD

PROJ. NO. 73564
DEPT. NO. 65
PROJECT NAME: SOLVAY MINERALS
SAMPLERS: (Signature) Steve Ferguson

LAB NO.	SAMPLE NO.	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS	METHANE	ETHANE	CO				REMARKS
-32		1/17	RUN 1	EP-1,2 TEDLAR BAG	1	X	X	X				
-33		"	RUN 2	" "	1	X	X	X				
-34		"	RUN 3	" "	1	X	X	X				

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Steve Ferguson	1/17/95				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by:	Date / Time		
		[signature]	1/18/94 Am		

REMARKS:

Clean Air Engineering
500 W. Wood Street
Palatine, IL 60067
708/991-3300

SOLVAY2016_6_000218

[redacted]E-P[redacted]FIL[redacted]Y [redacted]LOW[redacted]ORD[redacted]E CO[redacted]PIN[redacted]TAI[redacted]PY [redacted]D-C[redacted]MER[redacted]Y [redacted]

8460

CHAIN OF CUSTODY RECORD

PROJ. NO. 7356-1
DEPT. NO. 65
PROJECT NAME: SOLVAY MINERALS
SAMPLERS: (Signature) Steve Ferguson

LAB NO.	SAMPLE NO.	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS (IMPINGER H_2O CONDENSATE)	SEE LIST IN REMARKS SECTION						REMARKS
-35		1/17	RUN 1	EP-1,2 IMPINGER H_2O	1	X						IMPINGER CONTENTS PURGED
-36		1/17	RUN 2	" "	1	X						W/ZERO AIR AT 1 L/MIN
-37		1/17	RUN 3	" "	1	X						FOR 15 MIN AFTER EACH RUN
												M-18 ANALYSIS:
												ACRYLONITRILE
												BENZENE
												1,3 BUTADIENE
												HEXANE
												ETHYLBENZENE
												1,1,1 TRICHLOROETHANE
												METHYLENE CHLORIDE
												STYRENE
												TOLUENE
												O-XYLENE
												m/p-XYLENE

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Steve Ferguson	1/17/95				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by:	Date / Time		
		[illegible]	1/18/95 1m		

REMARKS:

SOLVAY_2016_6_0002219

Clean Air Engineering
500 W. Wood Street
Palatine, IL 60067
708/991-3300

WHITE-PRINT FILE COPY YELLOW-RECORD FILE COPY PINK- RETAIN COPY GOLD-CUSTOMER COPY

8463

CHAIN OF CUSTODY RECORD

PROJ. NO. 7356-1
DEPT. NO. 65
PROJECT NAME: SOLVAY MINERALS
SAMPLERS: (Signature) Steve Feigeman

LAB NO.	SAMPLE NO.	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS (TUBES)	SEE LIST IN REMARKS SECTION						REMARKS
												ANALYZE CHARCOAL TUBES SEPERATLY
-38		1/17	RUN 1	EP-1,2 FIRST TUBE (1)	1	X						
-39		"	RUN 1	SECOND TUBE (2)	1	X						M-18 ANALYSIS:
-40		"	RUN 2	" TUBE 1	1	X						ACRYLONTRILE
-41		"	RUN 2	" " 2	1	X						BENZENE
-42		"	RUN 3	" " 1	1	X						1,3 BUTADIENE
-43		"	RUN 3	" " 2	1	X						ETHYLBENZENE
												HEXANE
												1,1,1-TRICHLOROETHANE
												METHYLENE CHLORIDE
												STYRENE
												TOLUENE
												O-XYLENE
												m/p-XYLENE

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Steve Feig	1/17/95				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by:	Date / Time		
		[signature]	18		

REMARKS:

Clean Air Engineering
500 W. Wood Street
Palatine, IL 60067
708/991-3300

SOLVAY 2016_6_000220

[redacted]E-P[redacted]FIL[redacted]Y [redacted]LOW[redacted]ORD[redacted] CO[redacted]PIN[redacted]TAI[redacted]PY [redacted]D-C[redacted]MER[redacted]Y [redacted]

8461

CHAIN OF CUSTODY RECORD

6

PROJ. NO. 7356-1
DEPT. NO. 65
PROJECT NAME: SOLVAY MINERALS
SAMPLERS (Signature): Ron M. Linkmann

LAB NO	SAMPLE NO	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS	VOST						REMARKS
		1/11		EPS CALC. RUN 1	2	X						
		1/11		" " " 2	2	X						THE REST OF THE
		1/11		" " " 3	2	X						TRAPS WILL BE
		1/11		" " FIELD BLANKS	2	X						SHIPPED LATER FOR
		1/11		" " TRIP BLANKS	2	X						ANALYSIS.

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Steve Fergus	1/16/95				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by:	Date / Time		
		[signature]	1/17/95 1150		

REMARKS:

CAE
Clean Air Engineering
500 W. Wood Street
Palatine, IL 60067
708/991-3300

SOLVAY 2016_6_000221

[redacted]TE-P[redacted] FIL[redacted]PY [redacted]LOW[redacted]TOR[redacted]E CO[redacted] PINK-DETAIL COPY GOLD-CUSTOMER COPY

8457

CHAIN OF CUSTODY RECORD

JOB NO. 7356-1
DEPT. NO. 65

PROJECT NAME: SOLVAY MINERALS

SAMPLERS: (Signature) Steve Ferguson

LAB NO	SAMPLE NO	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS	VOST	BEING RETURNED					REMARKS
		1/17	RUN 1	EP-1,2 - VOST TRAPS	2	X						
		1/17	RUN 2	" "	2	X						
		1/17	RUN 3	" "	2	X						
		1/17	Ø	" FIELD BLANK	2	X						
		1/17	Ø	" TRIP BLANK	2	X						
				SET W/BROKEN HOLDER	2		X					
				HOLDERS ONLY TRAPS DESTROYED	2		X					

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Steve Ferguson	1/17/95				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by:	Date / Time		
			1/18/95	1:30	

REMARKS:

CAE
Clean Air Engineering
500 W. Wood Street
Palatine, IL 60067
708/991-3300

WHITE-PRINT FILE COPY YELLOW-RECORD FILE COPY PINK- RETAIN COPY GOLD-CUSTOMER COPY

SOLVAY2015_6_000022

01

H

OPERATING DATA

H

AVERAGE PRODUCTION INFORMATION
FOR STACK TEST 1/11/95

Method 0030, 18, 25A
GAS CALCINER
AQD 48

	EP–5
Production (Tons per Hour)	162
Draft (in of water)	–1.70
Product temperature F	305.40
Off gas temperature F	356.61
Ore Source	mine
Opacity %	1.79

PRECIPITATOR	Volts	mA
1	308	1413
2	323	1713
3	323	1763
4	324	1713
5	320	1675
6	309	1738

Attached are the DCS data printouts and work sheets

SOLVAY2016_6_000226

GAS CALCINER TEST
HIGH RATE

Hourly Average
PVR

PV RETRIEVAL REQUEST

07:47 12 Jan 95
PAGE 1

LEGEND: ' = Calculated time ~ = Time changed " = HG data * = Less than expected # samples

DATE/ TIME	FCCA3A IN WATER VACUUM	FCCA3AB GAS TO CALCINER	FCCA3B	TCDC5 DEG F PRODUCT	CA3 CONTRL SWITCH	TCCA3B DEG. F DEFGAS	IIDC5 AMPS MOTOR	WCBS8 TONS/hr TRONA
01/11/95 08:00	-1.7	152.802	1.952	304.8	????????	363.65	33.8	150.1
09:00	-1.7	151.921	1.887	304.3	????????	359.35	33.2	149.9
10:00	-1.7	150.125	1.882	312.0	????????	357.11	33.0	149.8
11:00	-1.7	150.637	1.946	304.5	????????	357.19	33.0	150.1
12:00	-1.7	151.496	1.934	300.5	????????	357.25	33.7	149.9
13:00	-1.7	149.682	1.911	311.7	????????	356.45	32.4	150.0
14:00	-1.7	150.607	1.923	304.0	????????	354.58	32.8	149.6
15:00	-1.7	151.343	1.924	301.8	????????	355.32	33.1	150.1
16:00	-1.7	152.007	1.923	300.8	????????	358.37	33.4	150.1
17:00	-1.7	149.441	1.907	309.2	????????	356.02	33.6	150.0
18:00	-1.8	147.802	1.911	309.1	????????	359.61	33.2	145.7
19:00	-1.7	140.575	1.729	300.2	????????	347.76	32.0	135.2
20:00	-1.7	137.644	1.659	310.5	????????	347.65	31.9	135.1
21:00	-1.7	134.447	1.587	315.7	????????	348.30	32.2	135.0

162 TPH VOLUMETRIC

MORE RELIABLE

SOLVAY2016_6_000227

Hourly Averages
PVR

PV RETRIEVAL REQUEST

07:48 12 Jan 95
PAGE 1

LEGEND: ' = Calculated time ~ = Time changed " = NG data * = Less than expected # samples

DATE/ TIME	TICA3 AMPS MOTOR	CO3 RATIO	AIEPSA PERCENT OXYGEN	AIEPSB PERCENT METHANE	FCCA3AA GAS TO CALCINER	TCDC5 DEG F PRODUCT	TTCA3B DEF GAS	FCCA3B
01/11/95 08:00	193.9	1.952	4.5	0.00	152.802	304.8	363.6	1.952
09:00	194.7	1.887	4.5	0.01	151.921	304.3	359.3	1.887
10:00	195.2	1.862	4.4	0.01	150.425	312.0	357.1	1.862
11:00	191.0	1.946	4.7	0.01	150.687	304.5	357.2	1.946
12:00	195.7	1.934	4.6	0.01	151.496	300.5	357.3	1.934
13:00	191.2	1.910	4.7	0.01	149.682	311.7	356.4	1.911
14:00	194.7	1.923	4.7	0.01	150.607	304.0	354.6	1.923
15:00	195.7	1.925	4.6	0.01	151.845	301.8	355.3	1.924
16:00	196.7	1.923	4.7	0.00	152.007	300.8	358.4	1.923
17:00	195.3	1.907	4.7	0.00	149.441	309.2	356.0	1.907
18:00	191.9	1.911	5.0	0.00	147.802	307.1	359.6	1.911
19:00	189.7	1.732	4.9	0.01	140.575	300.2	347.7	1.729
20:00	193.6	1.659	4.8	0.01	137.644	310.5	347.7	1.659
21:00	194.5	1.587	4.9	0.01	134.442	315.7	348.3	1.587

Hourly Averages
VR

PV RETRIEVAL REQUEST

LEGEND: ' = Calculated time ~ = Time changed " = NG data * = Less than expected # samples

DATE/ TIME	IIFN28 AMP MOTOR	EP5C COMBUST GASSES	AISM5A PERCENT DUST	AISM5B PERCENT DUST	IIFN10 AMPS MOTOR	CA1_AIR ACFM ACFM	IIFN11 AMPS MOTOR	CA2 AIR ACFM ACFM
01/11/95 08:00	31.2	????????	1.8	????????	138.1	297473.	119.6	218303.
09:00	31.0	????????	1.9	????????	134.1	288789.	121.2	223593.
10:00	31.1	????????	1.5	????????	131.4	280159.	118.9	216657.
11:00	31.1	????????	3.6	????????	131.6	280488.	118.7	216531.
12:00	31.2	????????	1.9	????????	132.9	283739.	120.1	219423.
13:00	31.3	????????	1.9	????????	133.3	283986.	119.3	217218.
14:00	31.2	????????	2.0	????????	132.6	282961.	118.8	216451.
15:00	31.1	????????	1.9	????????	131.0	278857.	119.1	217746.
16:00	31.1	????????	1.9	????????	131.9	280749.	119.0	216337.
17:00	30.9	????????	1.9	????????	134.0	286337.	119.0	218705.
18:00	31.2	????????	2.0	????????	135.9	292543.	121.3	224677.
19:00	31.3	????????	3.9	????????	138.1	297594.	122.0	224866.
20:00	30.9	????????	2.0	????????	139.0	302148.	121.9	225734.
21:00	30.9	????????	2.3	????????	139.2	306456.	124.4	233576.

SOLVAY2016_6_0000229

Hourly Averages
PVR

PV RETRIEVAL REQUEST

07:56 12 Jan 95
PAGE 1

LEGEND: ' = Calculated time ~ = Time changed " = HG data * = Less than expected # samples

DATE/ TIME	WQBS7 TONS TRONA	WQBS8 TONS/hr TRONA
01/11/95 08:00	1094.5	1126.2
09:00	1240.5	1276.2
10:00	1390.5	1426.1
11:00	1534.3	1576.4
12:00	1679.4	1726.2
13:00	1829.1	1876.4
14:00	1972.4	2026.5
15:00	2117.6	2176.5
16:00	2262.3	2326.6
17:00	2413.1	2476.6
18:00	2555.2	2625.8
19:00	2696.0	2745.0
20:00	2819.2	2900.0
21:00	2948.5	3035.1

VOLUMETRIC: 22.65 SEC/10 FLIGHTS

162 TPH

SOLVAY2016_6_000230

DATA LISTING

NAME: CALCINER/DRYER LOCATION: SOLVAY MINERALS STATION ID: 2

CHAN NAME	#30PT	#40PT	#50PT	
CHAN UNITS	%	%	%	
FULL SCALE	100.0	100.0	100.0	
ZERO OFFSET	0.0	0.0	0.0	
START / CHANNEL	01	02	03	
01/11/95 09:36	3.4	1.4	2.5	
01/11/95 09:42	3.3	1.4	2.5	
01/11/95 09:48	3.4	1.4	2.5	
01/11/95 09:54	3.3	1.6	2.3	
01/11/95 10:00	3.5	1.5	2.5	
01/11/95 10:06	3.4	1.7	2.5	
01/11/95 10:12	3.4	1.4	2.5	
01/11/95 10:18	3.5	1.5	2.5	
01/11/95 10:24	3.4	1.5	2.5	
01/11/95 10:30	3.3	1.4	2.5	
01/11/95 10:36	3.4	1.5	2.5	
01/11/95 10:42	3.3	1.4	2.5	RUN #1 START 10.45
01/11/95 10:48	3.5	1.4	2.5	
01/11/95 10:54	3.3	0.4C	2.5	
01/11/95 11:00	3.5	1.8<	2.5	
01/11/95 11:06	3.6	1.8	2.5	
01/11/95 11:12	3.9	1.8	2.5	
01/11/95 11:18	4.0	1.8	2.5	
01/11/95 11:24	4.4	1.8	2.5	
01/11/95 11:30	4.6	1.8	2.5	
01/11/95 11:36	4.7	1.9	2.5	
01/11/95 11:42	4.5	2.0	2.5	
01/11/95 11:48	3.5	2.0	2.5	RUN#1 STOP 11:45
01/11/95 11:54	0.2P	2.0	2.5	
01/11/95 12:00	4.2<	2.0	2.6	
01/11/95 12:06	4.2	2.1	2.5	
01/11/95 12:12	4.2	2.0	2.5	
01/11/95 12:18	4.3	1.9	2.5	
01/11/95 12:24	4.4	1.9	2.5	
01/11/95 12:30	4.6	1.8	2.5	
01/11/95 12:36	4.3	1.9	2.6	
01/11/95 12:42	4.4	1.7	2.5	
01/11/95 12:48	4.5	1.8	2.5	RUN #2 START 12:50
01/11/95 12:54	4.5	1.9	2.6	
01/11/95 13:00	4.7	1.7	2.5	
01/11/95 13:06	4.7	1.9	2.5	
01/11/95 13:12	4.6	2.0	2.5	
01/11/95 13:18	4.7	2.2	2.5	
01/11/95 13:24	4.7	2.0	2.5	
01/11/95 13:30	4.8	2.1	2.6	
01/11/95 13:36	4.6	2.0	2.3	
01/11/95 13:42	4.4	2.0	2.5	
01/11/95 13:48	4.5	1.8	2.5	
01/11/95 13:54	4.3	1.9	2.5	RUN#2 STOP 13:50
01/11/95 14:00	4.3	1.9	2.5	
01/11/95 14:06	4.1	1.8	2.5	
01/11/95 14:12	4.1	1.8	2.5	
01/11/95 14:18	4.0	1.9	2.4	

SOLVAY2016_6_000231

DATA LISTING

NAME: CALCINER/DRYER LOCATION: SOLVAY MINERALS STATION ID: 1

CHAN NAME		#30PT	#40PT	#50PT	
CHAN UNITS		%	%	%	
FULL SCALE		100.0	100.0	100.0	
ZERO OFFSET		0.0	0.0	0.0	
START / CHANNEL		01	02	03	
01/11/95	14:24	4.0	1.8	2.5	START RUN # 3 14:25
01/11/95	14:30	3.9	1.9	2.4	
01/11/95	14:36	3.9	1.8	2.5	
01/11/95	14:42	4.1	1.8	2.5	
01/11/95	14:48	4.0	1.8	2.5	
01/11/95	14:54	3.7	1.8	2.5	
01/11/95	15:00	3.9	1.7	2.5	
01/11/95	15:06	3.8	1.9	2.5	
01/11/95	15:12	3.9	1.8	2.5	
01/11/95	15:18	3.9	1.8	2.5	
01/11/95	15:24	3.9	1.9	2.5	
01/11/95	15:30	3.8	1.7	2.5	STOP RUN # 3 15:25
01/11/95	15:36	3.9	1.7	2.5	
01/11/95	15:42	3.8	1.8	2.5	
01/11/95	15:48	3.6	2.1	2.5	
01/11/95	15:54	3.6	1.8	2.5	START RUN # 4 15:51
01/11/95	16:00	3.6	1.9	2.6	
01/11/95	16:06	3.7	1.8	2.6	
01/11/95	16:12	3.6	1.9	2.5	
01/11/95	16:18	3.6	1.6	2.6	
01/11/95	16:24	3.7	1.8	1.20	
01/11/95	16:30	3.9	1.6	2.34	
01/11/95	16:36	4.1	1.7	2.3	
01/11/95	16:42	4.2	1.8	2.3	
01/11/95	16:48	4.1	2.0	2.3	
01/11/95	16:54	4.1	2.1	2.3	STOP RUN # 4 16:51
01/11/95	17:00	4.2	1.9	2.3	
01/11/95	17:06	4.2	2.0	2.3	
01/11/95	17:12	4.3	2.5	2.3	
01/11/95	17:18	4.3	2.1	2.3	
01/11/95	17:24	4.1	2.0	2.3	
01/11/95	17:30	4.2	1.9	2.3	
01/11/95	17:36	4.3	1.8	2.3	
01/11/95	17:42	4.7	1.7	2.3	
01/11/95	17:48	5.1	1.9	2.2	
01/11/95	17:54	5.1	1.8	2.3	
01/11/95	18:00	5.1	1.8	2.3	
01/11/95	18:06	5.1	2.0	2.2	
01/11/95	18:12	5.3	1.8	2.2	
01/11/95	18:18	5.5	1.9	2.3	
01/11/95	18:24	5.4	1.6	2.2	
01/11/95	18:30	5.5	1.6	2.2	
01/11/95	18:36	5.6	2.1	2.3	
01/11/95	18:42	5.6	2.2	2.3	
01/11/95	18:48	5.4	2.3	2.3	
01/11/95	18:54	5.3	0.70	2.3	
01/11/95	19:00	5.0	2.34	2.2	
01/11/95	19:06	5.3	2.0	2.3	

AVERAGE PRODUCTION INFORMATION FOR STACK TEST 1/12/95

Method 0030, 18, 25A
GAS CALCINER
AQD 48

	EP-5
Production (Tons per Hour)	147
Draft (in of water)	-1.70
Product temperature F	310.23
Off gas temperature F	343.46
Ore Source	mine
Opacity %	1.79

PRECIPITATOR	Volts	mA
1	268	1400
2	318	1717
3	320	1750
4	317	1700
5	310	1670
6	313	1750

Attached are the DCS data printouts and work sheets

SOLVAY2016_6_000233

O-F TEMP	87.0	88.0	88.0	88.0	90.0	91.0	91.0	88.0	88.0	91.0	93.0	88.0	89.0
COMPRESSOR TEMP	194.00												
DSP TANK LEVEL	11.7	11.7	11.7	11.7	11.6	11.6	10.8	11.0	11.2	11.3	11.4	11.4	

GAS CALCINER
TEST
LOW RATE

Hourly Averages
PVR

PV RETRIEVAL REQUEST

08:47 13 Jan 95
PAGE 1

LEGEND: ' = Calculated time ~ = Time changed " = DG data * = less than expected # samples

DATE/ TIME	FCCA3A IN WATER VACUUM	FCCA3AA GAS TO CALCINER	FCCA3B	TCDC5 DEG F PRODUCT	CA3 CONTRL SWITCH	TCCA3B DEG. F OFFGAS	IIDC5 AMPS MOTOR	WCRSR TONS/hr TRONA
01/12/95 07:00	1.7	141.034	1.672	306.8	????????	344.83	32.2	135.0
08:00	-1.7	141.375	1.666	304.3	????????	344.13	31.9	135.0
09:00	1.7	141.967	1.675	304.0	????????	344.00	32.7	135.2
10:00	-1.7	140.853	1.676	306.4	????????	344.53	32.1	134.8
11:00	-1.7	140.651	1.665	305.9	????????	341.99	31.7	134.9
12:00	-1.7	138.796	1.633	310.3	????????	341.21	31.6	135.1
13:00	-1.7	134.155	1.592	318.3	????????	345.70	31.7	136.7
14:00	-1.7	135.945	1.589	305.5	????????	339.71	31.5	136.6
15:00	-1.6	148.513	1.860	315.5	????????	355.21	32.8	140.6
16:00	-1.7	150.118	1.905	304.4	????????	355.87	33.1	150.3
17:00	-1.6	148.350	1.879	308.5	????????	354.09	32.8	150.0

→ 147 #/H
VOLUMETRIC

MORE
BELIEVABLE
&
RELIABLE

SOLVAY2016_6_000234

Hourly Averages
PVR

PV RETRIEVAL REQUEST

LEGEND: ' = Calculated time ~ = Time changed " = HG data * = Less than expected # samples

DATE/ TIME	JICA3 AMPS MOTOR	CA3_RATIO	AIEP5A PERCENT OXYGEN	AIEP5B PERCENT METHANE	FCCA3AA GAS TO CALCINER	TCD05 DEG F PRODUCT	TICA3R OFF GAS	FCCA3B
01/12/95 07:00	194.4	1.672	4.8	0.01	141.034	300.8	344.8	1.672
08:00	190.9	1.666	4.8	0.01	141.375	304.3	344.1	1.666
09:00	194.3	1.675	4.8	0.01	141.967	304.0	344.0	1.675
10:00	187.2	1.676	4.8	0.01	140.853	306.4	344.5	1.676
11:00	188.2	1.665	4.8	0.01	140.651	305.9	342.0	1.665
12:00	189.2	1.636	4.7	0.01	138.796	310.3	341.2	1.633
13:00	195.5	1.592	4.8	0.00	134.155	318.3	345.7	1.592
14:00	195.7	1.589	4.6	0.01	135.945	305.5	339.7	1.589
15:00	191.6	1.860	4.5	0.01	148.513	315.5	355.2	1.860
16:00	195.5	1.905	4.7	0.01	150.118	304.4	355.9	1.905
17:00	193.0	1.879	4.7	0.01	148.350	308.5	354.1	1.879

SOLVAY2016_6_000235

ourly Averages
VR

PV RETRIEVAL REQUEST

08:50 13 Jan '95
PAGE 1

EGEND: ' = Calculated time " = Time changed " = HG data * = Less than expected # samples

ATE/ IME	IIFN28 AMP MOTOR	EP5C COMBUST GASSES	AISM5A PERCENT DUST	AISM5B PERCENT DUST	IIFN10 AMPS MOTOR	CA1_AIR ACFM ACFM	IIFN11 AMPS MOTOR	CA2_AIR ACFM ACFM
1/12/95								
7:00	31.6	????????	1.6	????????	138.0	306867.	124.1	230539.
8:00	31.5	????????	1.5	????????	138.7	308970.	125.7	236181.
9:00	31.5	????????	1.5	????????	138.7	308907.	127.7	242148.
0:00	31.2	????????	1.7	????????	138.9	309862.	125.2	233420.
1:00	31.3	????????	4.9	????????	138.9	307279.	124.8	233795.
2:00	31.2	????????	2.1	????????	138.9	307827.	123.6	232047.
3:00	31.3	????????	2.1	????????	138.5	307268.	122.9	225506.
4:00	31.0	????????	2.0	????????	138.4	306716.	122.7	227923.
5:00	31.4	????????	1.9	????????	138.0	305213.	122.0	227617.
6:00	31.6	????????	1.7	????????	137.9	304846.	121.5	222704.
7:00	31.6	????????	1.8	????????	138.4	304806.	122.2	226041.

SOLVAY2016_6_000236

GAS CALCINER TEST

LOW RATE

Hourly Averages
PVR

PV RETRIEVAL REQUEST

08:52 13 Jan 95
PAGE 1

LEGEND: ' = Calculated time ~ = time changed " = NG data * = Less than expected # samples

DATE/ TIME	WQB57 TONS TRONA	WQB58 TONS/hr TRONA
01/12/95 07:00	858.2	878.6
08:00	989.7	1013.5
09:00	1112.0	1148.4
10:00	1252.9	1283.5
11:00	1386.6	1418.9
12:00	1518.4	1553.7
13:00	1645.0	1688.6
14:00	1779.4	1823.5
15:00	1914.8	1966.2
16:00	2062.1	2116.0
17:00	2212.2	2265.8
	BELT SCALE	NUCLEAR SCALE

VOLUMETRIC 24.85 SEC/10 FLTS = 147 TPH

SOLVAY2016_6_000237

DATA LISTING

NAME: CALCINER/DRYER LOCATION: SOLVAY MINERALS STATION ID: 2

CHAN NAME		#3OPT	#4OPT	#5OPT
CHAN UNITS		%	%	%
FULL SCALE		100.0	100.0	100.0
ZERO OFFSET		0.0	0.0	0.0
START / CHANNEL		01	02	03
01/12/95	04:48	4.7	1.6	2.4
01/12/95	04:54	4.6	1.6	2.3
01/12/95	05:00	4.8	1.6	2.4
01/12/95	05:06	4.7	1.7	2.3
01/12/95	05:12	4.8	1.5	2.4
01/12/95	05:18	4.9	1.6	2.3
01/12/95	05:24	4.9	1.6	2.4
01/12/95	05:30	4.6	1.5	2.4
01/12/95	05:36	4.7	1.4	2.4
01/12/95	05:42	4.6	1.5	2.5
01/12/95	05:48	4.7	1.5	2.4
01/12/95	05:54	4.6	1.6	2.4
01/12/95	06:00	4.5	1.6	2.3
01/12/95	06:06	4.9	1.7	2.4
01/12/95	06:12	4.5	1.6	2.4
01/12/95	06:18	4.6	1.6	2.3
01/12/95	06:24	4.7	1.6	2.4
01/12/95	06:30	4.6	1.5	2.4
01/12/95	06:36	4.6	1.6	2.3
01/12/95	06:42	4.5	1.5	2.3
01/12/95	06:48	4.5	1.6	2.3
01/12/95	06:54	4.7	1.4	2.5
01/12/95	07:00	4.5	1.6	2.3
01/12/95	07:06	4.4	1.5	2.4
01/12/95	07:12	4.4	1.6	2.4
01/12/95	07:18	4.4	1.5	2.4
01/12/95	07:24	4.3	1.5	2.4
01/12/95	07:30	4.4	1.5	2.4
01/12/95	07:36	4.3	1.5	2.4
01/12/95	07:42	4.5	1.6	2.3
01/12/95	07:48	4.5	1.5	2.4
01/12/95	07:54	4.4	1.6	2.4
01/12/95	08:00	4.4	1.5	2.4
01/12/95	08:06	4.5	1.5	2.3
01/12/95	08:12	4.4	1.6	2.3
01/12/95	08:18	4.5	1.5	2.3
01/12/95	08:24	4.6	1.5	1.00
01/12/95	08:30	4.5	1.5	2.4
01/12/95	08:36	4.7	1.5	2.4
01/12/95	08:42	4.6	1.6	2.4
01/12/95	08:48	4.7	1.6	2.4
01/12/95	08:54	4.7	1.6	2.4
01/12/95	09:00	4.7	1.5	2.4
01/12/95	09:06	4.7	1.7	2.4
01/12/95	09:12	4.5	1.6	2.4
01/12/95	09:18	4.7	1.6	2.3
01/12/95	09:24	4.6	1.8	2.4
01/12/95	09:30	4.6	1.6	2.3

Run #1 START 9:15

DATA LISTING

NAME: CALCINER/DRYER LOCATION: SOLVAY MINERALS STATION ID:

CHAN NAME		#3OFT	#4OFT	#5OFT	
CHAN UNITS		%	%	%	
FULL SCALE		100.0	100.0	100.0	
ZERO OFFSET		0.0	0.0	0.0	
START / CHANNEL		01	02	03	
01/12/95	09:36	4.5	1.9	2.4	
01/12/95	09:42	4.5	1.6	2.4	
01/12/95	09:48	4.7	1.8	2.3	
01/12/95	09:54	4.6	1.9	2.5	
01/12/95	10:00	4.5	1.9	2.3	
01/12/95	10:06	4.5	1.8	2.3	
01/12/95	10:12	4.5	1.9	2.4	
01/12/95	10:18	4.7	1.7	2.3	STOP RUN #1 10:15
01/12/95	10:24	4.7	1.9	2.3	
01/12/95	10:30	4.9	1.9	2.3	
01/12/95	10:36	5.0	1.9	2.3	
01/12/95	10:42	5.1	2.0	2.3	START RUN #2 10:46
01/12/95	10:48	5.2	2.0	2.3	
01/12/95	10:54	5.0	0.3C	2.2	
01/12/95	11:00	5.0	2.1<	2.2	
01/12/95	11:06	5.2	2.1	2.2	
01/12/95	11:12	5.1	2.1	2.2	
01/12/95	11:18	5.1	2.2	2.1	
01/12/95	11:24	5.1	2.2	2.1	
01/12/95	11:30	4.8	2.2	2.1	
01/12/95	11:36	4.9	2.1	2.1	
01/12/95	11:42	4.9	2.1	2.1	
01/12/95	11:48	3.5	2.1	2.0	STOP RUN #2 11:46
01/12/95	11:54	0.2P	2.1	2.0	
01/12/95	12:00	5.2<	2.1	2.0	
01/12/95	12:06	5.3	2.2	1.9	
01/12/95	12:12	5.5	2.0	1.9	START RUN #3 12:09
01/12/95	12:18	5.4	2.1	1.9	
01/12/95	12:24	5.2	2.2	1.8	
01/12/95	12:30	5.2	2.2	1.9	
01/12/95	12:36	5.3	2.1	1.8	
01/12/95	12:42	5.3	2.1	1.8	
01/12/95	12:48	5.4	2.1	1.8	
01/12/95	12:54	5.4	2.1	1.8	
01/12/95	13:00	5.4	2.1	1.8	
01/12/95	13:06	5.4	2.1	1.8	STOP RUN #3 12:09
01/12/95	13:12	5.3	2.0	1.8	
01/12/95	13:18	5.4	2.2	1.8	
01/12/95	13:24	5.4	2.3	1.7	
01/12/95	13:30	5.4	2.1	1.7	
01/12/95	13:36	5.3	2.0	1.7	
01/12/95	13:42	5.6	1.9	1.7	
01/12/95	13:48	5.6	2.0	1.7	
01/12/95	13:54	5.5	2.0	1.7	
01/12/95	14:00	5.5	2.0	1.8	
01/12/95	14:06	5.5	1.9	1.8	
01/12/95	14:12	5.4	2.0	1.8	
01/12/95	14:18	5.3	2.0	1.8	

AVERAGE PRODUCTION INFORMATION FOR STACK TEST 1/17/95

Method 25A
ORE CRUSHER
AQD 47

Production (Tons per Hour)	154.05
Draft (in of water)	NA
Product temperature F	NA
Off gas temperature F	NA
Ore Source	MINE
Opacity %	NA

Attached are the DCS data printouts and work sheets

AVERAGE PRODUCTION INFORMATION FOR STACK TEST 1/17/95

Method 0030, 18, 25A
1/17/95
(AQD 17) COAL CALCINER

	EP-1	EP-2	COMBINED
Production (Tons per Hour)	127	117	244
breech F	1649.88	1642.68	1646.28
Draft (in of water)	-0.08	-0.15	-0.11
Product temperature F	290.28	301.15	295.72
Furnace temperature F	2082.47	2254.47	2168.47
Off gas temperature F	502.42	539.23	520.83
Ore Source	mine	mine	mine
Opacity %			3.77

PRECIPITATOR	Volts	mA		Volts	mA
1A	372	674	2A	344	501
1B	458	1406	2B	395	1266
1C	423	1400	2C	416	1372
1D	428	1403	2D	418	1375
1E	419	974	2E	406	1379
1F	402	1348	2F	422	1406

Attached are the DCS data printouts and work sheets

SOLVAY20116_6*0000241

A & B CALCINER TEST

Hourly Averages
PVR

PV RETRIEVAL REQUEST

07:48 01 Jan 95
PAGE 1

LEGEND: ' = Calculated time ' = Time changed ' = No data * = Less than expected # samples.

DATE/ TIME	TJFU1F DEG F FREECH	WCDC1 TPH TRONA	PCFU1 IN WATER PRESSURE	TCCA1C DEG. F TEMP	TCFU1F DEG. F TEMP	TCCA1A DEG. F TEMP	HCCA1A PERCENT OPEN	HCCA1B PERCENT OPEN
01/17/95								
07:00	1748.2	129.7	-0.08	291.1	2039.0	502.5	????????	????????
08:00	1756.3	129.8	-0.05	284.9	2045.3	501.1	????????	????????
09:00	1744.9	130.0	-0.06	294.4	2134.3	503.1	????????	????????
10:00	1752.6	129.9	-0.08	294.3	2175.6	501.8	????????	????????
11:00	1198.9	40.9	-0.11	242.1	1648.3	503.9	????????	????????
12:00	1714.9	130.0	-0.07	309.5	2184.6	500.5	????????	????????
13:00	1731.7	130.1	-0.08	316.5	2306.7	504.1	????????	????????
14:00	1734.7	130.[illegible]	-0.08	305.3	2382.5	499.4	????????	????????
15:00	1753.0	130.1	-0.08	297.2	2358.1	499.2	????????	????????
16:00	1747.4	130.3	-0.07	292.6	2257.2	502.4	????????	????????
17:00	1761.0	130.4	-0.08	292.5	2264.4	503.8	????????	????????
18:00	1779.0	129.8	-0.06	298.8	2228.0	503.6	????????	????????

16.4 SEC/10 FLYS

127 TPH

SOLVAY2016_6_000242

Hourly Averages
PVR

PV RETRIEVAL REQUEST

07:47 01 Jan 95
PAGE 1

LEGEND: ? = Calculated time ? = Time changed " = NO data * = Less than expected # samples

DATE/ TIME		FIFN12 SCFM AIR FLOW	FIFN17 SCFM AIR FLOW	TIFN140 DEG. F TEMP	TIFN145 DEG. F TEMP	TIFN160 DEG. F BEARING	TIFN128 DEG. F BEARING
01/17/95 07:00	????????	55412.9	44389.2	----------*	----------*	125.8	115.7
08:00	????????	55413.2	44390.3	----------*	----------*	125.2	115.3
09:00	????????	55413.7	44389.8	----------*	----------*	124.9	114.7
10:00	????????	55345.9	44388.5	----------*	----------*	125.2	115.4
11:00	????????	54714.5	44389.5	----------*	----------*	126.3	116.7
12:00	????????	53557.7	44396.4	----------*	----------*	127.6	117.8
13:00	????????	53462.7	44393.9	----------*	----------*	128.6	118.4
14:00	????????	53540.7	44392.8	----------*	----------*	128.7	118.5
15:00	????????	53507.1	44392.5	----------*	----------*	128.8	118.5
16:00	????????	55153.6	44385.0	----------*	----------*	128.3	117.9
17:00	????????	55292.3	44385.0	----------*	----------*	127.5	117.1
18:00	????????	55404.3	44386.4	----------*	----------*	126.5	115.7

SOLVAY2016_6_000243

Hourly Averages
PVR

PV RETRIEVAL REQUEST

07:50 18 Jan 95
PAGE 1

LEGEND: ' = Calculated time " = Time changed " = MG data * = Less than expected # samples

DATE/ TIME	TIFU2F BREECH TEMP	WCAF14 TPH TRONA	FCFU2 FU-2 DRAFT	TCCA2C DEG. F TEMP	TCFU2F DEG. F TEMP	TCCA2B EXHAUST TEMP	HCCA2A PERCENT	HCCA2E PERCENT
01/17/95								
07:00	1640.7	134.8	-0.17	288.7	2206.6	539.1	????????	????????
08:00	1643.0	135.2	0.16	287.8	2232.0	540.2	????????	????????
09:00	1633.3	135.2	-0.12	286.2	2234.1	539.4	????????	????????
10:00	1646.0	135.1	-0.17	293.5	2251.5	541.0	????????	????????
11:00	1634.2	135.3	-0.16	297.3	2244.7	539.7	????????	????????
12:00	1652.8	134.8	-0.13	324.2	2288.2	538.4	????????	????????
13:00	1646.8	135.1	-0.17	317.9	2276.3	536.7	????????	????????
14:00	1634.9	134.9	-0.16	325.7	2257.4	535.0	????????	????????
15:00	1644.1	135.1	-0.12	312.1	2279.4	531.1	????????	????????
16:00	1625.5	134.9	-0.17	309.6	2244.0	532.3	????????	????????
17:00	1627.5	134.9	-0.16	306.5	2231.0	532.4	????????	????????
18:00	1624.3	134.5	-0.12	304.7	2229.7	531.0	????????	????????

17.82 SEC/10 FLTS

117 TPH

SOLVAY2016_6_000244

Hourly Averages
PVR

TV RETRIEVAL REQUEST

07:50 18 Jan 95
PAGE 1

LEGEND: ' = Calculated Time ~ = Time changed " = NO data # = less than expected # samples

DATE/ TIME	TIFN13A DEG. F BEARING	TIFN13B DEG. F BEARING	FIFN13 SCFM AIR FLOW	FIFN13 SCFM AIR FLOW	FN15 MOTOR STATUS	TIFN15A DEG. F TEMP	TIFN15B DEG. F TEMP
01/17/95 07:00	132.3	167.5	55465.6	44452.3	????????	????????	????????
08:00	132.1	167.2	55465.7	44451.9	????????	????????	????????
09:00	131.8	166.6	55464.5	44451.9	????????	????????	????????
10:00	132.0	165.6	55395.5	44452.6	????????	????????	????????
11:00	133.0	167.6	54775.1	44451.5	????????	????????	????????
12:00	134.0	168.6	53418.4	44446.1	????????	????????	????????
13:00	134.9	169.1	53528.3	44446.2	????????	????????	????????
14:00	135.2	169.5	53603.0	44445.2	????????	????????	????????
15:00	135.3	169.8	53574.7	44446.2	????????	????????	????????
16:00	134.9	169.6	55217.1	44453.7	????????	????????	????????
17:00	134.3	168.9	55354.6	44453.4	????????	????????	????????
18:00	133.5	168.2	55462.9	44451.4	????????	????????	????????

SOLVAY2016_6_000245

Hourly Averages
PVR

PV RETRIEVAL REQUEST

07:48 18 Jan 95
PAGE 1

LEGEND: ' = Calculated time " = Time changed " = NG data * = Less than expected # samples

DATE/ TIME	JIFN28 AMP MOTOR	FP5C COMBUST GASSES	A1SM5A PERCENT DUST	A1SM5B PERCENT DUST	JIFN10 AMPS MOTOR	CA1_AIR ACFM ACFM	JIFN11 AMPS MOTOR	CA2 AIR ACFM ACFM
01/17/95								
07:00	31.7	????????	2.8	????????	137.7	302769.	129.2	245005.
08:00	31.7	????????	2.8	????????	138.1	303[illegible].	129.8	248406.
09:00	31.5	????????	2.4	????????	138.8	305811.	129.7	247272.
10:00	31.4	????????	2.5	????????	137.9	302618.	128.9	245432.
11:00	31.3	????????	4.4	????????	118.3	229815.	128.5	244143.
12:00	31.3	????????	2.7	????????	138.8	300069.	126.9	243118.
13:00	31.6	????????	2.9	????????	138.1	299445.	125.8	237352.
14:00	31.6	????????	2.9	????????	138.3	299293.	126.2	238864.
15:00	31.5	????????	2.6	????????	138.6	300034.	126.6	237979.
16:00	31.5	????????	2.7	????????	138.5	299441.	126.4	239137.
17:00	31.5	????????	2.7	????????	138.1	299520.	127.6	245[illegible].
18:00	31.6	????????	2.7	????????	138.5	301621.	128.3	242929.

SOLVAY2016_6_000246

TOTALS DISPLAY

REV 1.21

FLOW SOURCE POINT	WIBS1
FLOW SOURCE TIMEBASE	******
FLOW VALUE SCALAR	1.00000
PERIOD	1MIN
LAST GOOD PV	110.251

WOBS1
TONS
BS1 BL-5 WEIGHT SCALE

DATE	TIME	SHIFT 1	SHIFT 2	SHIFT 3	DAY
01-18-95	07:53:32	2026.56	-------	-------	2026.56
01-17-95	23:59:32	3346.24	3096.87	-------	6443.11
01-16-95	23:59:32	3477.04	3070.46	-------	6547.48
01-15-95	23:59:32	3519.91	3456.85	-------	6976.76
01-14-95	23:59:32	3215.35	3375.32	-------	6590.67
01-13-95	23:59:32	3420.62	3119.57	-------	6540.20
01-12-95	23:59:32	3329.66	3359.47	-------	6689.13
01-11-95	23:59:32	3004.09	3121.89	-------	6130.97

HOURS BACK IN TIME STARTING FROM THIS HOUR

1	176.973	6	256.636	11	252.698	16	263.174	21	309.025
2	254.562	7	257.759	12	263.329	17	269.062	22	143.280
3	265.955	8	262.831	13	262.009	18	224.970	23	267.770
4	271.127	9	258.840	14	259.673	19	288.049	24	263.763
5	280.712	10	242.899	15	253.198	20	258.883	25	280.454

1	WOBS7	26	FOPU20A
2	WOBS8	27	FOPU21A
3	FOCZ11B	28	FOPU24A
4	FOPC40	29	FOPU24C
5	FOPU132A	30	FOPU28A
6	FOPC41	31	FOPU36A
7	FOPU132C	32	FOPU37A
8	FOC712B	33	FOPU39
9	FOPC42	34	FOMPU1
10	FOPU133A	35	FOTA31
11	FOPC43	36	FOTA31A
12	FOPU133B	37	FOOR4A
13	FOCY20	38	FOOR1
14	FOCU11B	39	FOOR2B
15	FOTA131	40	FOPS54A
16	FOCU12B	41	FOPU56A
17	FOPU134	42	WOBS2
18	FOPU136A	43	WOBS3
19	FOTA37	44	WOBS1
20	WOBS9	45	FOPU97A
21	WOPU111A	46	FOPU97B
22	WOPU111B	47	FOPU97C
23	FOTA14	48	FOPU97D
24	FOHP4	49	FOPU111
25	FOCO2A	50	FOPU112

DATA LISTING

NAME: CALCINER/DRYER LOCATION: SOLVAY MINERALS STATION ID: 2

CHAN NAME		#3OPT	#4OPT	#5OPT
CHAN UNITS		%	%	%
FULL SCALE		100.0	100.0	100.0
ZERO OFFSET		0.0	0.0	0.0
START / CHANNEL		01	02	03
01/17/95	04:48	3.5	2.7	2.3
01/17/95	04:54	3.5	2.7	2.3
01/17/95	05:00	3.4	2.8	2.3
01/17/95	05:06	3.7	2.5	2.3
01/17/95	05:12	3.7	2.6	2.3
01/17/95	05:18	3.7	2.8	2.3
01/17/95	05:24	3.7	2.7	2.3
01/17/95	05:30	3.7	2.7	2.3
01/17/95	05:36	3.5	2.8	2.3
01/17/95	05:42	3.6	2.6	2.3
01/17/95	05:48	3.7	2.8	2.3
01/17/95	05:54	3.7	2.8	2.3
01/17/95	06:00	3.7	2.7	2.3
01/17/95	06:06	3.7	2.7	2.3
01/17/95	06:12	3.6	2.8	2.2
01/17/95	06:18	3.7	2.7	2.3
01/17/95	06:24	3.6	2.6	2.2
01/17/95	06:30	3.5	2.7	2.3
01/17/95	06:36	3.5	2.8	2.3
01/17/95	06:42	3.6	2.7	2.3
01/17/95	06:48	3.5	2.8	2.3
01/17/95	06:54	3.7	2.8	2.3
01/17/95	07:00	3.7	2.7	2.3
01/17/95	07:06	3.8	2.6	2.3
01/17/95	07:12	3.7	2.7	2.3
01/17/95	07:18	3.7	2.7	2.3
01/17/95	07:24	3.7	2.9	2.2
01/17/95	07:30	3.7	2.7	2.3
01/17/95	07:36	3.6	2.7	2.2
01/17/95	07:42	3.6	2.7	2.3
01/17/95	07:48	3.6	2.8	2.3
01/17/95	07:54	3.6	2.8	2.3
01/17/95	08:00	3.5	2.7	2.3
01/17/95	08:06	3.5	2.8	2.3
01/17/95	08:12	3.6	2.6	2.3
01/17/95	08:18	3.6	2.4	2.0
01/17/95	08:24	3.6	2.3	0.2P
01/17/95	08:30	3.5	2.4	2.5<
01/17/95	08:36	3.6	2.3	2.4
01/17/95	08:42	3.7	2.4	2.4
01/17/95	08:48	3.9	2.4	2.4
01/17/95	08:54	3.7	2.5	2.4
01/17/95	09:00	3.9	2.5	2.4
01/17/95	09:06	4.0	2.5	2.4
01/17/95	09:12	3.9	2.5	2.4
01/17/95	09:18	4.0	2.5	2.4
01/17/95	09:24	4.0	2.5	2.4
01/17/95	09:30	3.9	2.5	2.4

RUN #1 START 8:53

DATA LISTING

NAME: CALCINER/DRYER LOCATION: SOLVAY MINERALS STATION ID:

CHAN NAME	#30FT	#40FT	#50FT
CHAN UNITS	%	%	%
FULL SCALE	100.0	100.0	100.0
ZERO OFFSET	0.0	0.0	0.0
START / CHANNEL	01	02	03
01/17/95 09:36	3.9	2.5	2.4
01/17/95 09:42	3.9	2.4	2.4
01/17/95 09:48	3.9	2.5	2.4
01/17/95 09:54	3.7	2.6	2.4
01/17/95 10:00	3.9	2.4	2.4
01/17/95 10:06	3.8	2.6	2.4
01/17/95 10:12	4.3	2.5	2.4
01/17/95 10:18	4.0	2.6	2.4
01/17/95 10:24	3.6	2.5	2.4
01/17/95 10:30	3.6<	2.5	2.4
01/17/95 10:36	3.4	2.5	2.4
01/17/95 10:42	3.5	2.5	2.4
01/17/95 10:48	3.4	1.7	2.4
01/17/95 10:54	3.8	-0.2P	2.4
01/17/95 11:00	4.0	2.5<	2.4
01/17/95 11:06	3.7	2.8	2.4
01/17/95 11:12	3.9	2.6	2.4
01/17/95 11:18	3.9	2.7	2.4
01/17/95 11:24	3.8	2.7	2.4
01/17/95 11:30	3.8	2.7	2.4
01/17/95 11:36	3.8	2.6	2.4
01/17/95 11:42	3.8	2.7	2.4
01/17/95 11:48	2.0C	2.7	2.3
01/17/95 11:54	3.7<	2.7	2.4
01/17/95 12:00	3.9	2.6	2.4
01/17/95 12:06	3.7	2.9	2.4
01/17/95 12:12	3.7	3.0	2.4
01/17/95 12:18	4.1	3.1	2.4
01/17/95 12:24	3.8	3.0	2.4
01/17/95 12:30	3.8	3.0	2.4
01/17/95 12:36	3.7	2.9	2.3
01/17/95 12:42	3.8	2.8	2.3
01/17/95 12:48	3.7	2.9	2.3
01/17/95 12:54	3.8	2.8	2.4
01/17/95 13:00	3.7	2.8	2.3
01/17/95 13:06	3.8	2.8	2.4
01/17/95 13:12	3.9	2.9	2.3
01/17/95 13:18	4.0	3.0	2.3
01/17/95 13:24	3.9	3.0	2.3
01/17/95 13:30	3.8	3.0	2.3
01/17/95 13:36	4.0	3.0	2.3
01/17/95 13:42	3.9	2.9	2.3
01/17/95 13:48	3.8	2.7	2.3
01/17/95 13:54	3.8	2.8	2.3
01/17/95 14:00	3.8	2.6	2.3
01/17/95 14:06	3.8	2.7	2.3
01/17/95 14:12	3.9	2.5	2.3
01/17/95 14:18	3.9	2.7	2.3

RUN #1 STOP 9:53

RUN #2 START 10:53

RUN #2 STOP 11:53

RUN #3 START 12:20

RUN #3 STOP 13:20

SOLVAY2016_6_000249