AMTEST

AmTest Inc.

Professional
Analytical
Services

14603 N.E. 87th St.
Redmond, WA
98052

Fax: 206 883 3495

Tel: 206 885 1664

SOURCE EMISSION EVALUATION REPORT

AUGUST 9, 1990

Prepared For:

SWEET-EDWARDS/EMCON, INC.
TCW ASSOCIATES
CEDAR HILLS LANDFILL
GAS COMBUSTOR TESTING
MAPLE VALLEY, WASHINGTON
MARCH 1-2, 1990

Submitted by:

KRIS A. HANSEN
DIRECTOR, AIR QUALITY DIVISION

ANGELA F. BLAISDELL
TECHNICAL WRITER

AM TEST, INC.
REDMOND, WASHINGTON

We certify that the information contained herein is accurate and complete to the best of our knowledge.

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1.0 INTRODUCTION

The purpose of this source emission evaluation was to quantify emission levels during typical operation of two (2) newly installed gas combustors installed at King County's Cedar Hills Regional Landfill in Maple Valley, Washington. Landfill gases are piped to the North Flare area where they are incinerated by the flares prior to emitting the exhaust gas to the atmosphere. Testing of the emissions at the inlet and the outlet of each of the landfill gas combustors (also called flares) was conducted by Am Test, Inc.'s Air Quality Division on March 1-2, 1990. The flares are identified throughout this report as Flare #1 (PNL 101) and Flare #2 (PNL 202). The testing was performed to comply with the requirements of the Puget Sound Air Pollution Control Agency (PSAPCA).

During the fall of 1989, King County expanded the landfill's gas collection capabilities with the installation of additional gas extraction wells at the North Flare Station. As part of the expansion, two (2) new modular-designed flares were installed. The new flares are refractory-lined, cylindrical, steel stacks 12 feet in diameter by 40 feet in height. Each unit is designed to burn up to 4,000 cfm of landfill gas with an operating temperature of approximately 1,400° F.

The testing performed on March 1-2, 1990 was conducted to determine the inlet and outlet emission concentration, mass emissions rate, and the destruction efficiency of each of the combustor systems which control emissions of landfill gas. The inlet and outlet gas streams were measured to quantify the gas velocity, gas temperature, percent carbon dioxide, percent oxygen, ppm carbon monoxide, percent moisture, hydrochloric acid (HCl), total sulfur (TS) (including sulfur

dioxide (SO_2), hydrogen sulfide (H_2S) and total reduced sulfur (TRS)), nitrogen oxides (NO_x), and volatile organic compounds (VOCs).

Volatile organic compounds (VOCs) were collected at the outlet using Compendium Method TO-14. This technique allows an integrated sample of gas to be collected in electropolished SUMMA^R six-liter stainless steel canisters. VOCs were collected in 10-liter Tedlar bags at the inlet sites. The integrated samples were analyzed using EPA Method 8240, which utilizes a gas chromatograph - mass spectrometer (GC-MS). In addition to the volatile organic compounds identified by GC-MS procedures, the fixed gases (carbon dioxide, carbon monoxide, oxygen, nitrogen, methane, were analyzed using a GC-TCD.

Environmental Protection Agency (EPA) sampling and analysis methods specified in the July 1, 1989 Title 40 Code of Federal Regulations, Part 60 (40 CFR 60), Appendix A, Methods 1, 2, 3A, 4, 6C, 7E and 16A were utilized. Methods 1 and 2 were performed to determine the stack gas velocity and volumetric flow rate. Method 3A was performed to determine the molecular weight of the stack gas. Method 4 was performed to measure the moisture content of the stack gas at the outlet. Chlorides as hydrochloric acid (HCl) were collected in the moisture sample. Method 16A/6C was performed to determine the total sulfur (TS) emission concentration. Total sulfur was measured at the outlet site only. Method 7E was performed to determine the nitrogen oxides (NO_x) emission concentration at the outlet. Three (3) replicate samples of each type were collected.

The samples were collected on March 1-2, 1990 by Mr. Kris A. Hansen, Mr. K. Steven Mackey, and Ms. Jan M. Widmeyer of Am Test, Inc.'s Air Quality Division. Analysis of the volatile organic samples was performed by Coast-to-Coast

Analytical of San Luis Obispo, California. Analysis of the chloride samples was performed by Am Test, Inc.'s Water Chemistry division. Data reduction and final report preparation was performed by Mr. Kris A. Hansen, Ms. Angela F. Blaisdell, and Ms. Jan M. Widmeyer of Am Test. Mr. David Vonasek coordinated this project for Sweet-Edwards/EMCON. Mr. Fred Austin of the Puget Sound Air Pollution Control Agency (PSAPCA) observed the field sampling.

A summary of the methodology which was used, and details of the information that each type of test yields is included below:

Methodology	Information Obtained
EPA Method 1, 2	Velocity, airflow, and temperature.
EPA Method 3A	Combustion gas composition (percent carbon dioxide, oxygen, and carbon monoxide).
EPA Method 4	Percent moisture in stack gas. Hydrochloric acid emissions are also quantified in this sample train by bubbling the gas through water and analyzing the liquid for chlorides.
EPA Method 6C/16A	Total Sulfur (TS) emission concentration and mass rate at the outlet.
EPA Method 7E	Nitrogen Oxides (NO_x) emission concentration and mass rate at the outlet.
Method TO-14	Volatile organic compound emission concentration and mass rate. TO-14 was performed at the inlet and outlet sites. Destruction efficiency for VOCs.
EPA Method 8240	Purge and trap method for GC-MS analysis of VOC samples.

2.0 SUMMARY OF RESULTS

The following sections of this report summarize the findings of this emission evaluation. The order of presentation is (1) by EPA method number (i.e., Method 1, 2, 3A, 4, 6C, 7E, and VOCs by TO-14), and (2) by Flare number (i.e., Flare #1 results followed by Flare #2 results). There are summary tables which include many of the measurements taken at the inlet and outlet of Flare #1 on pages 13 and 14. The summary tables for Flare #2 are included on page 15 and 16. These summary tables contain information obtained from computer printouts of results which are included in Appendix A of this report. Appendix B of this report contains copies of the original laboratory data from Coast-to-Coast Analytical and Am Test, Inc.'s Water Chemistry Division. Appendix C of this report contains example calculations of the derivation of emission concentration and emission rate units. Appendix D of this report contains copies of the original field data sheets. Appendix E of this report contains miscellaneous supporting information. The Table of Contents should be consulted to locate the page number of specific information the reader may be interested in.

2.1 EPA Methods 1 and 2 - Airflow Determination

2.1.1 Flare #1

The velocity and temperature of the gas passing through the inlet duct to Flare #1 was measured during this testing program. The average temperature at the inlet was 87° F. The velocity of the inlet gas stream averaged 66.9 ft/second, or 4014 ft/minute. The airflow of landfill gas into the system was 3051.9 dry standard cubic feet per minute (dscf/min) on test day. The results of the airflow determination at the inlet to Flare #1 are presented in the summary table on page 13.

A range of velocity heads and temperatures were also measured at the outlet of Flare #1. The average velocity at the outlet of Flare #1 was 22.61 ft/second. The average airflow through the stack was 33817.4 dscf/min. The average temperature at the outlet was 1567° F. These averages are based on measurements taken during the three (3) 120-minute moisture/chloride runs. The results of the airflow determination at the outlet of Flare #1 are presented in the summary table on page 14. The residence time based on combustion from the burner to the sample port was calculated to be 1.55 seconds using actual cubic feet per minute (ft/min) and an average temperature of 1567° F.

2.1.2 Flare #2

The velocity and temperature of the gas passing through the inlet duct to Flare #2 was measured during this testing program. The average temperature at the inlet was 95° F. The velocity of the inlet gas stream averaged 47.9 ft/second, or 2874 ft/minute. The airflow of landfill gas into the system was 2226.6 dry standard cubic feet per minute (dscf/min) on test day. The results of the airflow

determination at the inlet to Flare #2 are presented in the summary table on page 15.

A range of velocity heads and temperatures were also measured at the outlet of Flare #2. The average velocity at the outlet of Flare #2 was 17.95 ft/second. The average airflow through the stack was 28985.0 dscf/min. The average temperature at the outlet was 1428° F. These averages are based on measurements taken during the three (3) 120-minute moisture/chloride runs. The results of the airflow determination at the outlet of Flare #2 are presented in the summary table on page 16. The residence time based on combustion from the burner to the sample port was calculated to be 1.95 seconds using actual cubic feet per minute (ft/min) and an average temperature of 1428° F.

2.2 EPA Method 3A and Fixed Gases Analysis

2.2.1 Flare #1

EPA Method 3A procedures were used by Am Test in the Field to obtain continuous measurements of oxygen, carbon dioxide and carbon monoxide during each test at the flare outlet. Fixed gases were also quantified by Coast-to-Coast Analytical using the gas collected in Tedlar bags and TO-14 canisters. Average combustion gas values obtained at the inlet and outlet of Flare #1 are presented in Table 2.2.1 below.

Table 2.2.1. Concentration of gaseous constituents found in the inlet and outlet landfill gas at Flare #1 at the Cedar Hills Landfill on March 1, 1990.

COMPOUND	AVERAGE INLET GAS CONCENTRATIONS	AVERAGE OUTLET GAS CONCENTRATIONS
Methane (%)	33	< 0.005
Carbon Dioxide (%)	30	8.5
Oxygen (%)	4.5	12.0
Carbon Monoxide (ppm)	---	133
Nitrogen (%)	32	79

2.2.2 Flare #2

EPA Method 3A procedures were used by Am Test in the field to obtain continuous measurements of oxygen, carbon dioxide and carbon monoxide during each test at the flare outlet. Fixed gases were also quantified by Coast-to-Coast Analytical using the gas collected in Tedlar bags and TO-14 canisters. Average combustion gas values obtained at the inlet and outlet of Flare #2 are presented in Table 2.2.2 below.

Table 2.2.2. Concentration of gaseous constituents found in the inlet and outlet landfill gas at Flare #2 at the Cedar Hills Landfill on March 2, 1990.

COMPOUND	AVERAGE INLET GAS CONCENTRATIONS	AVERAGE OUTLET GAS CONCENTRATIONS
Methane (%)	50	< 0.005
Carbon Dioxide (%)	27	4.7
Oxygen (%)	3.8	14.8
Carbon Monoxide (ppm)	---	640
Nitrogen (%)	19	79

2.3 EPA Method 4 - Moisture and Hydrochloric Acid

2.3.1 Flare #1

A moisture determination was made at the inlet to Flare #1 by allowing gas to pass through a series of impingers, while monitoring the gas volume. The impingers were weighed before and after the test using an analytical balance. The percent moisture was calculated from this information. The average moisture at the inlet to Flare #1 was 1.6%. The results of the moisture determination at the inlet to Flare #1 are presented in the summary table on page 13.

The results of the three (3) Method 4 moisture tests for quantifying moisture and hydrochloric acid emissions at the outlet of Flare #1 are presented in the summary table on page 14. The average moisture at the outlet of Flare #1 was 7.0%. The average chloride emission concentration was 8.6 parts per million (ppm), or 14.2 ppm corrected to 7% oxygen.

2.3.2 Flare #2

A moisture determination was made at the inlet to Flare #2 by allowing gas to pass through a series of impingers, while monitoring the gas volume. The impingers were weighed before and after the test using an analytical balance. The percent moisture was calculated from this information. The average moisture at the inlet to Flare #2 was 1.9%. The results of the moisture determination at the inlet to Flare #2 are presented in the summary table on page 15.

The results of the three (3) Method 4 moisture tests for quantifying moisture and hydrochloric acid emissions at the outlet of Flare #2 are presented in the summary table on page 16. The average moisture at the outlet of Flare #2 was 6.1%. The

average chloride emission concentration was 1.7 parts per million (ppm), or 3.9 ppm corrected to 7% oxygen.

2.4 EPA Method 6C/16A and 7E - Total Sulfur and Nitrogen Oxides

2.4.1 Flare #1

On March 1, 1990 the landfill gas at the outlet of Flare #1 was continuously monitored to measure the total sulfur (TS) and nitrogen oxides (NO_x) content of the gas. A gas sample was continuously extracted from the stack and passed through a thermal oxidizer which converts total reduced sulfur compounds (TRS) and hydrogen sulfide (H_2S) to sulfur dioxide (SO_2). The oxidized gas sample was introduced to a fluorescence analyzer for measuring total sulfur as SO_2. A portion of the sample was also conveyed to an instrumental chemiluminescent analyzer for measuring the NO_x concentration (as nitrogen dioxide-NO_2).

Measurements were recorded every minute over three (3) 120-minute periods. The readings were recorded using a data logger, and were averaged for each test period. Printouts of the 1-minute readings and the averages are included in Appendix A of this report. The emission concentration and emission rate of each gas measured during each run are included the summary table on page 14. The average total sulfur (TS) emission concentration was 2.7 parts per million (ppm). The average TS emission rate was 0.9 pounds per hour (lb/hr). The average NO_x emission concentration was 11.0 parts per million (ppm). The average NO_x emission rate was 2.7 lb/hr.

2.4.2 Flare #2

On March 2, 1990 the landfill gas at the outlet of Flare #2 was continuously monitored to measure the total sulfur (TS) and nitrogen oxides (NO_x) content of the gas. Measurements were recorded every minute over three (3) 120-minute periods. The readings were recorded using a data logger, and were averaged for each test period. Printouts of the 1-minute readings and the averages are included

in Appendix A of this report. The emission concentration and emission rate of each gas measured during each run are included the summary table on page 16. The average total sulfur (TS) emission concentration was 0.6 ppm. The average TS emission rate was 0.2 lb/hr. The average NO_x emission concentration was 10.3 ppm. The average NO_x emission rate was 2.1 lb/hr.

SUMMARY OF RESULTS - METHODS 1, 2, 3a AND 4
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: CH-#1-IN
CLIENT: SWEET EDWARDS/EMCON
LOCATION: CEDAR HILLS LANDFILL
SAMPLE SITE: PNL101 - FLARE INLET

	RUN #1	RUN #2	RUN #3	AVERAGE
LAB #:	089491	089492	089493	
DATE:	3/1/90	3/1/90	3/1/90	
START TIME:	09:39	11:00	13:35	
STOP TIME:	11:00	13:00	15:35	
VOLUME SAMPLED (Cubic Feet):	13.474	13.474	13.474	13.474
VOLUME SAMPLED (Dry Std. Cubic Feet):	13.443	13.443	13.412	13.433
VOLUME SAMPLED (Dry Std. Cubic Meters):	0.381	0.381	0.380	0.381
STACK GAS MOISTURE (Percent):	1.62	1.62	1.63	1.62
BAROMETRIC PRESURE (Inches of Hg):	29.73	29.73	29.66	29.71
STATIC PRESSURE (Inches of H2O):	11.00	11.00	11.00	11.0
STACK PRESSURE (Inches of Hg):	30.54	30.54	30.47	30.52
STACK TEMPERATURE (Degrees F.):	86.4	87.7	87.0	87.0
STACK TEMPERATURE (Degrees R.):	546.4	547.7	547.0	547.0
METHANE (Percent):	35.0	38.0	27.0	33.3
NITROGEN (Percent):	30.0	28.0	39.0	32.3
CARBON DIOXIDE (Percent):	32.0	31.0	27.0	30.0
OXYGEN (Percent):	3.3	3.0	7.1	4.5
CARBON MONOXIDE (Percent):	< 0.1	< 0.1	< 0.1	<0.1
MOLECULAR WEIGHT (Dry, Lb/Lb-Mole):	33.25	33.08	32.60	32.98
MOLECULAR WEIGHT (Wet, Lb/Lb-Mole):	33.00	32.84	32.37	32.74
STACK GAS VELOCITY (Feet per Second):	66.5	66.5	67.6	66.9
STACK AREA (Square Feet):	0.785	0.785	0.785	0.79
AIRFLOW (Dry Std. Cubic Feet per Min.):	3042.2	3033.2	3080.2	3051.9
AIRFLOW (Actual Cubic Feet per Min.):	3135.4	3133.2	3185.4	3151.3

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, 6C, 7E, 10 AND HCl
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: CH-#1OUT
CLIENT: SWEET-EDWARDS/EMCON
LOCATION: CEDAR HILLS LANDFILL
SAMPLE SITE: NORTH FLARE #1 OUTLET
PNL 101 FLARE

	RUN #1	RUN #2	RUN #3	AVERAGE
LAB #:	004525	004526	004527	
DATE:	3/1/90	3/1/90	3/1/90	
START TIME:	08:31	11:00	13:37	
STOP TIME:	10:31	13:00	15:37	
VOLUME SAMPLED (Cubic Feet):	27.652	59.946	40.933	42.844
VOLUME SAMPLED (Dry Std. Cubic Feet):	27.843	58.404	40.000	42.082
VOLUME SAMPLED (Dry Std. Cubic Meters):	0.789	1.654	1.133	1.192
STACK GAS MOISTURE (Percent):	6.83	7.26	6.90	7.00
BAROMETRIC PRESURE (Inches of Hg):	29.73	29.75	29.66	29.71
STATIC PRESSURE (Inches of H2O):	-0.95	-0.95	-0.95	-0.95
STACK PRESSURE (Inches of Hg):	29.66	29.68	29.59	29.64
STACK TEMPERATURE (Degrees F.):	1590.0	1549.8	1562.5	1567.4
STACK TEMPERATURE (Degrees R.):	2050.0	2009.8	2022.5	2027.4
CARBON DIOXIDE (Percent):	8.5	7.8	7.6	8.0
OXYGEN (Percent):	12.0	12.5	12.9	12.5
CARBON MONOXIDE (ppm):	66	142	190	133
MOLECULAR WEIGHT (Dry, Lb/Lb-Mole):	29.84	29.75	29.73	29.77
MOLECULAR WEIGHT (Wet, Lb/Lb-Mole):	29.03	28.90	28.92	28.95
STACK GAS VELOCITY (feet per second):	23.24	22.80	21.80	22.61
STACK DIAMETER (inches):	138.0	138.0	138.0	138.0
STACK AREA (square feet):	103.87	103.87	103.87	103.87
AIRFLOW (Dry Std. Cubic Feet per Min.):	34456.8	34337.7	32657.7	33817.4
AIRFLOW (Actual Cubic Feet per Min.):	144849.2	142065.1	135868.5	140927.6
TOTAL SULFUR CONCENTRATION (ppm):	0.5	3.5	4.1	2.7
TOTAL SULFUR EMISSION RATE (lb/hr as SO2):	0.17	1.20	1.33	0.90
TOTAL SULFUR EMISSION RATE (tons/yr):	0.75	5.24	5.84	3.95
NITROGEN OXIDES EMISSION CONC. (ppm):	11.8	11.0	10.2	11.0
NOx EMISSION RATE (lb/hr as NO2):	2.91	2.71	2.39	2.67
NITROGEN OXIDES EMISSION RATE (tons/yr):	12.8	11.9	10.5	11.7
CARBON MONOXIDE CONCENTRATION (ppm):	66	142	190	133
CARBON MONOXIDE EMISSION RATE (lb/hr):	9.92	21.27	27.07	19.42
CARBON MONOXIDE EMISSION RATE (tons/yr):	43.4	93.2	118.6	85.1
CHLORIDE EMISSION CONCENTRATION (mg/dscm):	7.72	20.40	10.70	12.94
CHLORIDE EMISSION CONCENTRATION (ppm):	5.09	13.50	7.08	8.56
CHLORIDE EMISSION CONC. (ppm @ 7% oxygen):	7.95	22.30	12.30	14.18
CHLORIDE EMISSION RATE (mg/min):	7321.3	19321.5	9645.5	12096.1
CHLORIDE EMISSION RATE (lb/hr):	1.00	2.63	1.31	1.65

SUMMARY OF RESULTS - METHODS 1, 2, 3a AND 4
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: CH-#2-IN
CLIENT: SWEET EDWARDS/EMCON
LOCATION: CEDAR HILLS LANDFILL
SAMPLE SITE: PNL201 - FLARE INLET

	RUN #1	RUN #2	RUN #3	AVERAGE
LAB #:	089494	089495	089496	
DATE:	3/2/90	3/2/90	3/2/90	
START TIME:	08:10	10:25	12:44	
STOP TIME:	10:10	12:25	14:44	
VOLUME SAMPLED (Cubic Feet):	8.552	8.552	8.552	8.552
VOLUME SAMPLED (Dry Std. Cubic Feet):	8.822	8.811	8.806	8.813
VOLUME SAMPLED (Dry Std. Cubic Meters):	0.250	0.250	0.249	0.250
STACK GAS MOISTURE (Percent):	1.86	1.86	1.86	1.86
BAROMETRIC PRESURE (Inches of Hg):	28.20	29.57	29.55	29.11
STATIC PRESSURE (Inches of H2O):	28.20	28.20	28.20	28.2
STACK PRESSURE (Inches of Hg):	31.68	31.64	31.62	31.65
STACK TEMPERATURE (Degrees F.):	91.9	95.4	97.9	95.1
STACK TEMPERATURE (Degrees R.):	551.9	555.4	557.9	555.1
METHANE (Percent):	49.0	50.0	51.0	50.0
NITROGEN (Percent):	23.0	18.0	17.0	19.3
CARBON DIOXIDE (Percent):	22.0	29.0	29.0	26.7
OXYGEN (Percent):	5.5	3.0	3.0	3.8
CARBON MONOXIDE (Percent):	< 0.1	< 0.1	< 0.1	< 0.1
MOLECULAR WEIGHT (Dry, Lb/Lb-Mole):	31.74	32.76	32.76	32.42
MOLECULAR WEIGHT (Wet, Lb/Lb-Mole):	31.48	32.49	32.49	32.15
STACK GAS VELOCITY (Feet per Second):	48.1	47.6	47.9	47.9
STACK AREA (Square Feet):	0.785	0.785	0.785	0.79
AIRFLOW (Dry Std. Cubic Feet per Min.):	2252.7	2212.4	2214.6	2226.6
AIRFLOW (Actual Cubic Feet per Min.):	2265.7	2242.2	2256.0	2254.6

SUMMARY OF RESULTS - METHODS 1, 2, 3A, 4, 6C, 7E, 10 AND HCl
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: CH-#2OUT
CLIENT: SWEET-EDWARDS/EMCON
LOCATION: CEDAR HILLS LANDFILL
SAMPLE SITE: NORTH FLARE #2 OUTLET
PNL 201 FLARE

	RUN #1	RUN #2	RUN #3	AVERAGE
LAB #:	004528	004529	004530	
DATE:	3/2/90	3/2/90	3/2/90	
START TIME:	08:10	10:25	12:44	
STOP TIME:	10:10	12:25	14:44	
VOLUME SAMPLED (Cubic Feet):	40.571	40.812	40.595	40.659
VOLUME SAMPLED (Dry Std. Cubic Feet):	41.227	40.173	38.944	40.115
VOLUME SAMPLED (Dry Std. Cubic Meters):	1.168	1.138	1.103	1.136
STACK GAS MOISTURE (Percent):	6.06	6.01	6.13	6.07
BAROMETRIC PRESURE (Inches of Hg):	29.61	29.57	29.55	29.58
STATIC PRESSURE (Inches of H2O):	-0.90	-0.90	-0.90	-0.90
STACK PRESSURE (Inches of Hg):	29.54	29.50	29.48	29.51
STACK TEMPERATURE (Degrees F.):	1398.8	1458.0	1426.0	1427.6
STACK TEMPERATURE (Degrees R.):	1858.8	1918.0	1886.0	1887.6
CARBON DIOXIDE (Percent):	4.4	4.6	5.2	4.7
OXYGEN (Percent):	14.7	14.8	14.9	14.8
CARBON MONOXIDE (ppm):	632	611	676	640
MOLECULAR WEIGHT (Dry, Lb/Lb-Mole):	29.29	29.33	29.43	29.35
MOLECULAR WEIGHT (Wet, Lb/Lb-Mole):	28.61	28.65	28.73	28.66
STACK GAS VELOCITY (feet per second):	17.50	17.78	18.56	17.95
STACK DIAMETER (inches):	138.0	138.0	138.0	138.0
STACK AREA (square feet):	103.87	103.87	103.87	103.87
AIRFLOW (Dry Std. Cubic Feet per Min.):	28735.5	28263.9	29955.6	28985.0
AIRFLOW (Actual Cubic Feet per Min.):	109055.7	110779.4	115669.5	111834.9
TOTAL SULFUR CONCENTRATION (ppm):	0.8	0.5	0.6	0.6
TOTAL SULFUR EMISSION RATE (lb/hr as SO2):	0.23	0.14	0.18	0.18
TOTAL SULFUR EMISSION RATE (tons/yr):	1.00	0.62	0.78	0.80
NITROGEN OXIDES EMISSION CONC. (ppm):	10.4	10.3	10.2	10.3
NOx EMISSION RATE (lb/hr as NO2):	2.14	2.09	2.19	2.14
NITROGEN OXIDES EMISSION RATE (tons/yr):	9.4	9.1	9.6	9.4
CARBON MONOXIDE CONCENTRATION (ppm):	632	611	676	640
CARBON MONOXIDE EMISSION RATE (lb/hr):	79.22	75.33	88.33	80.96
CARBON MONOXIDE EMISSION RATE (tons/yr):	347.0	329.9	386.9	354.6
CHLORIDE EMISSION CONCENTRATION (mg/dscm):	2.65	2.27	2.80	2.57
CHLORIDE EMISSION CONCENTRATION (ppm):	1.75	1.50	1.85	1.70
CHLORIDE EMISSION CONC. (ppm @ 7% oxygen):	3.92	3.41	4.29	3.87
CHLORIDE EMISSION RATE (mg/min):	2096.6	1766.6	2313.7	2059.0
CHLORIDE EMISSION RATE (lb/hr):	0.29	0.24	0.31	0.28

2.5 Volatile Organic Compound Determination

2.5.1 Flare #1

Integrated samples of the gas at the inlet and outlet of Flare #1 were collected for volatile organic compound analysis. The inlet samples were collected in 10-liter Tedlar bags. The outlet samples were collected using Compendium Method TO-14. This ambient air testing method was used for these source tests to collect integrated samples of volatile organic compounds (VOCs) at the outlet site. The integrated samples were analyzed using EPA Method 8240, which utilizes a gas chromatograph equipped with a mass spectrophotometer (GC-MS) to quantify a standard list of volatile organic compounds. Copies of the original laboratory analysis data supplied by Coast-to-Coast Analytical are included in Appendix B of this report in concentration units of micrograms per cubic meter ($\mu g/m^3$). The concentration units were converted to mass emission rate units of milligrams per minute (mg/min) to use in the destruction efficiency calculations. Copies of the VOC emission rate results for each individual run are included in Appendix A of this report. The emission rate results for each of the three (3) runs at the inlet and outlet of Flare #1 were averaged and are presented on the summary tables on pages 19-20. For mathematical purposes, if the calculated concentration value for a compound was less than the detection limit, it is presented as < DL and is included in the average as zero. If the average value is less than the detection limit, the average is presented as < DL.

2.5.2 Flare #2

Integrated samples of the gas at the inlet and outlet of Flare #1 were collected for volatile organic compound analysis. The inlet samples were collected in 10-liter Tedlar bags. The outlet samples were collected using Compendium Method TO-14. This ambient air testing method was used for these source tests to collect

integrated samples of volatile organic compounds (VOCs) at the outlet sites. The integrated samples were analyzed using EPA Method 8240, which utilizes a gas chromatograph equipped with a mass spectrophotometer (GC-MS) to quantify a standard list of volatile organic compounds. Copies of the original laboratory analysis data supplied by Coast-to-Coast Analytical are included in Appendix B of this report in concentration units of micrograms per cubic meter ($\mu g/m^3$). The concentration units were converted to mass emission rate units of milligrams per minute (mg/min) to use in the destruction efficiency calculations. Copies of the VOC emission rate results for each individual run are included in Appendix A of this report. The emission rate results for each of the three (3) runs at the inlet and outlet of Flare #2 were averaged and are presented on the summary tables on pages 21-22. For mathematical purposes, if the calculated concentration value for a compound was less than the detection limit, it is presented as < DL and is included in the average as zero. If the average value is less than the detection limit, the average is presented as < DL.

SUMMARY OF EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
ANALYZED BY GC/MS - EPA METHOD 8240
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 13\CH#1-INL
CLIENT: Sweet-Edwards/EMCON
LOCATION: Cedar Hills Landfill
SAMPLE LOCATION: Inlet to Flare #1 (PNL 101)
SAMPLE DATE: March 1, 1990

ANALYTE	Inlet Run 1 mg/min	Inlet Run 2 mg/min	Inlet Run 3 mg/min	Inlet Average mg/min
Acetone	1206	945	8549	3567
Benzene	706	739	698	714
Bromodichloromethane	< DL	< DL	< DL	< DL
Bromomethane	< DL	< DL	< DL	< DL
Bromoform	< DL	< DL	< DL	< DL
2-Butanone (MEK)	2068	1117	1745	1643
Carbon Disulfide	121	13744	12213	8693
Carbon Tetrachloride	< DL	21	< DL	7
Chlorobenzene	78	77	72	76
Chloroethane	64	51	60	58
2-Chloroethylvinyl Ether	< DL	< DL	< DL	< DL
Chloroform	17	13	< DL	10
Chloromethane	45	61	21	42
Dibromochloromethane	< DL	< DL	< DL	< DL
1,2-Dibromoethane (EDB)	< DL	< DL	< DL	< DL
1,1-Dichloroethane	2068	2062	2094	2075
1,2-Dichloroethane	164	120	140	141
1,1-Dichloroethene	190	70	183	148
c-1,2-Dichloroethene	1723	1632	1570	1642
t-1,2-Dichloroethene	121	120	113	118
Dichloromethane	18955	16321	16574	17283
1,2-Dichloropropane	< DL	< DL	< DL	< DL
cis-1,3-Dichloropropene	< DL	< DL	< DL	< DL
trans-1,3-Dichloropropene	< DL	< DL	< DL	< DL
Ethylbenzene	6376	3264	4711	4784
Trichlorofluoromethane	948	636	654	746
1,1,2-Trichlorotrifluoroethane	103	94	96	98
2-Hexanone	< DL	< DL	< DL	< DL
4-Methyl-2-Pentanone (MIBK)	3015	2577	2530	2707
Styrene	5083	7388	4100	5524
1,1,2,2-Tetrachloroethane	< DL	< DL	< DL	< DL
Tetrachloroethene (PCE)	7151	6958	5408	6506
Toluene	12924	10308	13957	12396
1,1,1-Trichloroethane (TCA)	526	387	445	453
1,1,2-Trichloroethane	< DL	< DL	< DL	< DL
Trichloroethene (TCE)	2671	2749	2530	2650
Vinyl Acetate	< DL	< DL	< DL	< DL
Vinyl Chloride	1292	945	785	1007
Xylenes	33601	28348	23553	28501

< DL designates that the compound was not detected, or was found at levels below the method detection limit.

mg/min = milligrams of analyte emitted per minute

SUMMARY OF EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
ANALYZED BY GC/MS - EPA METHOD 8240
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 13\CH#1-OUT
CLIENT: Sweet-Edwards/EMCON
LOCATION: Cedar Hills Landfill
SAMPLE LOCATION: Outlet of Flare #1 (PNL 101)
SAMPLE DATE: March 1, 1990

ANALYTE	Outlet Run 1 mg/min	Outlet Run 2 mg/min	Outlet Run 3 mg/min	Outlet Average mg/min
Acetone	< DL	< DL	< DL	< DL
Benzene	20.5	3.2	0	7.9
Bromodichloromethane	< DL	< DL	< DL	< DL
Bromomethane	< DL	< DL	< DL	< DL
Bromoform	< DL	< DL	< DL	< DL
2-Butanone (MEK)	< DL	< DL	< DL	< DL
Carbon Disulfide	< DL	< DL	< DL	< DL
Carbon Tetrachloride	< DL	< DL	< DL	< DL
Chlorobenzene	< DL	< DL	< DL	< DL
Chloroethane	< DL	< DL	< DL	< DL
2-Chloroethylvinyl Ether	< DL	< DL	< DL	< DL
Chloroform	< DL	< DL	< DL	< DL
Chloromethane	< DL	< DL	< DL	< DL
Dibromochloromethane	< DL	< DL	< DL	< DL
1,2-Dibromoethane (EDB)	NA	NA	NA	NA
1,1-Dichloroethane	< DL	< DL	< DL	< DL
1,2-Dichloroethane	< DL	< DL	< DL	< DL
1,1-Dichloroethene	< DL	< DL	< DL	< DL
c-1,2-Dichloroethene	< DL	< DL	< DL	< DL
t-1,2-Dichloroethene	< DL	< DL	< DL	< DL
Dichloromethane	< DL	< DL	< DL	< DL
1,2-Dichloropropane	< DL	< DL	< DL	< DL
cis-1,3-Dichloropropene	< DL	< DL	< DL	< DL
trans-1,3-Dichloropropene	< DL	< DL	< DL	< DL
Ethylbenzene	< DL	< DL	< DL	< DL
Trichlorofluoromethane	NA	NA	NA	NA
1,1,2-Trichlorotrifluoroethane	NA	NA	NA	NA
2-Hexanone	< DL	< DL	< DL	< DL
4-Methyl-2-Pentanone (MIBK)	< DL	< DL	< DL	< DL
Styrene	< DL	< DL	< DL	< DL
1,1,2,2-Tetrachloroethane	< DL	< DL	< DL	< DL
Tetrachloroethene (PCE)	< DL	< DL	< DL	< DL
Toluene	156.1	13.6	16.6	62.1
1,1,1-Trichloroethane (TCA)	< DL	< DL	< DL	< DL
1,1,2-Trichloroethane	< DL	< DL	< DL	< DL
Trichloroethene (TCE)	< DL	< DL	< DL	< DL
Vinyl Acetate	< DL	< DL	< DL	< DL
Vinyl Chloride	< DL	< DL	< DL	< DL
Xylenes	< DL	< DL	< DL	< DL

< DL designates that the compound was not detected, or was found at levels below the method detection limit.

mg/min = milligrams of analyte emitted per minute

SUMMARY OF EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
ANALYZED BY GC/MS - EPA METHOD 8240
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 13\CH#2-INL
CLIENT: Sweet-Edwards/EMCON
LOCATION: Cedar Hills Landfill
SAMPLE LOCATION: Inlet to Flare #2 (PNL 201)
SAMPLE DATE: March 2, 1990

ANALYTE	Inlet Run 1 mg/min	Inlet Run 2 mg/min	Inlet Run 3 mg/min	Inlet Average mg/min
Acetone	2552	3822	2321	2898
Benzene	287	320	119	242
Bromodichloromethane	< DL	< DL	< DL	< DL
Bromomethane	< DL	< DL	< DL	< DL
Bromoform	< DL	< DL	< DL	< DL
2-Butanone (MEK)	< DL	1190	690	627
Carbon Disulfide	< DL	< DL	< DL	< DL
Carbon Tetrachloride	< DL	< DL	< DL	< DL
Chlorobenzene	77	125	58	87
Chloroethane	6	9	< DL	5
2-Chloroethylvinyl Ether	< DL	< DL	< DL	< DL
Chloroform	< DL	< DL	< DL	< DL
Chloromethane	< DL	< DL	< DL	< DL
Dibromochloromethane	< DL	< DL	< DL	< DL
1,2-Dibromoethane (EDB)	NA	< DL	< DL	< DL
1,1-Dichloroethane	325	207	107	213
1,2-Dichloroethane	23	53	0	25
1,1-Dichloroethene	89	75	56	73
c-1,2-Dichloroethene	1212	1128	527	956
t-1,2-Dichloroethene	83	81	43	69
Dichloromethane	< DL	1754	753	836
1,2-Dichloropropane	13	< DL	< DL	4
cis-1,3-Dichloropropene	< DL	< DL	< DL	< DL
trans-1,3-Dichloropropene	< DL	< DL	< DL	< DL
Ethylbenzene	2550	4887	2258	3232
Trichlorofluoromethane	NA	100	45	73
1,1,2-Trichlorotrifluoroethane	NA	39	12	26
2-Hexanone	< DL	< DL	< DL	< DL
4-Methyl-2-Pentanone (MIBK)	829	1754	6272	2952
Styrene	1595	2882	1066	1848
1,1,2,2-Tetrachloroethane	< DL	< DL	< DL	< DL
Tetrachloroethene (PCE)	2424	3383	1568	2458
Toluene	19777	8772	4014	10854
1,1,1-Trichloroethane (TCA)	29	55	< DL	28
1,1,2-Trichloroethane	< DL	< DL	< DL	< DL
Trichloroethene (TCE)	957	1441	621	1006
Vinyl Acetate	< DL	< DL	< DL	< DL
Vinyl Chloride	542	94	270	302
Xylenes	11484	2506	13798	9263

< DL designates that the compound was not detected, or was found at levels below the method detection limit.

mg/min = milligrams of analyte emitted per minute

SUMMARY OF EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
ANALYZED BY GC/MS - EPA METHOD 8240
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 13\CH#2-OUT
CLIENT: Sweet-Edwards/EMCON
LOCATION: Cedar Hills Landfill
SAMPLE LOCATION: Outlet of Flare #2 (PNL 201)
SAMPLE DATE: March 2, 1990

ANALYTE	Outlet Run 1 mg/min	Outlet Run 2 mg/min	Outlet Run 3 mg/min	Outlet Average mg/min
Acetone	< DL	< DL	< DL	< DL
Benzene	18.7	12.8	9.3	13.6
Bromodichloromethane	< DL	< DL	< DL	< DL
Bromomethane	< DL	< DL	< DL	< DL
Bromoform	< DL	< DL	< DL	< DL
2-Butanone (MEK)	< DL	< DL	< DL	< DL
Carbon Disulfide	< DL	< DL	< DL	< DL
Carbon Tetrachloride	< DL	< DL	< DL	< DL
Chlorobenzene	< DL	< DL	< DL	< DL
Chloroethane	< DL	< DL	< DL	< DL
2-Chloroethylvinyl Ether	< DL	< DL	< DL	< DL
Chloroform	< DL	< DL	< DL	< DL
Chloromethane	< DL	< DL	< DL	< DL
Dibromochloromethane	< DL	< DL	< DL	< DL
1,2-Dibromoethane (EDB)	NA	NA	NA	NA
1,1-Dichloroethane	< DL	< DL	< DL	< DL
1,2-Dichloroethane	< DL	< DL	< DL	< DL
1,1-Dichloroethene	< DL	< DL	< DL	< DL
c-1,2-Dichloroethene	< DL	< DL	< DL	< DL
t-1,2-Dichloroethene	< DL	< DL	< DL	< DL
Dichloromethane	< DL	14.4	< DL	4.8
1,2-Dichloropropane	< DL	< DL	< DL	< DL
cis-1,3-Dichloropropene	< DL	< DL	< DL	< DL
trans-1,3-Dichloropropene	< DL	< DL	< DL	< DL
Ethylbenzene	< DL	< DL	< DL	< DL
Trichlorofluoromethane	NA	NA	NA	NA
1,1,2-Trichlorotrifluoroethane	NA	NA	NA	NA
2-Hexanone	< DL	< DL	< DL	< DL
4-Methyl-2-Pentanone (MIBK)	< DL	< DL	< DL	< DL
Styrene	< DL	< DL	< DL	< DL
1,1,2,2-Tetrachloroethane	< DL	< DL	< DL	< DL
Tetrachloroethene (PCE)	12.2	< DL	< DL	4.1
Toluene	30.9	22.4	8.2	20.5
1,1,1-Trichloroethane (TCA)	< DL	< DL	< DL	< DL
1,1,2-Trichloroethane	< DL	< DL	< DL	< DL
Trichloroethene (TCE)	< DL	< DL	< DL	< DL
Vinyl Acetate	< DL	< DL	< DL	< DL
Vinyl Chloride	< DL	< DL	< DL	< DL
Xylenes	5.5	5.4	< DL	3.6

< DL designates that the compound was not detected, or was found at levels below the method detection limit.

mg/min = milligrams of analyte emitted per minute

2.6 Destruction Efficiency of Volatile Organic Compounds

2.6.1 Flare #1

The destruction efficiency is the amount of vapors destroyed through incineration, expressed on a percentage basis. The percent destruction efficiency for Flare #1 for the compounds which were common to the analysis methods used at the inlet and outlet are reported on page 24. Destruction efficiencies were calculated based on the average mass emission rate of each compound detected in milligrams per minute (mg/min). The compounds which were not completely destroyed were benzene and toluene.

2.6.2 Flare #2

The destruction efficiency is the amount of vapors destroyed through incineration, expressed on a percentage basis. The percent destruction efficiency for Flare #2 for the compounds which were common to the analysis methods used at the inlet and outlet are reported on page 25. Destruction efficiencies were calculated based on the average mass emission rate of each compound detected in milligrams per minute (mg/min). The compounds which were not completely destroyed were benzene, tetrachloroethene, and toluene.

VOLATILE ORGANIC COMPOUNDS IN AIR
DESTRUCTION EFFICIENCY EVALUATION
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 13\CH#1DEST
CLIENT: Sweet-Edwards/EMCON, Inc.
LOCATION: Cedar Hills Landfill
SAMPLE SITE: Inlet/Outlet of Flare #1 (PNL 101)
SAMPLE DATES: March 1, 1990

COMPOUNDS	Average Inlet Mass Rate mg/min	Average Outlet Mass Rate mg/min	Destruction Efficiency Percent
Acetone	3567	< DL	100
Benzene	714	7.9	98.9
Bromodichloromethane	< DL	< DL	---
Bromomethane	< DL	< DL	---
Bromoform	< DL	< DL	---
2-Butanone (MEK)	1643	< DL	100
Carbon Disulfide	8693	< DL	100
Carbon Tetrachloride	7	< DL	100
Chlorobenzene	76	< DL	100
Chloroethane	58	< DL	100
2-Chloroethylvinyl Ether	< DL	< DL	---
Chloroform	10	< DL	100
Chloromethane	42	< DL	100
Dibromochloromethane	< DL	< DL	---
1,1-Dichloroethane	2075	< DL	100
1,2-Dichloroethane	141	< DL	100
1,1-Dichloroethene	148	< DL	100
c-1,2-Dichloroethene	1642	< DL	100
t-1,2-Dichloroethene	118	< DL	100
Dichloromethane	17283	< DL	100
1,2-Dichloropropane	< DL	< DL	---
cis-1,3-Dichloropropene	< DL	< DL	---
trans-1,3-Dichloropropene	< DL	< DL	---
Ethylbenzene	4784	< DL	100
2-Hexanone	< DL	< DL	---
4-Methyl-2-Pentanone (MIBK)	2707	< DL	100
Styrene	5524	< DL	100
1,1,2,2-Tetrachloroethane	< DL	< DL	---
Tetrachloroethene (PCE)	6506	< DL	100
Toluene	12396	62.1	99.5
1,1,1-Trichloroethane (TCA)	453	< DL	100
1,1,2-Trichloroethane	< DL	< DL	---
Trichloroethene (TCE)	2650	< DL	100
Vinyl Acetate	< DL	< DL	---
Vinyl Chloride	1007	< DL	100
Xylenes	28501	< DL	100

VOLATILE ORGANIC COMPOUNDS IN AIR
DESTRUCTION EFFICIENCY EVALUATION
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 13\CH#2DEST
CLIENT: Sweet-Edwards/EMCON, Inc.
LOCATION: Cedar Hills Landfill
SAMPLE SITE: Inlet/Outlet of Flare #2 (PNL 201)
SAMPLE DATES: March 2, 1990

COMPOUNDS	Average Inlet Mass Rate mg/min	Average Outlet Mass Rate mg/min	Destruction Efficiency Percent
Acetone	2898	< DL	100
Benzene	242	13.6	94.4
Bromodichloromethane	< DL	< DL	---
Bromomethane	< DL	< DL	---
Bromoform	< DL	< DL	---
2-Butanone (MEK)	627	< DL	100
Carbon Disulfide	< DL	< DL	---
Carbon Tetrachloride	< DL	< DL	---
Chlorobenzene	87	< DL	100
Chloroethane	5	< DL	100
2-Chloroethylvinyl Ether	< DL	< DL	---
Chloroform	< DL	< DL	---
Chloromethane	< DL	< DL	---
Dibromochloromethane	< DL	4.8	---
1,1-Dichloroethane	213	< DL	100
1,2-Dichloroethane	25	< DL	100
1,1-Dichloroethene	73	< DL	100
c-1,2-Dichloroethene	956	< DL	100
t-1,2-Dichloroethene	69	< DL	100
Dichloromethane	836	< DL	100
1,2-Dichloropropane	4	< DL	---
cis-1,3-Dichloropropene	< DL	< DL	---
trans-1,3-Dichloropropene	< DL	< DL	---
Ethylbenzene	3232	< DL	100
2-Hexanone	< DL	< DL	---
4-Methyl-2-Pentanone (MIBK)	2952	< DL	100
Styrene	1848	< DL	100
1,1,2,2-Tetrachloroethane	< DL	< DL	---
Tetrachloroethene (PCE)	2458	4.1	99.8
Toluene	10854	20.5	99.8
1,1,1-Trichloroethane (TCA)	28	< DL	100
1,1,2-Trichloroethane	< DL	< DL	---
Trichloroethene (TCE)	1006	< DL	100
Vinyl Acetate	< DL	< DL	---
Vinyl Chloride	302	< DL	100
Xylenes	9263	3.6	100

3.0 METHODOLOGY REFERENCES

Sampling procedures specified in the July 1, 1989 Title 40 Code of Federal Regulations, Part 60 (40 CFR 60), Appendix A, Methods 1, 2, 3A, 4, 5, 6C , 7E and 16A were followed throughout this project. Methodology suggested in the EPA Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, (EPA-600/4-77-027b)" was used for supplemental information with respect to quality assurance and testing protocol. A document titled Guidelines for Stack Testing of Municipal Waste Combustion Facilities, EPA-600/8-88-085, dated June 1988 was used to obtain suggested procedures for sampling at municipal waste facilities. Compendium Method TO-14 is the specific method for the volatile organic compound (VOC) sampling. This is an ambient air sampling method included in the EPA document "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air".

4.0 SAMPLING AND ANALYSIS PROCEDURES

4.1 EPA Methods 1 and 2 - Airflow Determination

The inlet gas flows to the two flares through 12-inch (I.D.) circular ducts which have taps available to draw gas samples. A standard pitot tube connected to a magnehelic gauge was used to monitor the velocity of the inlet gas. The outlet stacks are 138 inches in diameter (inside diameter) with two (2) sample ports available 6 feet upstream and 35 feet downstream from the nearest flow disturbance. A point of average velocity was determined in the stack per Method 1 and 2 criteria using calibrated "S" type pitot tubes. The emissions samples were collected at a point of average velocity. Temperature was monitored using thermocouple probes connected to a digital thermocouple indicator.

4.2 EPA Method 3A and Fixed Gas Analysis

Fixed gases (carbon dioxide, carbon monoxide, oxygen, nitrogen, and methane) were quantified by Coast-to-Coast Analytical using the gas collected in Tedlar bags and TO-14 canisters from the flare inlet and outlet. A gas chromatograph equipped with a thermal conductivity detector was used for this analysis.

The outlet gas was continuously measured on-site to quantify the carbon monoxide, oxygen and carbon monoxide content. An Infrared Industries non-dispersive infrared (NDIR) analyzer (Model IR 702D) was used to measure the percent carbon dioxide (CO_2). An Infrared Industries Model 2200 analyzer was used to measure the percent oxygen (O_2). An Automated Custom Systems (ACS) Model 3300 non-dispersive infrared analyzer was used to measure the parts per million (ppm) carbon monoxide (CO). Standard CO_2, O_2, and CO calibration gases provided by Scott Specialty Gases were utilized to check the calibration of the instruments.

The results of these combustion gas analyses were utilized to calculate the molecular weight of the gas.

4.3 EPA Method 4 - Moisture and Hydrochloric Acid

The moisture content of the flare inlet and outlet gas was measured using EPA Method 4. The deionized water used in the impinger section of the moisture sample train at the outlet was recovered and analyzed for hydrochloric acid using a titrametric method. The sample probe was positioned in the stack at a point of average velocity. The sample pump was started and a moisture sample was collected over a 120-minute period. Three (3) Method 4/HCl sample runs were performed at the combustor outlet.

The sample train used for moisture sampling was an EPA Method 4 design as illustrated in Figure 1 in Appendix E of this report. The gas was pulled through a heated probe liner into an impinger train which was immersed in an ice water bath. The first impinger was a modified Greenburg-Smith type containing 100 milliliters of deionized water. The second Greenburg-Smith impinger also contained 100 ml of water. The third impinger was empty, and the fourth bubbler contained indicating silica gel desiccant to absorb any moisture from the stack gas before it entered the control box. The impinger section was maintained at a temperature below 68° F by keeping ice on the impingers. The temperature at the outlet of the silica gel bubbler was monitored to verify that it did not exceed 68° F during a test. Prior to each run, the sample train was leak-checked following the procedures in Method 5. Upon completion of each test, the probe was removed from the stack and a post-test leak check was performed.

The sample train was connected to a control box by means of an umbilical cord which contains a vacuum hose, pitot lines, thermocouple wires and a 4-wire electrical cord. The control box (meter box) is used to monitor stack conditions. The control box consists of a leak-free pump used to pull the stack gas through the sample train, fine and coarse metering valves to control the sampling rate, a vacuum gauge which measures the pressure drop from the sampling nozzle to the metering valves, and a calibrated dry gas meter readable to 0.005 cubic feet. The dry gas meter inlet and outlet temperatures were monitored by thermocouples which are connected to the multichannel Fluke thermocouple indicator. The dry gas meter calibration factor, Y, is determined by calibrating the meter against a wet test meter.

Before and after each run, the impingers in the sample train were removed and weighed with a readability of 0.1 grams using a Mettler electronic top loading balance. The difference between the initial and final weights of the condenser section constitute the amount of moisture gained during the run. The moisture at the inlet was quantified by allowing the positive pressure gas to pass through a series of pre-weighed impingers while metering the gas volume.

4.4 EPA Method 6C, 7E and 16A - Total Sulfur and Nitrogen Oxides

The Method 6C/16A samples were collected at a point of average velocity in the outlet gas stream. Method 6C and 16A utilize instrumental analyzers to measure total sulfur (TS) (including sulfur dioxide (SO_2), hydrogen sulfide (H_2S) and total reduced sulfur (TRS)). A gas sample was continuously extracted from the stack and passed through a thermal oxidizer which converts TRS and H_2S to SO_2. The gas sample then passed through an instrumental fluorescent analyzer for measuring total sulfur as SO_2. Measurements were recorded at 1-minute intervals during each

120-minute test period, and the results were averaged. For each run, only those measurements obtained after twice the response time of the measurement system had elapsed were used to determine the average emission concentration.

The Method 7E samples were collected along with the Method 6C and 16A samples at the outlet. Method 7E utilizes an instrumental analyzer to measure nitrogen oxides. A gas sample was continuously extracted from the stack, and a portion of the sample was conveyed to an instrumental chemiluminescent analyzer for determination of NO_x concentration. Measurements were recorded at 1-minute intervals during each 120-minute test, and the results were averaged. For each run, only those measurements obtained after twice the response time of the measurement system had elapsed were used to determine the average emission concentration.

The Method 6C and 7E sample train is illustrated in Figure 2 in Appendix E of this report. An effluent gas sample was drawn through a stainless steel sample probe and through a refrigerator type moisture removal system to continuously remove condensate from the sample gas. A Teflon coated leak-free pump was utilized to pull the sample gas through the system at a flow rate sufficient to minimize the response time of the measurement system. A sample flow rate control valve and rotameter were used to maintain a constant sampling rate within 10 percent. A sample gas manifold system (dilution system) constructed of nonreactive materials was utilized to divert a portion of the sample gas stream to the analyzer for dilution with ambient air at a ratio of 20:1, and the remainder of the gas to the by-pass discharge vent. The dilution sample system is capable of introducing calibration gases directly to the analyzer. The gas passes through an NO_2 to NO converter which converts the nitrogen dioxide in the sample to nitrogen

oxide (with no ammonia interference). The sample is divided into two paths, one leading through the converter and the other leading directly to the reaction chamber of the analyzer. The difference between the 2 channels' readings is NO_2. The dilution sample system is capable of introducing calibration gases directly to the analyzers. An analyzer flow rate control valve and rotameter were used to maintain a constant sampling rate to the analyzer. A Hewlett-Packard data acquisition system was used to log outputs of the analyzer. Readings were recorded at one-minute intervals over the duration of each sample run.

The TS and NO_x measurement system was assembled on-site and calibration gases were introduced and calibration adjustments were made to calibrate the instrument. The sampling system components were adjusted to achieve correct sampling rates. Prior to sampling, a calibration error check was performed by introducing calibration gases to the system upstream of the analyzer. Zero, mid-range, and high-range calibration gases were introduced, and no adjustments to the system were made, except as necessary to maintain a constant flow rate of calibration gas through the instrument.

Immediately preceding and following each run, or whenever adjustments to the measurement system were made, a sampling system bias check was performed. In this test, a zero gas and either the mid-range or high-range gas, whichever most closely approximates the effluent concentrations, was introduced. The concentration displayed by the analyzer was noted and then the zero gas was introduced to verify that the output returned to zero. The calibration gas flow rates were maintained at a constant rate. Zero and upscale gases were alternately introduced until a stable response was achieved. The response time was determined by observing the times required to achieve a stable response when both the zero

and upscale gas was introduced. The longer of the two times was used as the response time of the analyzer. Once acceptable bias specifications were met, the average of the initial and final bias check values were used to calculate the gas concentration for the run.

4.5 Volatile Organic Compound Determination

Integrated samples of the gas at the inlet and outlet of Flare #1 were collected for volatile organic compound analysis. The inlet samples were collected in 10-liter Tedlar bags. The outlet samples were collected using Compendium Method T0-14. This ambient air testing method was used for these source tests to collect integrated samples of volatile organic compounds (VOCs) at the outlet sites. The TO-14 sampling system is illustrated in Figure 3 in Appendix E of this report. The integrated samples were analyzed using EPA Method 8240, which utilizes a gas chromatograph - mass spectrophotometer (GC-MS).

The TO-14 sampling apparatus included a leak-free metal bellows pump, a mechanical critical orifice flow regulator, and a mechanical compensating flow restrictive device. The system is specifically designed to collect uniformly integrated air samples over a predetermined time period. The integrated air sample was pressurized and stored in electropolished SUMMA^{R} six-liter stainless steel canisters for transport and subsequent analysis. The interior surfaces of these stainless steel canisters are passivated using the Molectrics SUMMA^{R} process. A teflon sample line was inserted into the port to pull a gas sample through the flow controller and into the canister. Other components of the sampling system were constructed of stainless-steel or Teflon fittings.

Coast-to-Coast Analytical Services, Inc., the outside contract laboratory used to analyze these samples, owns and maintains the integrity of the SUMMA^{R} passivated canisters and performs leak tests to assure that they can contain a gas sample over time. To prepare the canisters, the contract laboratory heated them in an isothermal oven to 100° C. Once heated, the canisters were evacuated and maintained under vacuum for several hours. At the end of the heated/evacuation cycle, the canisters were pressurized with humid zero air and were quality assurance checked with a gas chromatograph equipped with a flame ionization detector. Once certified cleaned, the canisters were reevacuated and remained in the evacuated state until they were used.

Each canister was labeled with an identification tag before it was returned to the contract laboratory for analysis. Upon return receipt of the canisters by the contract laboratory, the pressure of each canister was checked by attaching a pressure gauge to the canister inlet and opening the valve briefly to note the pressure. The sample canister was connected to the inlet of the GC-MS-SCAN analytical system. A mass flow controller was placed on the canister and the canister valve was opened. Following preliminary flushing, the canister flow was vented past a tee inlet to the analytical system. The sample was preconcentrated in a cryogenic trap, then the trapped analytes were thermally desorbed onto the head of the column to be separated and scanned. Primary identification is based on retention time and relative abundance of eluting ions as compared to the spectral library stored on the hard disk of the GC-MS data system. The concentration of each compound was calculated using the previously established response factors. Analysis of the gas contained in the canisters was accomplished using GC-MS as described in Method TO-14. This protocol is virtually identical to EPA Method 8240 procedures for quantifying volatile organic compounds.

5.0 CALCULATION OF RESULTS

The Method 1-4, 6C, 7E and 16A results were calculated in accordance wi
CFR 60, Appendix A criteria. Copies of the pertinent equations are in
Appendix E of this report. Standard conditions are 68° F and 29.92
mercury. The laboratory results were converted to concentration
emission rate units. The results from each run are presented along with a
for the series of three (3) runs. If the average value for 3 runs is less
detection limit, the average is presented as < DL. Final result calcula
report preparation were performed using Hewlett-Packard Vectra
systems. By-hand sample calculations of computerized results were perf
verify computer program integrity, and are included in Appendix C of thi

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Fahrenheit and has been certified by the manufacturer for its' accuracy. Each thermocouple probe used to monitor temperature is checked quarterly at three (3) temperature settings.

A Monitor Labs Model 8850 sulfur dioxide measurement system equipped with a Model 8770 H_2S to SO_2 converter was used for Method 6C and 16A sampling. A Monitor Labs Model 8840 NO_2 analyzer was used for Method 7E nitrogen oxides sampling. These instruments are capable of meeting the system performance specifications detailed in 40 CFR 60, Appendix A, Method 6C, Section 4. The calibration gases used were purchased from Scott Specialty Gases and were analyzed following the EPA Traceability Protocol Number 1. Purified nitrogen was utilized for the zero gas.

Support equipment is defined as all equipment, not previously discussed that is required for completing an environmental monitoring or measurement task. This equipment may include storage and transportation containers, sample recovery glassware, and communications gear. Support equipment is periodically inspected to maintain the performance standards necessary for proper and efficient execution of all tasks and responsibilities.

During the project, a systems audit was performed, consisting of an on-site qualitative inspection and review of the total measurement system. This inspection was conducted on a daily basis by the Project Manager. During the systems audit, the auditor observed the procedures and techniques of the field team in the following general areas:

- Setting up and leak testing the sampling train
- Isokinetic sampling check of the sampling train
- Final leak check of train
- Sample recovery

Visual inspections of pitot tubes, glassware, and other equipment were also made. The main purpose of a systems audit is to ensure that the measurement system will generate valid data, if operated properly.

6.2 Sample Recovery and Field Documentation

Data relative to samples, collected during each test, were immediately inspected for completeness and placed under the custody of the Project Manager until custody was transferred when the samples were turned over to the laboratory. Sample recovery was carried out in a suitable area sheltered from wind and dust to prevent contamination of samples.

Many types of documentation were used in the field to keep track of project information. A bound field notebook was used to note any conditions which were not covered by the various field data sheets which Am Test uses. The field team leader recorded all information related to sampling or field activities.

6.3 Chain of Custody

The history of each sample was documented from collection through all transfers of custody until it was transferred to the analytical laboratory. Copies of chain of custody forms are included in Appendix B of this report. Internal laboratory records document the custody of the samples through their final disposition. Care was taken to record precisely the sample type, sample time, and sample location

and to help ensure that the sample number on the label exactly matches those numbers on the sample logsheet and the chain-of-custody record. The persons undertaking the actual sampling in the field were responsible for the care and custody of the samples collected until they were properly transferred or dispatched. Sample labels were completed for each sample bottle using water-proof ink.

6.4 Transfer of Custody and Shipment

All sample shipping containers were accompanied by an analysis request or chain-of-custody record form when they left the site. When transferring the possession of samples, the individuals relinquishing and receiving the samples signed, dated, and noted the time on the record. This record documents sample custody transfer from the sampler, often through another person, to the analyst in the laboratory.

The laboratory representative who accepted the incoming sample shipment signed and dated the chain-of-custody record, completing the sample transfer process. It is the laboratory's responsibility to maintain internal logbooks and custody records throughout sample preparation and analysis in accordance with the laboratory's written QA Plan.

It is important to maintain the integrity of the samples from the time of collection until the analyses are performed. The samples were preserved during transportation and storage to prevent or retard degradation or modification of chemicals in samples. The chloride samples were kept cool with blue ice packets placed in the coolers the sample were shipped in. Prior to shipping the TO-14 canisters, the samples were placed in boxes along with a chain-of-custody form. Empty space in the box was filled with bubble pack and styrofoam to prevent

damage during shipment. The samples were shipped to Coast-to-Coast Analytical via Federal Express for overnight delivery.

6.5 Data Reduction, Validation, and Reporting

Raw data is handled according to strict guidelines when they are being transposed into computer files or on other logs. The guidelines include document receipt control procedures, file review, and sign-off by a checker. Raw data was entered into the appropriate software package by a "processor", then the entered figures were checked for accuracy by a "checker," different from the "processor". Any mistakes were corrected, and figures were rechecked and signed off by the "checker". In addition, by-hand calculation checks were made to validate the computer output. All data generated by each phase of a laboratory or field sampling program were reviewed by the senior reviewer. The data was signed off by the senior reviewer prior to releasing the data for report preparation.

APPENDIX A

Computer Printouts of Results

METHOD 1-4 - VELOCITY AND MOISTURE INFORMATION
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME:	M1-4/CHM4-IR1	LAB #:	G-08949-1
CLIENT:	SWEET EDWARDS/EMCON	START TIME:	09:59 o'clock
LOCATION:	CEDAR HILLS LANDFILL	STOP TIME:	11:00 o'clock
SAMPLE SITE:	PNL101 - FLARE INLET		
SAMPLE DATE:	MARCH 1, 1990		
RUN #:	1-M1-4		
OPERATORS:	MACKEY/WIDMEYER		
CONTACT:	D. VONASEK		

IMPINGER WEIGHTS

FINAL GRAMS	INITIAL GRAMS	NET GRAMS
100.2847	95.5738	4.7109
0.0	0.0	0.0
0.0	0.0	0.0
0.0	0.0	0.0
TOTAL H2O GAIN:		4.7109
TOTAL VOLUME (SCF):		0.22
PERCENT MOISTURE:		1.62
Bws:		0.0162

PITOT TUBE Cp:	0.99
STACK DIAMETER:	12.0 inches
STACK AREA:	0.785 sq. feet
METER TEMPERATURE:	79.1 degrees F
BAROMETRIC PRES.:	29.73 inches Hg
STATIC PRESSURE:	11.0 inches H2O
STACK PRESSURE:	30.54 inches Hg
ORIFICE PRESSURE:	11.00 inches H2O
METER PRESSURE:	30.54 inches Hg

INIT. METER VOLUME:	195.934
FINAL METER VOLUME:	209.408
VOLUME SAMPLED:	13.474
STD VOLUME (DSCF):	13.443
STD VOLUME (DSCM):	0.381
Y FACTOR:	0.998

AVERAGE CO2 CONC:	32.0 percent
AVERAGE O2 CONC:	3.3 percent
AVERAGE CO CONC:	< 0.1 percent
MOLECULAR WEIGHT:	33.25 g/g-mole-dry
MOLECULAR WEIGHT:	33.00 g/g-mole-wet

****

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
Single Point	1.14	86	Single Point	1.14	87
	1.14	86		1.14	87
	1.14	86		1.14	87
	1.14	86			

****

STACK TEMPERATURE:	86.4 degrees F	546.4 degrees R
AVERAGE VELOCITY HEAD:	1.140 " of H2O	
STACK GAS VELOCITY:		66.5 ft/sec
STACK GAS AIR FLOW:	3135.4 acf/min	3042.2 dscf/min

METHOD 1-4 - VELOCITY AND MOISTURE INFORMATION
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME:	M1-4/CHM4-IR2	LAB #:	G-08949-2
CLIENT:	SWEET EDWARDS/EMCON	START TIME:	11:00 o'clock
LOCATION:	CEDAR HILLS LANDFILL	STOP TIME:	13:00 o'clock
SAMPLE SITE:	PNL101 - FLARE INLET		
SAMPLE DATE:	MARCH 1, 1990		
RUN #:	2-M1-4		
OPERATORS:	MACKEY/WIDMEYER		
CONTACT:	D. VONASEK		

IMPINGER WEIGHTS

FINAL GRAMS	INITIAL GRAMS	NET GRAMS
100.2847	95.5738	4.7109
0.0	0.0	0.0
0.0	0.0	0.0
0.0	0.0	0.0

TOTAL H2O GAIN:	4.7109
TOTAL VOLUME (SCF):	0.22
PERCENT MOISTURE:	1.62
Bws:	0.0162

PITOT TUBE Cp:	0.99
STACK DIAMETER:	12.0 inches
STACK AREA:	0.785 sq. feet
METER TEMPERATURE:	79.1 degrees F
BAROMETRIC PRES.:	29.73 inches Hg
STATIC PRESSURE:	11.0 inches H2O
STACK PRESSURE:	30.54 inches Hg
ORIFICE PRESSURE:	11.00 inches H2O
METER PRESSURE:	30.54 inches Hg

INIT. METER VOLUME:	195.934
FINAL METER VOLUME:	209.408
VOLUME SAMPLED:	13.474
STD VOLUME (DSCF):	13.443
STD VOLUME (DSCM):	0.381
Y FACTOR:	0.998

AVERAGE CO2 CONC:	31.0 percent
AVERAGE O2 CONC:	3.0 percent
AVERAGE CO CONC:	< 0.1 percent
MOLECULAR WEIGHT:	33.08 g/g-mole-dry
MOLECULAR WEIGHT:	32.84 g/g-mole-wet

****

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
Single Point	1.13	87	Single Point	1.13	86
	1.13	87		1.13	88
	1.13	87		1.13	88
	1.13	87		1.13	88
	1.13	88		1.13	90
	1.13	87		1.13	89

****

STACK TEMPERATURE:	87.7 degrees F	547.7 degrees R
AVERAGE VELOCITY HEAD:	1.130 " of H2O	
STACK GAS VELOCITY:		66.5 ft/sec
STACK GAS AIR FLOW:	3133.2 acf/min	3033.2 dscf/min

METHOD 1-4 - VELOCITY AND MOISTURE INFORMATION
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME:	M1-4/CHM4-IR3	LAB #:	G-08949-3
CLIENT:	SWEET EDWARDS/EMCON	START TIME:	13:35 o'clock
LOCATION:	CEDAR HILLS LANDFILL	STOP TIME:	15:35 o'clock
SAMPLE SITE:	PNL101 - FLARE INLET		
SAMPLE DATE:	MARCH 1, 1990		
RUN #:	3-M1-4		
OPERATORS:	MACKEY/WIDMEYER		
CONTACT:	D. VONASEK		

IMPINGER WEIGHTS

FINAL GRAMS	INITIAL GRAMS	NET GRAMS
100.2847	95.5738	4.7109
0.0	0.0	0.0
0.0	0.0	0.0
0.0	0.0	0.0
TOTAL H2O GAIN:		4.7109
TOTAL VOLUME (SCF):		0.22
PERCENT MOISTURE:		1.63
Bws:		0.0163

PITOT TUBE Cp:	0.99
STACK DIAMETER:	12.0 inches
STACK AREA:	0.785 sq. feet
METER TEMPERATURE:	79.1 degrees F
BAROMETRIC PRES.:	29.66 inches Hg
STATIC PRESSURE:	11.0 inches H2O
STACK PRESSURE:	30.47 inches Hg
ORIFICE PRESSURE:	11.00 inches H2O
METER PRESSURE:	30.47 inches Hg

INIT. METER VOLUME:	195.934
FINAL METER VOLUME:	209.408
VOLUME SAMPLED:	13.474
STD VOLUME (DSCF):	13.412
STD VOLUME (DSCM):	0.380
Y FACTOR:	0.998

AVERAGE CO2 CONC:	27.0 percent
AVERAGE O2 CONC:	7.1 percent
AVERAGE CO CONC:	< 0.1 percent
MOLECULAR WEIGHT:	32.60 g/g-mole-dry
MOLECULAR WEIGHT:	32.37 g/g-mole-wet

****

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
Single	1.15	87	Single	1.15	87
Point	1.15	87	Point	1.15	87
	1.15	87		1.15	87
	1.15	87		1.15	87
	1.15	87		1.15	86
	1.15	88		1.15	87

****

STACK TEMPERATURE:	87.0 degrees F	547.0 degrees R
AVERAGE VELOCITY HEAD:	1.150 " of H2O	
STACK GAS VELOCITY:		67.6 ft/sec
STACK GAS AIR FLOW:	3185.4 acf/min	3080.2 dscf/min

METHODS 1-4 AND CHLORIDE
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME:	CHCL#1R1	LAB #:	004525
CLIENT:	SWEET EDWARDS/EMCON	START TIME:	08:31 o'clock
LOCATION:	CEDAR HILLS LANDFILL	STOP TIME:	10:31 o'clock
SAMPLE SITE:	N. FLARE #1 OUTLET	SAMPLE TIME:	120.0 minutes
SAMPLE DATE:	MARCH 1, 1990		
RUN #:	1-METHOD 1-4/HCL		
OPERATORS:	MACKEY/WIDMEYER		
CONTACT:	D. VONASEK		

IMPINGER WEIGHTS

FINAL GRAMS	INITIAL GRAMS	NET GRAMS
614.9	579.8	35.1
574.0	571.4	2.6
526.1	527.0	-0.9
787.0	780.5	6.5
TOTAL H2O GAIN:		43.3
TOTAL VOLUME (SCF):		2.04
PERCENT MOISTURE:		6.83
Bws:		0.0683

PITOT TUBE Cp:	0.84
NOZZLE DIAMETER:	NA inches
NOZZLE AREA:	NA sq. feet
STACK DIAMETER:	138.0 inches
STACK AREA:	103.87 sq. feet
METER TEMPERATURE:	70.3 degrees F
BAROMETRIC PRES.:	29.73 inches Hg
STATIC PRESSURE:	-0.95 inches H2O
STACK PRESSURE:	29.66 inches Hg
ORIFICE PRESSURE:	0.300 inches H2O
METER PRESSURE:	29.75 inches Hg

INIT. METER VOLUME:	210.766
FINAL METER VOLUME:	238.418
VOLUME SAMPLED:	27.652
STD VOLUME (DSCF):	27.843
STD VOLUME (DSCM):	0.789
Y FACTOR:	1.017

AVERAGE CONC. CO2:	8.5 percent
AVERAGE CONC. O2:	12.0 percent
AVERAGE CONC. CO:	66 ppm
MOLECULAR WEIGHT:	29.84 g/g-mole-dry
MOLECULAR WEIGHT:	29.03 g/g-mole-wet

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
Point of	0.044	1570	Point of	0.044	1605
Avg. Vel.	0.044	1575	Avg. Vel.	0.044	1610

STACK TEMPERATURE:	1590.0 degrees F	2050.0 degrees R
AVERAGE VELOCITY HEAD:	0.044 inches H2O	
STACK GAS VELOCITY:		23.24 ft/sec
STACK GAS AIR FLOW:	144849.2 acf/min	34456.8 dscf/min

GASEOUS CHLORIDE EMISSIONS (as HYDROCHLORIC ACID)

CHLORIDE DETECTION LIMIT (ug/ml):	2.0
CHLORIDE DETECTION LIMIT (micrograms):	580
CHLORIDE CONCENTRATION IN SAMPLE (ug/ml):	20.4
TOTAL VOLUME OF SAMPLE (milliliters):	290
CHLORIDE CONCENTRATION IN SAMPLE (micrograms):	5916
CHLORIDE CONCENTRATION IN AIR (mg/dscm):	7.72
CHLORIDE AS HCL (ppm):	5.09
CHLORIDE AS HCL (ppm @ 7% O2):	7.95
CHLORIDE EMISSION RATE (mg/min):	7321.3
CHLORIDE EMISSION RATE (lb/hr):	1.00

METHODS 1-4 AND CHLORIDE
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME:	CHCL#1R2	LAB #:	004526
CLIENT:	SWEET EDWARDS/EMCON	START TIME:	11:00 o'clock
LOCATION:	CEDAR HILLS LANDFILL	STOP TIME:	13:00 o'clock
SAMPLE SITE:	N. FLARE #1 OUTLET	SAMPLE TIME:	120.0 minutes
SAMPLE DATE:	MARCH 1, 1990		
RUN #:	2-METHOD 1-4/HCL		
OPERATORS:	MACKEY/WIDMEYER		
CONTACT:	D. VONASEK		

IMPINGER WEIGHTS

FINAL GRAMS	INITIAL GRAMS	NET GRAMS
676.8	598.8	78.0
608.3	598.3	10.0
518.0	518.4	-0.4
761.2	751.9	9.3
TOTAL H2O GAIN:		96.9
TOTAL VOLUME (SCF):		4.57
PERCENT MOISTURE:		7.26
Bws:		0.0726

INIT. METER VOLUME:	238.826
FINAL METER VOLUME:	298.772
VOLUME SAMPLED:	59.946
STD VOLUME (DSCF):	58.404
STD VOLUME (DSCM):	1.654
Y FACTOR:	1.017

PITOT TUBE Cp:	0.84
NOZZLE DIAMETER:	NA inches
NOZZLE AREA:	NA sq. feet
STACK DIAMETER:	138.0 inches
STACK AREA:	103.87 sq. feet
METER TEMPERATURE:	89.1 degrees F
BAROMETRIC PRES.:	29.75 inches Hg
STATIC PRESSURE:	-0.95 inches H2O
STACK PRESSURE:	29.68 inches Hg
ORIFICE PRESSURE:	0.800 inches H2O
METER PRESSURE:	29.81 inches Hg

AVERAGE CONC. CO2:	7.8 percent
AVERAGE CONC. O2:	12.5 percent
AVERAGE CONC. CO:	142 ppm
MOLECULAR WEIGHT:	29.75 g/g-mole-dry
MOLECULAR WEIGHT:	28.90 g/g-mole-wet

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
Point of	0.043	1575	Point of	0.043	1550
Avg. Vel.	0.043	1540	Avg. Vel.	0.043	1534

STACK TEMPERATURE:	1549.8 degrees F	2009.8 degrees R
AVERAGE VELOCITY HEAD:	0.043 inches H2O	
STACK GAS VELOCITY:		22.80 ft/sec
STACK GAS AIR FLOW:	142065.1 acf/min	34337.7 dscf/min

GASEOUS CHLORIDE EMISSIONS (as HYDROCHLORIC ACID)

CHLORIDE DETECTION LIMIT (ug/ml):	2.0
CHLORIDE DETECTION LIMIT (micrograms):	670
CHLORIDE CONCENTRATION IN SAMPLE (ug/ml):	98.1
TOTAL VOLUME OF SAMPLE (milliliters):	335
CHLORIDE CONCENTRATION IN SAMPLE (micrograms):	32864
CHLORIDE CONCENTRATION IN AIR (mg/dscm):	20.4
CHLORIDE AS HCL (ppm):	13.5
CHLORIDE AS HCL (ppm @ 7% O2):	22.3
CHLORIDE EMISSION RATE (mg/min):	19321.5
CHLORIDE EMISSION RATE (lb/hr):	2.63

METHODS 1-4 AND CHLORIDE
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME:	CHCL#1R3	LAB #:	004527
CLIENT:	SWEET EDWARDS/EMCON	START TIME:	13:37 o'clock
LOCATION:	CEDAR HILLS LANDFILL	STOP TIME:	15:37 o'clock
SAMPLE SITE:	N. FLARE #1 OUTLET	SAMPLE TIME:	120.0 minutes
SAMPLE DATE:	MARCH 1, 1990		
RUN #:	3-METHOD 1-4/HCL		
OPERATORS:	MACKEY/WIDMEYER		
CONTACT:	D. VONASEK		

IMPINGER WEIGHTS

FINAL GRAMS	INITIAL GRAMS	NET GRAMS
690.9	636.7	54.2
634.1	631.4	2.7
538.2	538.9	-0.7
808.1	801.4	6.7
TOTAL H2O GAIN:		62.9
TOTAL VOLUME (SCF):		2.97
PERCENT MOISTURE:		6.90
Bws:		0.0690

PITOT TUBE Cp:	0.84
NOZZLE DIAMETER:	NA inches
NOZZLE AREA:	NA sq. feet
STACK DIAMETER:	138.0 inches
STACK AREA:	103.87 sq. feet
METER TEMPERATURE:	85.4 degrees F
BAROMETRIC PRES.:	29.66 inches Hg
STATIC PRESSURE:	-0.95 inches H2O
STACK PRESSURE:	29.59 inches Hg
ORIFICE PRESSURE:	0.500 inches H2O
METER PRESSURE:	29.70 inches Hg

INIT. METER VOLUME:	300.263
FINAL METER VOLUME:	341.196
VOLUME SAMPLED:	40.933
STD VOLUME (DSCF):	40.000
STD VOLUME (DSCM):	1.133
Y FACTOR:	1.017

AVERAGE CONC. CO2:	7.6 percent
AVERAGE CONC. O2:	12.9 percent
AVERAGE CONC. CO:	190 ppm
MOLECULAR WEIGHT:	29.73 g/g-mole-dry
MOLECULAR WEIGHT:	28.92 g/g-mole-wet

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
Point of	0.039	1540	Point of	0.039	1570
Avg. Vel.	0.039	1565	Avg. Vel.	0.039	1575

STACK TEMPERATURE:	1562.5 degrees F	2022.5 degrees R
AVERAGE VELOCITY HEAD:	0.039 inches H2O	
STACK GAS VELOCITY:		21.80 ft/sec
STACK GAS AIR FLOW:	135868.5 acf/min	32657.7 dscf/min

GASEOUS CHLORIDE EMISSIONS (as HYDROCHLORIC ACID)

CHLORIDE DETECTION LIMIT (ug/ml):	2.0
CHLORIDE DETECTION LIMIT (micrograms):	660
CHLORIDE CONCENTRATION IN SAMPLE (ug/ml):	35.8
TOTAL VOLUME OF SAMPLE (milliliters):	330
CHLORIDE CONCENTRATION IN SAMPLE (micrograms):	11814
CHLORIDE CONCENTRATION IN AIR (mg/dscm):	10.7
CHLORIDE AS HCL (ppm):	7.08
CHLORIDE AS HCL (ppm @ 7% O2):	12.3
CHLORIDE EMISSION RATE (mg/min):	9645.5
CHLORIDE EMISSION RATE (lb/hr):	1.31

METHOD 1-4 - VELOCITY AND MOISTURE INFORMATION
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME:	M1-4/CHM4#211	LAB #:	G-08949-4
CLIENT:	SWEET EDWARDS/EMCON	START TIME:	08:10 o'clock
LOCATION:	CEDAR HILLS LANDFILL	STOP TIME:	10:10 o'clock
SAMPLE SITE:	PNL201 - FLARE INLET		
SAMPLE DATE:	MARCH 2, 1990		
RUN #:	1-M1-4		
OPERATORS:	MACKEY/WIDMEYER		
CONTACT:	D. VONASEK		

IMPINGER WEIGHTS

FINAL GRAMS	INITIAL GRAMS	NET GRAMS
103.3181	99.7727	3.5454
0.0	0.0	0.0
0.0	0.0	0.0
0.0	0.0	0.0

TOTAL H2O GAIN:	3.5454
TOTAL VOLUME (SCF):	0.17
PERCENT MOISTURE:	1.86
Bws:	0.0186

PITOT TUBE Cp:	0.99
STACK DIAMETER:	12.0 inches
STACK AREA:	0.785 sq. feet
METER TEMPERATURE:	80.9 degrees F
BAROMETRIC PRES.:	29.61 inches Hg
STATIC PRESSURE:	28.2 inches H2O
STACK PRESSURE:	31.68 inches Hg
ORIFICE PRESSURE:	28.20 inches H2O
METER PRESSURE:	31.68 inches Hg

INIT. METER VOLUME:	209.411
FINAL METER VOLUME:	217.963
VOLUME SAMPLED:	8.552
STD VOLUME (DSCF):	8.822
STD VOLUME (DSCM):	0.250
Y FACTOR:	0.998

AVERAGE CO2 CONC:	22.0 percent
AVERAGE O2 CONC:	5.5 percent
AVERAGE CO CONC:	< 0.1 percent
MOLECULAR WEIGHT:	31.74 g/g-mole-dry
MOLECULAR WEIGHT:	31.48 g/g-mole-wet

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SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
Single Point	0.58	90	Single Point	0.58	92
	0.58	90		0.58	93
	0.58	90		0.58	93
	0.58	91		0.58	93
	0.58	91		0.60	94
	0.58	92		0.60	94

****

STACK TEMPERATURE:	91.9 degrees F	551.9 degrees R
AVERAGE VELOCITY HEAD:	0.583 " of H2O	
STACK GAS VELOCITY:		48.1 ft/sec
STACK GAS AIR FLOW:	2265.7 acf/min	2252.7 dscf/min

METHOD 1-4 - VELOCITY AND MOISTURE INFORMATION
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME:	M1-4/CHM4#212	LAB #:	G-08949-5
CLIENT:	SWEET EDWARDS/EMCON	START TIME:	10:25 o'clock
LOCATION:	CEDAR HILLS LANDFILL	STOP TIME:	12:25 o'clock
SAMPLE SITE:	PNL201 - FLARE INLET		
SAMPLE DATE:	MARCH 2, 1990		
RUN #:	2-M1-4		
OPERATORS:	MACKEY/WIDMEYER		
CONTACT:	D. VONASEK		

IMPINGER WEIGHTS

FINAL GRAMS	INITIAL GRAMS	NET GRAMS
103.3181	99.7727	3.5454
0.0	0.0	0.0
0.0	0.0	0.0
0.0	0.0	0.0

TOTAL H2O GAIN:	3.5454
TOTAL VOLUME (SCF):	0.17
PERCENT MOISTURE:	1.86
Bws:	0.0186

PITOT TUBE Cp:	0.99
STACK DIAMETER:	12.0 inches
STACK AREA:	0.785 sq. feet
METER TEMPERATURE:	80.9 degrees F
BAROMETRIC PRES.:	29.57 inches Hg
STATIC PRESSURE:	28.2 inches H2O
STACK PRESSURE:	31.64 inches Hg
ORIFICE PRESSURE:	28.20 inches H2O
METER PRESSURE:	31.64 inches Hg

INIT. METER VOLUME:	209.411
FINAL METER VOLUME:	217.963
VOLUME SAMPLED:	8.552
STD VOLUME (DSCF):	8.811
STD VOLUME (DSCM):	0.250
Y FACTOR:	0.998

AVERAGE CO2 CONC:	29.0 percent
AVERAGE O2 CONC:	3.0 percent
AVERAGE CO CONC:	< 0.1 percent
MOLECULAR WEIGHT:	32.76 g/g-mole-dry
MOLECULAR WEIGHT:	32.49 g/g-mole-wet

****

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
Single Point	0.60	95	Single Point	0.58	95
	0.60	95		0.58	96
	0.58	95		0.58	96
	0.58	95		0.58	96
	0.58	95		0.58	96
	0.60	95		0.58	96

****

STACK TEMPERATURE:	95.4 degrees F	555.4 degrees R
AVERAGE VELOCITY HEAD:	0.585 " of H2O	
STACK GAS VELOCITY:		47.6 ft/sec
STACK GAS AIR FLOW:	2242.2 acf/min	2212.4 dscf/min

METHOD 1-4 - VELOCITY AND MOISTURE INFORMATION
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME:	M1-4/CHM4#213	LAB #:	G-08949-6
CLIENT:	SWEET EDWARDS/EMCON	START TIME:	12:44 o'clock
LOCATION:	CEDAR HILLS LANDFILL	STOP TIME:	14:44 o'clock
SAMPLE SITE:	PNL201 - FLARE INLET		
SAMPLE DATE:	MARCH 2, 1990		
RUN #:	3-M1-4		
OPERATORS:	MACKEY/WIDMEYER		
CONTACT:	D. VONASEK		

IMPINGER WEIGHTS

FINAL GRAMS	INITIAL GRAMS	NET GRAMS
103.3181	99.7727	3.5454
0.0	0.0	0.0
0.0	0.0	0.0
0.0	0.0	0.0

TOTAL H2O GAIN:	3.5454
TOTAL VOLUME (SCF):	0.17
PERCENT MOISTURE:	1.86
Bws:	0.0186

PITOT TUBE Cp:	0.99
STACK DIAMETER:	12.0 inches
STACK AREA:	0.785 sq. feet
METER TEMPERATURE:	80.9 degrees F
BAROMETRIC PRES.:	29.55 inches Hg
STATIC PRESSURE:	28.2 inches H2O
STACK PRESSURE:	31.62 inches Hg
ORIFICE PRESSURE:	28.20 inches H2O
METER PRESSURE:	31.62 inches Hg

INIT. METER VOLUME:	209.411
FINAL METER VOLUME:	217.963
VOLUME SAMPLED:	8.552
STD VOLUME (DSCF):	8.806
STD VOLUME (DSCM):	0.249
Y FACTOR:	0.998

AVERAGE CO2 CONC:	29.0 percent
AVERAGE O2 CONC:	3.0 percent
AVERAGE CO CONC:	< 0.1 percent
MOLECULAR WEIGHT:	32.76 g/g-mole-dry
MOLECULAR WEIGHT:	32.49 g/g-mole-wet

****

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
Single Point	0.60	97	Single Point	0.59	98
	0.58	97		0.59	98
	0.58	97		0.59	99
	0.58	97		0.60	99
	0.59	97		0.60	99
	0.59	98		0.58	99

****

STACK TEMPERATURE:	97.9 degrees F	557.9 degrees R
AVERAGE VELOCITY HEAD:	0.589 " of H2O	
STACK GAS VELOCITY:		47.9 ft/sec
STACK GAS AIR FLOW:	2256.0 acf/min	2214.6 dscf/min

METHODS 1-4 AND CHLORIDE
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME:	CHCL#2R1	LAB #:	004528
CLIENT:	SWEET EDWARDS/EMCON	START TIME:	08:10 o'clock
LOCATION:	CEDAR HILLS LANDFILL	STOP TIME:	10:10 o'clock
SAMPLE SITE:	N. FLARE #2 OUTLET	SAMPLE TIME:	120.0 minutes
SAMPLE DATE:	MARCH 2, 1990		
RUN #:	1-METHOD 1-4/HCL		
OPERATORS:	MACKEY/WIDMEYER		
CONTACT:	D. VONASEK		

GASEOUS CHLORIDE EMISSIONS (as HYDROCHLORIC ACID)

CHLORIDE DETECTION LIMIT (ug/ml):	2.0
CHLORIDE DETECTION LIMIT (micrograms):	640
CHLORIDE CONCENTRATION IN SAMPLE (ug/ml):	9.40
TOTAL VOLUME OF SAMPLE (milliliters):	320
CHLORIDE CONCENTRATION IN SAMPLE (micrograms):	3008
CHLORIDE AS HCL CONC. IN AIR (mg/dscm):	2.65
CHLORIDE AS HCL (ppm):	1.75
CHLORIDE AS HCL (ppm @ 7% O2):	3.92
CHLORIDE EMISSION RATE (mg/min):	2096.6
CHLORIDE EMISSION RATE (lb/hr):	0.29

IMPINGER WEIGHTS

FINAL GRAMS	INITIAL GRAMS	NET GRAMS
682.5	634.4	48.1
635.0	632.6	2.4
537.0	536.6	0.4
805.5	800.0	5.5
TOTAL H2O GAIN:		56.4
TOTAL VOLUME (SCF):		2.66
PERCENT MOISTURE:		6.06
Bws:		0.0606

PITOT TUBE Cp:	0.84
NOZZLE DIAMETER:	NA inches
NOZZLE AREA:	NA sq. feet
STACK DIAMETER:	138.0 inches
STACK AREA:	103.87 sq. feet
METER TEMPERATURE:	63.6 degrees F
BAROMETRIC PRES.:	29.61 inches Hg
STATIC PRESSURE:	-0.90 inches H2O
STACK PRESSURE:	29.54 inches Hg
ORIFICE PRESSURE:	0.500 inches H2O
METER PRESSURE:	29.65 inches Hg

INIT. METER VOLUME:	341.332
FINAL METER VOLUME:	381.903
VOLUME SAMPLED:	40.571
STD VOLUME (DSCF):	41.227
STD VOLUME (DSCM):	1.168
Y FACTOR:	1.017

AVERAGE CONC. CO2:	4.4 percent
AVERAGE CONC. O2:	14.7 percent
AVERAGE CONC. CO:	632 ppm
MOLECULAR WEIGHT:	29.29 g/g-mole-dry
MOLECULAR WEIGHT:	28.61 g/g-mole-wet

****

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
Point of	0.027	1390	Point of	0.027	1385
Avg. Vel.	0.027	1400	Avg. Vel.	0.027	1420

****

STACK TEMPERATURE:	1398.8 degrees F	1858.8 degrees R
AVERAGE VELOCITY HEAD:	0.027 inches H2O	
STACK GAS VELOCITY:		17.50 ft/sec
STACK GAS AIR FLOW:	109055.7 acf/min	28735.5 dscf/min

METHODS 1-4 AND CHLORIDE
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME:	CHCL#2R2	LAB #:	004529
CLIENT:	SWEET EDWARDS/EMCON	START TIME:	10:25 o'clock
LOCATION:	CEDAR HILLS LANDFILL	STOP TIME:	12:25 o'clock
SAMPLE SITE:	N. FLARE #2 OUTLET	SAMPLE TIME:	120.0 minutes
SAMPLE DATE:	MARCH 2, 1990		
RUN #:	2-METHOD 1-4/HCL		
OPERATORS:	MACKEY/WIDMEYER		
CONTACT:	D. VONASEK		

IMPINGER WEIGHTS

FINAL GRAMS	INITIAL GRAMS	NET GRAMS
646.2	600.1	46.1
601.6	599.1	2.5
517.3	517.7	-0.4
756.7	750.4	6.3
TOTAL H2O GAIN:		54.5
TOTAL VOLUME (SCF):		2.57
PERCENT MOISTURE:		6.01
Bws:		0.0601

PITOT TUBE Cp:	0.84
NOZZLE DIAMETER:	NA inches
NOZZLE AREA:	NA sq. feet
STACK DIAMETER:	138.0 inches
STACK AREA:	103.87 sq. feet
METER TEMPERATURE:	79.8 degrees F
BAROMETRIC PRES.:	29.57 inches Hg
STATIC PRESSURE:	-0.90 inches H2O
STACK PRESSURE:	29.50 inches Hg
ORIFICE PRESSURE:	0.500 inches H2O
METER PRESSURE:	29.61 inches Hg

INIT. METER VOLUME:	382.055
FINAL METER VOLUME:	422.867
VOLUME SAMPLED:	40.812
STD VOLUME (DSCF):	40.173
STD VOLUME (DSCM):	1.138
Y FACTOR:	1.017

AVERAGE CONC. CO2:	4.6 percent
AVERAGE CONC. O2:	14.8 percent
AVERAGE CONC. CO:	611 ppm
MOLECULAR WEIGHT:	29.33 g/g-mole-dry
MOLECULAR WEIGHT:	28.65 g/g-mole-wet

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
Point of	0.027	1475	Point of	0.027	1425
Avg. Vel.	0.027	1487	Avg. Vel.	0.027	1445

STACK TEMPERATURE:	1458.0 degrees F	1918.0 degrees R
AVERAGE VELOCITY HEAD:	0.027 inches H2O	
STACK GAS VELOCITY:		17.78 ft/sec
STACK GAS AIR FLOW:	110779.4 acf/min	28263.9 dscf/min

GASEOUS CHLORIDE EMISSIONS (as HYDROCHLORIC ACID)

CHLORIDE DETECTION LIMIT (ug/ml):	2.0
CHLORIDE DETECTION LIMIT (micrograms):	620
CHLORIDE CONCENTRATION IN SAMPLE (ug/ml):	8.10
TOTAL VOLUME OF SAMPLE (milliliters):	310
CHLORIDE CONCENTRATION IN SAMPLE (micrograms):	2511
CHLORIDE CONCENTRATION IN AIR (mg/dscm):	2.27
CHLORIDE AS HCL (ppm):	1.50
CHLORIDE AS HCL (ppm @ 7% O2):	3.41
CHLORIDE EMISSION RATE (mg/min):	1766.6
CHLORIDE EMISSION RATE (lb/hr):	0.24

METHODS 1-4 AND CHLORIDE
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME:	CHCL#2R3	LAB #:	004530
CLIENT:	SWEET EDWARDS/EMCON	START TIME:	12:44 o'clock
LOCATION:	CEDAR HILLS LANDFILL	STOP TIME:	14:44 o'clock
SAMPLE SITE:	N. FLARE #2 OUTLET	SAMPLE TIME:	120.0 minutes
SAMPLE DATE:	MARCH 2, 1990		
RUN #:	3-METHOD 1-4/HCL		
OPERATORS:	MACKEY/WIDMEYER		
CONTACT:	D. VONASEK		

GASEOUS CHLORIDE EMISSIONS (as HYDROCHLORIC ACID)

CHLORIDE DETECTION LIMIT (ug/ml):	2.0
CHLORIDE DETECTION LIMIT (micrograms):	640
CHLORIDE CONCENTRATION IN SAMPLE (ug/ml):	9.40
TOTAL VOLUME OF SAMPLE (milliliters):	320
CHLORIDE CONCENTRATION IN SAMPLE (micrograms):	3008
CHLORIDE CONCENTRATION IN AIR (mg/dscm):	2.80
CHLORIDE AS HCL (ppm):	1.85
CHLORIDE AS HCL (ppm @ 7% O2):	4.29
CHLORIDE EMISSION RATE (mg/min):	2313.7
CHLORIDE EMISSION RATE (lb/hr):	0.31

IMPINGER WEIGHTS

FINAL GRAMS	INITIAL GRAMS	NET GRAMS
625.4	580.1	45.3
632.4	629[illegible]	2.5
471.4	471.4	0.0
784.5	778.4	6.1
TOTAL H2O GAIN:		53.9
TOTAL VOLUME (SCF):		2.54
PERCENT MOISTURE:		6.13
Bws:		0.0613

PITOT TUBE Cp:	0.84
NOZZLE DIAMETER:	NA inches
NOZZLE AREA:	NA sq. feet
STACK DIAMETER:	138.0 inches
STACK AREA:	103.87 sq. feet
METER TEMPERATURE:	93.5 degrees F
BAROMETRIC PRES.:	29.55 inches Hg
STATIC PRESSURE:	-0.90 inches H2O
STACK PRESSURE:	29.48 inches Hg
ORIFICE PRESSURE:	0.500 inches H2O
METER PRESSURE:	29.59 inches Hg

INIT. METER VOLUME:	423.068
FINAL METER VOLUME:	463.663
VOLUME SAMPLED:	40.595
STD VOLUME (DSCF):	38.944
STD VOLUME (DSCM):	1.103
Y FACTOR:	1.017

AVERAGE CONC. CO2:	5.2 percent
AVERAGE CONC. O2:	14.9 percent
AVERAGE CONC. CO:	676 ppm
MOLECULAR WEIGHT:	29.43 g/g-mole-dry
MOLECULAR WEIGHT:	28.73 g/g-mole-wet

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
Point of	0.030	1436	Point of	0.030	1380
Avg. Vel.	0.030	1438	Avg. Vel.	0.030	1450

STACK TEMPERATURE:	1426.0 degrees F	1886.0 degrees R
AVERAGE VELOCITY HEAD:	0.030 inches H2O	
STACK GAS VELOCITY:		18.56 ft/sec
STACK GAS AIR FLOW:	115669.5 acf/min	29955.6 dscf/min

CLIENT NAME: SWEET EDWARDS/EMCON
SAMPLE LOCATION: CEDAR HILLS LANDFILL
#1 NORTH FLARE STACK
SAMPLE DATE: MARCH 1, 1990

TIME RUN 1	CARBON MONOXIDE ppm	OXYGEN %	CARBON DIOXIDE %	NITROGEN OXIDES ppm	TOTAL SULFUR ppm
831	173	12.9	7.7	9.4	0.2
832	125	12.7	7.9	10.1	0.3
833	126	12.8	7.8	10.2	0.2
834	141	12.8	7.8	10.2	0.2
835	115	12.8	7.7	10.2	0.2
836	174	13.2	7.5	9.9	0.1
837	185	13.1	7.4	9.8	0.2
838	140	13.0	7.6	9.9	0.1
839	77	12.8	8.0	10.2	0.1
840	41	12.6	8.0	10.6	0.1
841	46	12.5	8.2	11.0	0.2
842	52	12.5	8.1	11.1	0.1
843	51	12.4	8.2	11.1	0.2
844	44	12.2	8.5	11.2	0.1
845	73	12.7	8.2	11.2	0.2
846	34	12.3	8.4	11.3	0.2
847	47	12.1	8.4	11.6	0.2
848	70	12.2	8.6	11.6	0.2
849	58	12.1	8.7	11.6	0.3
850	62	11.9	8.8	11.7	0.4
851	58	11.9	8.8	11.9	0.4
852	59	11.8	8.5	12.0	0.4
853	72	11.8	8.1	12.3	0.4
854	85	11.9	8.1	12.0	0.4
855	93	12.0	7.9	11.9	0.3
856	82	12.0	8.1	11.7	0.3
857	58	11.9	8.2	11.9	0.3
858	52	12.1	7.8	11.9	0.2
859	90	12.4	7.7	11.5	0.2
900	95	12.3	7.9	11.2	0.2
901	51	11.9	8.3	11.4	0.3
902	41	11.9	8.2	11.8	0.2
903	59	12.1	7.9	11.7	0.2
904	47	12.2	8.0	11.6	0.2
905	48	12.3	8.0	11.6	0.2
906	41	12.0	8.1	11.7	0.3
907	60	12.2	8.1	11.7	0.2
908	32	12.1	8.2	11.7	0.2
909	63	12.3	7.8	11.7	0.2
910	68	12.6	8.2	11.3	0.3
911	50	12.2	8.2	11.4	0.2
912	47	12.3	8.0	11.5	0.2
913	62	12.5	7.8	11.3	0.3
914	43	12.4	7.9	11.0	0.3

915	45	12.2	8.2	11.2	0.3
916	34	12.1	8.3	11.6	0.4
917	28	12.0	8.3	11.8	0.4
918	39	11.9	8.8	11.8	0.4
919	21	11.7	8.9	12.1	0.3
920	30	11.6	9.1	12.3	0.4
921	35	11.6	9.0	12.5	0.4
922	37	11.5	9.0	12.4	0.4
923	31	11.4	9.0	12.6	0.3
924	63	12.0	8.4	12.5	0.3
925	35	11.7	8.9	12.1	0.3
926	21	11.4	9.2	12.6	0.2
927	20	11.1	9.2	13.0	0.2
928	46	11.5	8.7	13.0	0.2
929	56	12.0	8.4	12.4	0.2
930	53	12.1	8.0	12.0	0.2
931	43	12.0	8.3	11.6	0.1
932	29	12.0	8.4	11.6	0.2
933	26	11.8	8.6	12.0	0.1
934	26	11.9	8.3	12.2	0.2
935	23	12.1	8.3	11.9	0.2
936	34	12.1	8.3	11.8	0.2
937	88	12.5	8.2	11.5	0.2
938	42	11.9	8.6	11.4	0.2
939	55	11.9	8.2	11.8	0.2
940	85	12.0	8.4	11.7	0.2
941	45	11.8	8.6	11.8	0.2
942	21	11.6	8.8	12.1	0.2
943	14	11.5	8.8	12.5	0.2
944	35	12.0	8.4	12.5	0.3
945	41	11.9	8.6	12.1	0.3
946	40	11.8	8.4	12.2	0.3
947	41	11.9	8.6	12.0	0.3
948	48	12.2	8.3	12.0	0.4
949	38	11.8	8.3	12.0	0.4
950	72	12.2	8.4	11.6	0.4
951	93	12.2	8.4	11.5	0.5
952	59	11.8	8.7	11.8	0.6
953	60	11.9	8.3	12.1	0.6
954	89	12.2	8.1	11.7	0.8
955	88	12.5	8.2	11.3	0.8
956	61	12.0	8.5	11.4	0.8
957	65	11.9	8.8	11.7	0.8
958	47	11.7	8.9	12.3	1.0
959	51	11.5	9.0	12.6	1.1
1000	31	11.4	8.6	12.8	1.2
1001	44	11.5	8.4	12.9	1.3
1002	28	11.3	9.3	12.9	1.3
1003	25	11.3	9.2	13.2	1.3
1004	31	11.3	9.3	13.2	1.3
1005	24	11.3	9.2	13.1	1.3
1006	28	11.4	9.3	13.0	1.2
1007	16	11.4	9.3	13.1	1.2
1008	16	11.3	9.3	13.0	1.1
1009	13	11.4	9.3	12.9	1.1
1010	14	11.5	9.3	12.9	1.2

1011	13	11.3	9.3	12.9	1.1
1012	12	11.4	9.3	13.0	1.1
1013	15	11.5	9.2	12.9	1.1
1014	9	11.3	9.5	12.9	1.1
1015	12	11.3	9.5	13.1	1.3
1016	13	11.3	9.4	13.1	1.4
1017	13	11.3	9.4	13.2	1.4
1018	54	11.7	8.8	13.0	1.4
1019	113	12.1	8.3	12.1	1.3
1020	134	12.1	8.7	11.7	1.1
1021	120	12.1	8.6	11.6	1.1
1022	133	12.1	8.7	11.5	1.1
1023	145	12.2	8.5	11.5	1.1
1024	203	12.4	8.5	11.2	1.1
1025	176	12.3	8.5	11.1	1.2
1026	195	12.2	8.5	11.1	1.2
1027	186	12.2	8.5	11.1	1.3
1028	202	12.5	8.2	11.1	1.3
1029	252	12.9	7.8	10.7	1.3
1030	183	12.8	8.0	10.3	1.2
1031	198	12.9	8.1	10.2	1.2
AVG RUN 1	66	12.0	8.5	11.8	0.5
	CARBON MONOXIDE ppm	OXYGEN %	CARBON DIOXIDE %	NITROGEN OXIDES ppm	TOTAL SULFUR ppm

TIME RUN 2	CARBON MONOXIDE ppm	OXYGEN %	CARBON DIOXIDE %	NITROGEN OXIDES ppm	TOTAL SULFUR ppm
1100				11.3	0.8
1101				11.3	0.8
1102				10.9	0.7
1103				10.4	0.6
1104				10.2	0.6
1105				10.4	0.6
1106				10.6	0.6
1107				10.8	0.5
1108				10.9	0.5
1109	45	12.4	7.7	11.1	0.4
1110	46	12.0	8.3	11.2	0.3
1111	52	11.8	8.2	11.5	1.1
1112	72	12.1	7.8	11.8	2.0
1113	244	13.0	6.7	11.4	2.1
1114	315	13.3	6.7	9.8	1.9
1115	327	13.4	7.0	9.5	1.6
1116	218	13.0	7.4	9.9	1.5
1117	196	12.9	7.1	10.3	1.6
1118	328	13.3	6.8	9.9	1.6
1119	247	13.1	7.1	9.7	1.5
1120	111	12.5	7.8	10.4	1.7
1121	122	12.7	8.1	10.7	2.0
1122	112	12.4	7.5	11.2	2.1
1123	310	13.2	7.0	10.5	2.2
1124	190	12.9	7.4	10.2	2.1
1125	142	12.7	7.9	10.3	2.1
1126	181	12.6	7.4	10.8	2.3
1127	111	12.5	8.1	10.7	2.6
1128	40	12.0	8.5	11.4	2.8
1129	42	11.9	8.0	12.1	3.4
1130	321	13.2	6.7	11.5	3.6
1131	261	13.3	7.0	9.9	3.2
1132	330	13.4	6.7	9.5	2.7
1133	406	13.6	6.9	9.0	2.4
1134	149	12.6	7.8	9.6	2.4
1135	191	12.8	7.4	10.6	3.0
1136	94	12.5	8.0	10.7	3.4
1137	63	12.3	7.4	11.4	3.7
1138	100	12.5	8.0	10.9	3.7
1139	44	12.1	8.4	11.4	3.7
1140	48	12.0	8.3	11.8	4.0
1141	107	12.3	7.9	11.8	4.0
1142	73	12.0	7.6	11.8	4.1
1143	372	13.2	6.8	11.1	3.9
1144	117	12.6	8.0	10.4	3.6
1145	35	11.9	8.2	11.3	3.6
1146	261	12.9	6.8	11.7	4.1
1147	272	13.1	7.6	10.0	3.8
1148	68	12.1	7.8	10.8	3.6
1149	65	12.3	7.3	11.5	4.0
1150	73	12.4	8.0	11.2	4.0
1151	22	11.8	8.0	11.8	4.0
1152	150	12.5	6.9	12.0	4.4

1153	401	13.5	6.4	10.2	4.1
1154	476	13.8	6.7	9.0	3.4
1155	177	12.7	7.9	9.2	3.0
1156	54	12.2	8.2	10.9	3.4
1157	233	12.8	7.0	11.4	4.1
1158	413	13.8	6.8	9.8	3.9
1159	199	13.1	7.3	9.4	3.5
1200	117	12.7	7.8	10.1	3.3
1201	36	12.2	8.3	11.0	3.6
1202	19	11.9	8.4	11.8	4.1
1203	26	11.9	8.5	12.2	4.8
1204	24	11.8	8.4	12.4	5.0
1205	37	12.1	8.0	12.3	5.1
1206	162	12.8	7.3	11.5	4.8
1207	283	13.2	6.9	10.5	4.2
1208	524	13.9	6.6	9.2	3.6
1209	186	12.8	7.9	9.2	3.1
1210	78	12.4	8.0	10.7	3.3
1211	49	12.0	8.4	11.6	3.8
1212	213	12.8	7.5	11.8	4.3
1213	75	12.3	8.3	11.3	4.3
1214	35	11.8	8.5	12.1	4.3
1215	22	11.7	8.5	12.5	5.0
1216	34	12.1	8.1	12.4	5.1
1217	26	12.1	8.5	12.1	5.0
1218	23	11.9	8.5	12.4	5.0
1219	15	11.7	8.7	12.5	5.1
1220	19	11.6	8.7	12.8	5.2
1221	21	11.6	8.7	12.9	5.2
1222	14	11.6	8.8	12.8	5.3
1223	50	11.9	7.8	12.7	5.1
1224	279	13.2	7.1	11.3	4.8
1225	204	13.1	7.2	10.3	4.1
1226	167	12.9	7.7	10.3	3.6
1227	163	12.6	7.4	10.8	3.5
1228	203	13.1	7.4	10.4	3.7
1229	93	12.5	8.0	10.7	3.6
1230	83	12.3	7.5	11.4	4.0
1231	99	12.5	7.8	11.0	4.3
1232	91	12.6	8.1	11.2	4.4
1233	52	12.0	8.1	11.6	4.4
1234	75	12.4	7.8	11.6	4.5
1235	127	12.6	7.3	11.3	4.4
1236	238	13.3	7.4	10.4	4.1
1237	82	12.3	8.1	10.5	3.7
1238	54	12.3	7.6	11.3	4.1
1239	248	13.3	7.3	10.7	4.2
1240	231	13.2	7.1	10.1	3.8
1241	335	13.5	7.0	9.7	3.6
1242	275	13.3	7.3	9.4	3.4
1243	103	12.5	8.3	10.1	3.4
1244	58	12.2	8.3	11.3	4.1
1245	37	11.8	8.9	11.9	4.8
1246	23	11.9	8.5	12.6	5.2
1247	58	11.6	8.9	12.6	5.4
1248	42	11.7	8.8	12.8	5.7

1249	53	11.8	8.8	12.7	5.6
1250	57	11.8	8.7	12.7	5.5
1251	51	12.1	8.4	12.5	5.3
1252	85	12.5	7.7	12.3	5.0
1253	157	12.9	7.8	11.4	4.4
1254	205	13.1	7.5	10.9	4.0
1255	169	12.6	7.9	10.7	3.8
1256	194	12.8	7.4	10.8	3.9
1257	157	12.8	7.8	10.5	4.0
1258	106	12.6	8.1	10.8	4.0
1259	82	12.5	8.1	11.3	4.2
1300	63	12.1	8.2	11.7	4.4
AVG RUN 2	142	12.5	7.8	11.0	3.5
	CARBON MONOXIDE ppm	OXYGEN %	CARBON DIOXIDE %	NITROGEN OXIDES ppm	TOTAL SULFUR ppm

TIME RUN 3	CARBON MONOXIDE ppm	OXYGEN %	CARBON DIOXIDE %	NITROGEN OXIDES ppm	TOTAL SULFUR ppm
1337	164	12.7	8.1	10.1	4.1
1338	190	12.6	7.5	10.6	4.6
1339	146	12.7	7.9	10.3	4.4
1340	174	12.7	7.5	10.6	4.4
1341	147	12.7	7.7	10.4	4.2
1342	175	12.9	7.6	10.3	4.1
1343	189	12.9	7.7	10.1	4.1
1344	237	13.1	7.7	10.0	4.1
1345	174	12.9	7.7	10.0	4.1
1346	150	12.7	7.9	10.2	4.3
1347	102	12.7	7.7	10.5	4.4
1348	157	12.8	7.9	10.3	4.4
1349	106	12.5	7.7	10.6	4.5
1350	141	12.9	7.6	10.5	4.7
1351	108	12.8	7.7	10.4	4.7
1352	153	12.9	7.7	10.3	4.4
1353	125	12.8	7.8	10.3	4.2
1354	174	12.8	7.5	10.3	4.2
1355	212	13.2	7.4	10.0	4.1
1356	190	13.0	7.6	9.9	3.8
1357	225	13.0	7.7	10.0	4.0
1358	154	12.8	7.7	10.2	4.0
1359	193	12.8	7.9	10.2	4.1
1400	182	12.8	7.6	10.4	4.2
1401	140	12.8	7.6	10.4	4.3
1402	137	12.8	7.6	10.5	4.3
1403	225	13.1	7.5	10.0	4.3
1404	162	12.8	7.7	10.2	4.0
1405	204	12.8	7.8	10.3	4.1
1406	229	12.9	7.7	10.3	4.1
1407	238	13.1	7.3	10.2	4.0
1408	324	13.2	7.6	9.8	3.8
1409	293	13.2	7.2	9.8	3.8
1410	217	13.2	7.3	9.5	3.7
1411	235	13.2	7.6	9.4	3.7
1412	268	13.2	7.4	9.8	3.6
1413	68	12.3	8.0	10.4	3.8
1414	69	12.6	7.8	11.0	4.4
1415	117	12.6	7.8	10.8	4.4
1416	172	13.0	7.8	10.6	4.5
1417	161	12.7	7.4	10.9	4.4
1418	266	13.2	7.9	10.0	4.2
1419	152	13.0	7.7	10.4	4.2
1420	130	12.9	8.1	10.5	4.0
1421	203	13.1	7.5	10.8	4.2
1422	178	13.1	7.7	10.3	4.0
1423	161	12.8	7.2	10.5	4.0
1424	255	13.4	7.2	9.7	4.0
1425	269	13.4	7.1	9.6	3.7
1426	214	12.9	7.3	10.1	3.8
1427	347	13.5	7.0	9.7	3.8
1428	305	13.4	7.5	9.3	3.7
1429	322	13.2	7.3	9.8	3.7

1430	321	13.1	7.5	9.8	3.8
1431	190	12.8	7.6	10.0	3.8
1432	175	12.9	7.6	10.3	4.0
1433	186	12.8	7.5	10.5	4.2
1434	146	12.9	7.4	10.3	4.3
1435	159	13.0	7.6	10.2	4.1
1436	162	12.9	7.5	10.4	4.0
1437	160	12.7	7.6	10.4	4.2
1438	104	12.5	8.0	10.5	4.1
1439	93	12.8	7.7	10.7	4.4
1440	112	12.6	7.9	10.6	4.2
1441	144	12.8	7.7	10.6	4.4
1442	168	12.9	7.7	10.4	4.3
1443	274	13.0	7.2	10.4	4.0
1444	151	12.7	8.1	9.9	4.0
1445	212	13.0	7.4	10.3	4.2
1446	334	13.5	7.3	9.7	4.1
1447	306	13.1	7.6	9.7	3.7
1448	196	12.9	7.6	10.0	3.9
1449	217	12.9	7.2	10.4	4.1
1450	310	13.2	7.3	10.2	4.1
1451	202	13.0	7.5	10.0	3.9
1452	96	12.6	7.7	10.5	4.0
1453	158	12.6	7.8	10.8	4.5
1454	123	12.7	7.9	10.8	4.5
1455	318	13.2	7.3	10.5	4.5
1456	162	12.8	7.9	10.2	4.2
1457	158	12.9	7.4	10.4	4.1
1458	161	13.0	7.6	10.2	4.0
1459	147	12.9	7.9	10.0	3.9
1500	181	12.8	7.7	10.4	4.0
1501	183	12.9	7.7	10.2	4.1
1502	178	12.6	8.0	10.3	4.0
1503	199	12.9	7.6	10.5	4.3
1504	192	13.0	7.6	10.2	4.1
1505	205	12.9	7.7	10.1	4.1
1506	162	13.0	7.4	10.1	4.0
1507	164	13.0	7.5	10.0	4.0
1508	177	12.9	7.8	10.1	4.0
1509	180	12.9	7.6	10.5	4.2
1510	153	12.9	7.7	10.3	4.3
1511	133	12.8	8.1	10.3	4.1
1512	185	12.8	7.9	10.5	4.3
1513	184	12.7	7.4	10.7	4.3
1514	197	12.9	7.5	10.2	4.2
1515	130	12.8	7.7	10.1	4.0
1516	243	13.0	7.2	10.4	4.1
1517	174	12.8	7.8	10.1	4.0
1518	199	13.1	7.3	10.4	4.1
1519	244	13.1	7.3	10.1	4.0
1520	200	12.8	7.7	10.1	3.8
1521	146	13.0	7.5	10.2	3.9
1522	124	12.8	7.8	10.3	3.9
1523	185	12.9	7.7	10.5	4.1
1524	147	12.7	7.7	10.4	4.1
1525	167	12.7	7.6	10.6	4.1
1526	143	12.5	7.7	10.8	4.4

1527	173	12.8	7.8	10.7	4.4
1528	159	12.8	7.5	10.4	4.4
1529	176	12.8	7.9	10.4	4.2
1530	134	12.8	7.6	10.6	4.2
1531	181	13.0	7.8	10.3	4.1
1532	208	13.0	7.6	10.3	4.1
1533	321	13.5	7.2	10.1	4.0
1534	359	13.4	7.1	9.6	3.8
1535	311	13.3	7.2	9.3	3.7
1536	270	13.3	7.2	9.6	3.8
1537	237	13.3	7.3	9.6	3.8
AVG RUN 3	190	12.9	7.6	10.2	4.1
	CARBON MONOXIDE ppm	OXYGEN %	CARBON DIOXIDE %	NITROGEN OXIDES ppm	TOTAL SULFUR ppm

CLIENT NAME: SWEET EDWARDS/EMCON
SAMPLE LOCATION: CEDAR HILLS LANDFILL
#2 NORTH FLARE STACK
SAMPLE DATE: MARCH 2, 1990

TIME RUN 1	CARBON MONOXIDE ppm	OXYGEN %	CARBON DIOXIDE %	NITROGEN OXIDES ppm	TOTAL SULFUR ppm
829				9.4	1.0
830	786	15.1	4.2	9.9	1.0
831	749	15.0	4.3	10.3	0.7
832	792	15.0	4.3	9.4	0.7
833	873	15.2	4.3	8.9	0.7
834	786	15.0	4.4	9.2	0.9
835	775	14.9	4.5	9.5	1.0
836	708	14.8	4.5	9.7	1.2
837	676	14.9	4.5	10.1	1.2
838	729	14.9	4.5	10.0	1.2
839	690	14.9	4.5	10.0	1.2
840	720	14.9	4.5	10.0	1.2
841	724	14.9	4.4	9.9	1.2
842	695	14.9	4.5	9.7	1.1
843	675	14.8	4.5	9.8	1.2
844	771	14.9	4.3	9.9	1.1
845	693	14.8	4.4	9.9	1.2
846	708	14.8	4.4	9.8	1.1
847	704	14.8	4.4	9.7	1.1
848	657	14.7	4.4	9.8	1.1
849	684	14.7	4.3	10.1	1.1
850	704	14.8	4.3	10.1	1.1
851	733	14.9	4.3	9.8	1.1
852	732	14.8	4.4	9.6	1.1
853	578	14.3	4.7	10.2	1.1
854	655	14.6	4.5	10.9	1.1
855	663	14.5	4.5	11.0	1.1
856	647	14.6	4.5	11.2	1.1
857	611	14.5	4.4	11.2	1.0
858	665	14.7	4.3	11.0	1.0
859	669	14.6	4.4	10.7	1.0
900	666	14.6	4.3	10.7	0.9
901	706	14.8	4.1	10.4	0.9
902	692	14.9	4.1	10.2	0.8
903	667	14.8	4.2	10.3	0.8
904	652	14.8	4.2	10.3	0.8
905	661	14.7	4.1	10.4	0.8
906	707	14.9	4.1	10.1	0.8
907	715	14.8	4.1	10.0	0.9
908	726	14.9	4.1	9.8	0.8
909	768	15.0	4.1	9.7	0.8
910	713	14.8	4.1	9.8	0.7
911	673	14.8	4.1	10.1	0.8
912	638	14.9	4.1	10.3	0.8

913	592	14.7	4.4	10.5	0.7
914	644	14.7	4.2	10.7	0.8
915	724	14.9	4.2	10.5	0.7
916	719	14.9	4.1	10.3	0.8
917	598	14.8	4.2	10.2	0.7
918	601	14.8	4.3	10.4	0.7
919	644	14.8	4.1	10.4	0.8
920	793	15.0	4.1	10.1	0.7
921	632	14.8	4.2	10.1	0.7
922	628	14.8	4.2	10.2	0.7
923	677	14.8	4.1	10.3	0.7
924	782	15.0	4.0	10.1	0.7
925	677	14.8	4.2	9.9	0.7
926	586	14.8	4.3	10.1	0.7
927	548	14.7	4.3	10.5	0.7
928	554	14.7	4.2	10.7	0.6
929	660	14.9	4.2	10.3	0.7
930	676	14.9	4.3	10.1	0.7
931	629	14.8	4.2	10.2	0.6
932	608	14.8	4.2	10.2	0.6
933	668	14.9	4.2	10.2	0.6
934	639	14.8	4.2	10.1	0.6
935	622	14.8	4.1	10.2	0.6
936	631	14.9	4.3	10.0	0.6
937	550	14.7	4.3	10.4	0.6
938	550	14.7	4.3	10.5	0.6
939	543	14.7	4.4	10.6	0.6
940	530	14.6	4.4	10.7	0.6
941	516	14.7	4.3	10.6	0.6
942	548	14.6	4.4	10.5	0.6
943	540	14.6	4.4	10.6	0.5
944	582	14.6	4.4	10.8	0.6
945	523	14.5	4.5	10.8	0.5
946	468	14.1	5.0	11.1	0.6
947	381	13.7	5.2	12.2	0.6
948	480	14.2	4.7	12.6	0.7
949	530	14.6	4.4	11.7	0.6
950	601	14.7	4.2	11.1	0.6
951	617	14.8	4.4	10.7	0.5
952	598	14.7	4.5	10.6	0.5
953	627	14.7	4.4	10.4	0.5
954	587	14.8	4.4	10.2	0.5
955	578	14.7	4.4	10.3	0.5
956	609	14.8	4.3	10.4	0.5
957	566	14.8	4.5	10.5	0.4
958	588	14.8	4.3	10.7	0.5
959	592	14.8	4.4	10.5	0.5
1000	515	14.4	4.9	10.5	0.5
1001	393	13.8	5.2	11.5	0.5
1002	374	13.5	5.4	12.6	0.6
1003	357	13.5	5.5	12.9	0.6
1004	444	14.1	4.9	12.7	0.7
1005	499	14.3	4.7	11.8	0.7
1006	570	14.7	4.4	10.9	0.6
1007	585	14.8	4.3	10.4	0.5
1008	512	14.6	4.6	10.3	0.5

1009	584	14.7	4.3	10.5	0.5
1010	566	14.8	4.4	10.3	0.5
AVG RUN 1	632	14.7	4.4	10.4	0.8
	CARBON MONOXIDE ppm	OXYGEN %	CARBON DIOXIDE %	NITROGEN OXIDES ppm	TOTAL SULFUR ppm

TIME RUN 2	CARBON MONOXIDE ppm	OXYGEN %	CARBON DIOXIDE %	NITROGEN OXIDES ppm	TOTAL SULFUR ppm
1025	542	14.8	4.5	10.6	0.4
1026	458	14.6	4.8	10.7	0.5
1027	476	14.6	4.6	11.1	0.5
1028	478	14.7	4.7	10.9	0.5
1029	468	14.6	4.7	10.9	0.5
1030	528	14.8	4.5	10.8	0.5
1031	474	14.8	4.6	10.4	0.5
1032	446	14.6	4.9	10.5	0.5
1033	368	14.0	5.4	11.4	0.4
1034	390	14.0	5.3	12.5	0.5
1035	411	14.0	5.6	12.3	0.5
1036	375	13.8	5.4	12.7	0.6
1037	359	13.8	5.5	12.7	0.6
1038	385	13.9	5.5	13.0	0.6
1039	416	13.9	5.2	13.3	0.6
1040	415	14.1	5.2	12.7	0.6
1041	427	14.1	5.2	12.6	0.6
1042	449	14.1	5.3	12.4	0.5
1043	488	14.3	5.0	12.0	0.6
1044	379	14.0	5.4	12.0	0.6
1045	397	14.1	5.1	12.4	0.6
1046	522	14.7	4.7	11.6	0.6
1047	534	14.8	4.7	10.9	0.5
1048	547	14.8	4.6	10.7	0.5
1049	546	14.8	4.7	10.4	0.4
1050	532	14.8	4.7	10.5	0.4
1051	630	14.9	4.6	10.4	0.4
1052	715	15.0	4.4	10.2	0.4
1053	760	15.0	4.5	9.8	0.4
1054	697	15.0	4.4	9.8	0.4
1055	676	15.0	4.6	9.7	0.4
1056	540	14.8	4.6	10.0	0.5
1057	692	15.0	4.5	10.0	0.4
1058	525	14.9	4.6	10.0	0.4
1059	506	14.7	4.7	10.4	0.4
1100	488	14.8	4.6	10.6	0.4
1101	435	14.8	4.8	10.8	0.4
1102	404	14.6	4.8	11.1	0.5
1103	437	14.7	4.7	11.3	0.5
1104	444	14.7	4.7	11.1	0.5
1105	538	14.8	4.6	10.8	0.5
1106	633	15.0	4.6	10.4	0.4
1107	650	14.9	4.6	10.1	0.4
1108	703	15.0	4.5	9.9	0.4
1109	768	15.0	4.4	9.7	0.4
1110	811	15.1	4.4	9.4	0.4
1111	848	15.2	4.3	9.3	0.4
1112	808	15.1	4.3	9.2	0.4
1113	836	15.2	4.3	9.0	0.3
1114	752	15.1	4.4	9.3	0.4
1115	734	15.1	4.4	9.5	0.4
1116	782	15.1	4.4	9.5	0.4
1117	788	15.1	4.5	9.6	0.4

1118	770	15.1	4.4	9.5	0.4
1119	757	15.0	4.5	9.6	0.4
1120	748	15.0	4.5	9.7	0.4
1121	675	15.1	4.6	9.7	0.4
1122	610	15.0	4.5	9.9	0.4
1123	596	15.0	4.5	10.0	0.4
1124	616	15.0	4.5	10.1	0.4
1125	585	14.9	4.6	10.3	0.4
1126	625	15.0	4.6	10.4	0.5
1127	620	15.0	4.5	10.2	0.4
1128	606	15.0	4.6	10.1	0.5
1129	560	14.9	4.6	10.3	0.4
1130	592	15.0	4.6	10.2	0.4
1131	641	15.0	4.5	10.2	0.4
1132	617	15.0	4.6	10.0	0.4
1133	594	14.9	4.6	10.0	0.4
1134	576	15.0	4.6	10.1	0.5
1135	528	14.9	4.6	10.3	0.4
1136	572	14.9	4.5	10.2	0.5
1137	640	15.0	4.6	10.0	0.5
1138	554	14.9	4.7	10.1	0.5
1139	608	15.0	4.5	10.2	0.5
1140	588	15.0	4.6	10.1	0.5
1141	535	14.9	4.6	10.3	0.5
1142	548	15.0	4.5	10.4	0.5
1143	653	15.1	4.6	10.3	0.5
1144	575	14.9	4.6	10.1	0.6
1145	597	14.7	4.8	10.1	0.5
1146	702	14.8	4.6	10.1	0.5
1147	608	14.9	4.6	9.9	0.6
1148	645	14.9	4.5	10.0	0.6
1149	801	15.1	4.3	9.9	0.6
1150	900	15.3	4.3	9.4	0.5
1151	869	15.2	4.3	9.2	0.5
1152	765	15.2	4.4	9.2	0.5
1153	580	15.0	4.6	9.6	0.6
1154	749	15.2	4.3	9.7	0.5
1155	725	15.1	4.4	9.5	0.6
1156	725	15.1	4.4	9.5	0.5
1157	603	15.0	4.6	9.9	0.5
1158	653	15.0	4.5	10.1	0.5
1159	762	15.1	4.4	9.8	0.5
1200	839	15.1	4.4	9.5	0.4
1201	836	15.1	4.3	9.1	0.5
1202	747	15.2	4.4	8.9	0.4
1203	545	14.9	4.7	9.4	0.5
1204	491	14.7	4.7	10.2	0.5
1205	465	14.7	4.7	10.7	0.6
1206	421	14.5	5.0	11.0	0.6
1207	494	14.6	4.8	11.3	0.6
1208	669	14.8	4.5	10.7	0.5
1209	867	15.2	4.2	9.8	0.5
1210	929	15.3	4.2	9.1	0.5
1211	866	15.2	4.4	9.0	0.4
1212	779	15.1	4.4	9.3	0.4
1213	754	15.1	4.5	9.4	0.5

1214	630	15.0	4.6	9.6	0.5
1215	677	15.1	4.5	9.7	0.5
1216	513	14.9	4.6	9.9	0.4
1217	468	14.8	4.8	10.3	0.5
1218	470	14.8	4.7	10.5	0.5
1219	508	14.8	4.8	10.4	0.5
1220	434	14.6	4.8	10.7	0.5
1221	646	14.9	4.5	10.6	0.5
1222	798	15.2	4.3	9.9	0.5
1223	792	15.2	4.4	9.3	0.5
1224	883	15.2	4.4	9.2	0.5
1225	763	15.1	4.6	9.1	0.5
AVG RUN 2	611	14.8	4.6	10.3	0.5
	CARBON MONOXIDE ppm	OXYGEN %	CARBON DIOXIDE %	NITROGEN OXIDES ppm	TOTAL SULFUR ppm

TIME RUN 3	CARBON MONOXIDE ppm	OXYGEN %	CARBON DIOXIDE %	NITROGEN OXIDES ppm	TOTAL SULFUR ppm
1244				10.4	0.3
1245	489	15.2	5.0	10.4	0.3
1246	522	15.2	5.2	10.1	0.2
1247	522	14.9	5.2	9.8	0.2
1248	466	14.9	5.3	9.6	0.4
1249	561	15.0	5.2	9.6	0.5
1250	512	14.8	5.4	9.5	0.6
1251	607	15.0	5.3	9.7	0.6
1252	517	14.8	5.3	10.1	0.6
1253	611	14.9	5.2	10.3	0.6
1254	679	15.0	5.3	10.1	0.7
1255	554	14.9	5.4	10.2	0.7
1256	614	15.0	5.2	10.4	0.7
1257	670	15.0	5.1	10.2	0.6
1258	638	15.0	5.2	10.0	0.7
1259	608	15.0	5.2	10.0	0.7
1300	495	14.9	5.3	10.1	0.6
1301	581	15.0	5.2	10.3	0.6
1302	581	14.9	5.3	10.1	0.7
1303	522	14.9	5.3	10.3	0.7
1304	481	14.9	5.3	10.6	0.7
1305	617	15.0	5.1	10.4	0.7
1306	735	15.0	5.1	10.1	0.7
1307	774	15.0	5.2	9.8	0.6
1308	905	15.1	5.0	9.8	0.7
1309	890	15.1	5.1	9.5	0.7
1310	780	15.1	5.0	9.5	0.6
1311	793	15.0	5.1	9.7	0.7
1312	906	15.1	5.0	9.6	0.7
1313	876	15.2	4.9	9.4	0.7
1314	886	15.4	4.8	9.4	0.6
1315	851	15.3	4.9	9.2	0.7
1316	848	15.2	4.9	9.2	0.6
1317	948	15.4	5.0	9.1	0.6
1318	735	15.0	5.0	9.6	0.6
1319	847	15.3	5.1	9.7	0.6
1320	859	15.2	5.0	9.8	0.7
1321	856	15.1	5.0	9.7	0.7
1322	818	15.2	5.1	9.6	0.6
1323	835	15.2	4.9	9.6	0.6
1324	896	15.4	4.7	9.4	0.7
1325	921	15.5	4.7	8.9	0.6
1326	946	15.5	4.7	8.7	0.6
1327	919	15.5	4.8	8.7	0.5
1328	947	15.5	4.7	8.7	0.5
1329	974	15.4	4.8	8.8	0.5
1330	989	15.4	4.8	8.8	0.5
1331	958	15.4	4.8	8.9	0.6
1332	900	15.2	5.0	9.0	0.5
1333	867	15.2	4.9	9.3	0.5
1334	801	15.2	4.9	9.4	0.6
1335	727	14.9	5.2	9.7	0.6
1336	718	15.1	5.1	10.0	0.6

1337	662	15.1	5.0	10.0	0.7
1338	744	15.0	5.0	10.1	0.7
1339	808	15.0	5.0	9.9	0.7
1340	728	15.2	5.1	9.8	0.7
1341	603	15.0	5.2	10.0	0.6
1342	560	15.0	5.2	10.3	0.7
1343	784	15.3	4.8	10.1	0.7
1344	835	15.4	4.9	9.4	0.7
1345	791	15.3	4.9	9.1	0.7
1346	775	15.3	5.0	9.1	0.6
1347	793	15.2	4.9	9.3	0.6
1348	771	15.2	5.0	9.3	0.6
1349	704	15.2	5.0	9.4	0.6
1350	803	15.3	4.9	9.4	0.6
1351	795	15.3	4.9	9.1	0.6
1352	718	15.2	4.9	9.3	0.6
1353	634	15.1	5.1	9.6	0.5
1354	537	15.0	5.3	10.2	0.6
1355	529	14.9	5.3	10.7	0.6
1356	545	15.0	5.3	10.7	0.7
1357	577	15.0	5.3	10.6	0.8
1358	572	15.0	5.2	10.5	0.8
1359	539	14.7	5.5	10.7	0.8
1400	508	14.5	5.6	10.8	0.8
1401	659	14.7	5.3	10.9	0.8
1402	779	15.0	5.1	10.7	0.8
1403	847	15.1	5.1	10.2	0.8
1404	881	15.2	5.0	9.8	0.7
1405	818	15.1	5.2	9.6	0.6
1406	605	14.6	5.6	10.1	0.5
1407	482	14.1	6.2	11.3	0.5
1408	544	14.2	5.7	12.5	0.5
1409	740	14.9	5.3	11.2	0.4
1410	848	15.2	4.9	9.9	0.4
1411	909	15.3	4.9	8.9	0.3
1412	736	15.1	5.2	9.0	0.3
1413	525	14.4	5.9	9.8	0.2
1414	417	14.2	5.9	11.5	0.3
1415	403	14.2	5.9	11.9	0.3
1416	490	14.2	5.8	12.0	0.4
1417	550	14.4	5.6	12.0	0.4
1418	654	14.7	5.4	11.5	0.4
1419	497	14.0	5.9	11.6	0.4
1420	529	14.3	5.8	12.3	0.4
1421	403	14.1	5.9	12.1	0.4
1422	433	14.4	5.8	12.2	0.4
1423	453	14.1	5.6	12.2	0.5
1424	676	14.8	5.3	11.3	0.4
1425	867	15.2	4.9	10.3	0.5
1426	829	15.2	5.2	9.4	0.3
1427	901	15.0	5.0	9.6	0.4
1428	782	15.0	5.2	9.6	0.3
1429	765	14.8	5.5	9.9	0.3
1430	558	14.5	5.7	10.7	0.3
1431	377	14.0	6.2	11.5	0.4
1432	398	14.2	5.8	12.7	0.4

1406	605	14.6	5.6	10.1	0.5
1407	482	14.1	6.2	11.3	0.5
1408	544	14.2	5.7	12.5	0.5
1409	740	14.9	5.3	11.2	0.4
1410	848	15.2	4.9	9.9	0.4
1411	909	15.3	4.9	8.9	0.3
1412	736	15.1	5.2	9.0	0.3
1413	525	14.4	5.9	9.8	0.2
1414	417	14.2	5.9	11.5	0.3
1415	403	14.2	5.9	11.9	0.3
1416	490	14.2	5.8	12.0	0.4
1417	550	14.4	5.6	12.0	0.4
1418	654	14.7	5.4	11.5	0.4
1419	497	14.0	5.9	11.6	0.4
1420	529	14.3	5.8	12.3	0.4
1421	403	14.1	5.9	12.1	0.4
1422	433	14.4	5.8	12.2	0.4
1423	453	14.1	5.6	12.2	0.5
1424	676	14.8	5.3	11.3	0.4
1425	867	15.2	4.9	10.3	0.5
1426	829	15.2	5.2	9.4	0.3
1427	901	15.0	5.0	9.6	0.4
1428	782	15.0	5.2	9.6	0.3
1429	765	14.8	5.5	9.9	0.3
1430	558	14.5	5.7	10.7	0.3
1431	377	14.0	6.2	11.5	0.4
1432	398	14.2	5.8	12.7	0.4
1433	396	14.2	5.9	12.3	0.5
1434	397	14.5	5.8	11.9	0.5
1435	390	14.5	5.9	11.8	0.6
1436	442	14.2	5.7	12.0	0.7
1437	581	14.4	5.9	12.2	0.6
1438	647	14.5	5.5	12.1	0.8
1439	549	14.4	5.7	11.4	0.7
1440	478	14.6	5.4	11.4	0.7
1441	499	14.8	5.3	11.1	0.7
1442	498	14.9	5.3	10.6	0.8
1443	546	14.8	5.3	10.7	0.9
1444	492	14.7	5.4	10.8	1.0
AVG RUN 3	676	14.9	5.2	10.2	0.6
	CARBON MONOXIDE ppm	OXYGEN %	CARBON DIOXIDE %	NITROGEN OXIDES ppm	TOTAL SULFUR ppm

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
ANALYZED BY GC/MS - EPA METHOD 8240
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 15\CH#1IN1
CLIENT: Sweet-Edwards/EMCON
LOCATION: Cedar Hills Landfill
SAMPLE LOCATION: Inlet to Flare #1 (PNL 101)
SAMPLE DATE: March 1, 1990
SAMPLE TIMES: 09:39-11:00
LAB NUMBER(S): G-0849-1
AIRFLOW: 3042.2 dscf/min

ANALYTE	Inlet Run 1 mg/min	Blank mg/min	DL Run 1 mg/min
Acetone	1206	< DL	44.2
Benzene	706	< DL	5.9
Bromodichloromethane	< DL	< DL	12.3
Bromomethane	< DL	< DL	14.4
Bromoform	< DL	< DL	19.1
2-Butanone (MEK)	2068	< DL	5.6
Carbon Disulfide	121	< DL	59.4
Carbon Tetrachloride	< DL	< DL	57.4
Chlorobenzene	78	< DL	8.6
Chloroethane	64	< DL	4.9
2-Chloroethylvinyl Ether	< DL	< DL	8.2
Chloroform	17	< DL	9.1
Chloromethane	45	< DL	3.9
Dibromochloromethane	< DL	< DL	15.7
1,2-Dibromoethane (EDB)	< DL	< DL	NA
1,1-Dichloroethane	2068	< DL	7.5
1,2-Dichloroethane	164	< DL	7.5
1,1-Dichloroethene	190	< DL	7.5
c-1,2-Dichloroethene	1723	< DL	7.5
t-1,2-Dichloroethene	121	< DL	7.5
Dichloromethane	18955	< DL	66.3
1,2-Dichloropropane	< DL	< DL	8.6
cis-1,3-Dichloropropene	< DL	< DL	8.6
trans-1,3-Dichloropropene	< DL	< DL	8.6
Ethylbenzene	6376	< DL	8.2
Trichlorofluoromethane	948	< DL	NA
1,1,2-Trichlorotrifluoroethane	103	< DL	NA
2-Hexanone	< DL	< DL	7.8
4-Methyl-2-Pentanone (MIBK)	3015	< DL	7.8
Styrene	5083	< DL	7.8
1,1,2,2-Tetrachloroethane	< DL	< DL	66.3
Tetrachloroethene (PCE)	7151	< DL	24.6
Toluene	12924	< DL	14.4
1,1,1-Trichloroethane (TCA)	526	< DL	10.1
1,1,2-Trichloroethane	< DL	< DL	10.1
Trichloroethene (TCE)	2671	< DL	10.1
Vinyl Acetate	< DL	< DL	6.6
Vinyl Chloride	1292	< DL	9.6
Xylenes	33601	< DL	16.4

< DL designates that the compound was not detected, or was found at levels below the method detection limit.

mg/min = milligrams of analyte emitted per minute

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
ANALYZED BY GC/MS - EPA METHOD 8240
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 15\CH#1IN2
CLIENT: Sweet-Edwards/EMCON
LOCATION: Cedar Hills Landfill
SAMPLE LOCATION: Inlet to Flare #1 (PNL 101)
SAMPLE DATE: March 1, 1990
SAMPLE TIMES: 11:00-13:00
LAB NUMBER(S): G-08949-2
AIRFLOW: 3033.2 dscf/min

ANALYTE	Inlet Run 2 mg/min	Blank mg/min	DL Run 2 mg/min
Acetone	945	< DL	44.1
Benzene	739	< DL	5.9
Bromodichloromethane	< DL	< DL	12.3
Bromomethane	< DL	< DL	14.3
Bromoform	< DL	< DL	19.1
2-Butanone (MEK)	1117	< DL	5.5
Carbon Disulfide	13744	< DL	59.2
Carbon Tetrachloride	21	< DL	57.3
Chlorobenzene	77	< DL	8.6
Chloroethane	51	< DL	4.9
2-Chloroethylvinyl Ether	< DL	< DL	8.2
Chloroform	13	< DL	9.0
Chloromethane	61	< DL	3.9
Dibromochloromethane	< DL	< DL	15.6
1,2-Dibromoethane (EDB)	< DL	< DL	NA
1,1-Dichloroethane	2062	< DL	7.5
1,2-Dichloroethane	120	< DL	7.5
1,1-Dichloroethene	70	< DL	7.5
c-1,2-Dichloroethene	1632	< DL	7.5
t-1,2-Dichloroethene	120	< DL	7.5
Dichloromethane	16321	< DL	66.1
1,2-Dichloropropane	< DL	< DL	8.6
cis-1,3-Dichloropropene	< DL	< DL	8.6
trans-1,3-Dichloropropene	< DL	< DL	8.6
Ethylbenzene	3264	< DL	8.2
Trichlorofluoromethane	636	< DL	NA
1,1,2-Trichlorotrifluoroethane	94	< DL	NA
2-Hexanone	< DL	< DL	7.8
4-Methyl-2-Pentanone (MIBK)	2577	< DL	7.8
Styrene	7388	< DL	7.8
1,1,2,2-Tetrachloroethane	< DL	< DL	66.1
Tetrachloroethene (PCE)	6958	< DL	24.5
Toluene	10308	< DL	14.3
1,1,1-Trichloroethane (TCA)	387	< DL	10.1
1,1,2-Trichloroethane	< DL	< DL	10.1
Trichloroethene (TCE)	2749	< DL	10.1
Vinyl Acetate	< DL	< DL	6.6
Vinyl Chloride	945	< DL	9.5
Xylenes	28348	< DL	16.4

< DL designates that the compound was not detected, or was found at levels below the method detection limit.

mg/min = milligrams of analyte emitted per minute

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
ANALYZED BY GC/MS - EPA METHOD 8240
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 15\CH#1IN3
CLIENT: Sweet-Edwards/EMCON
LOCATION: Cedar Hills Landfill
SAMPLE LOCATION: Inlet to Flare #1 (PNL 101)
SAMPLE DATE: March 1, 1990
SAMPLE TIMES: 13:35-15:35
LAB NUMBER(S): G-0849-3
AIRFLOW: 3080.2 dscf/min

ANALYTE	Inlet Run 3 mg/min	Blank mg/min	DL Run 3 mg/min
Acetone	8549	< DL	44.7
Benzene	698	< DL	6.0
Bromodichloromethane	< DL	< DL	12.5
Bromomethane	< DL	< DL	14.5
Bromoform	< DL	< DL	19.4
2-Butanone (MEK)	1745	< DL	5.6
Carbon Disulfide	12213	< DL	60.2
Carbon Tetrachloride	< DL	< DL	58.2
Chlorobenzene	72	< DL	8.7
Chloroethane	60	< DL	5.0
2-Chloroethylvinyl Ether	< DL	< DL	8.3
Chloroform	< DL	< DL	9.2
Chloromethane	21	< DL	4.0
Dibromochloromethane	< DL	< DL	15.9
1,2-Dibromoethane (EDB)	< DL	< DL	---
1,1-Dichloroethane	2094	< DL	7.6
1,2-Dichloroethane	140	< DL	7.6
1,1-Dichloroethene	183	< DL	7.6
c-1,2-Dichloroethene	1570	< DL	7.6
t-1,2-Dichloroethene	113	< DL	7.6
Dichloromethane	16574	< DL	67.1
1,2-Dichloropropane	< DL	< DL	8.7
cis-1,3-Dichloropropene	< DL	< DL	8.7
trans-1,3-Dichloropropene	< DL	< DL	8.7
Ethylbenzene	4711	< DL	8.3
Trichlorofluoromethane	654	< DL	---
1,1,2-Trichlorotrifluoroethane	96	< DL	---
2-Hexanone	< DL	< DL	7.9
4-Methyl-2-Pentanone (MIBK)	2530	< DL	7.9
Styrene	4100	< DL	7.9
1,1,2,2-Tetrachloroethane	< DL	< DL	67.1
Tetrachloroethene (PCE)	5408	< DL	24.9
Toluene	13957	< DL	14.5
1,1,1-Trichloroethane (TCA)	445	< DL	10.3
1,1,2-Trichloroethane	< DL	< DL	10.3
Trichloroethene (TCE)	2530	< DL	10.3
Vinyl Acetate	< DL	< DL	6.7
Vinyl Chloride	785	< DL	9.7
Xylenes	23553	< DL	16.6

< DL designates that the compound was not detected, or was found at levels below the method detection limit.

mg/min = milligrams of analyte emitted per minute

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
ANALYZED BY GC/MS - EPA METHOD 8240
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 15\CH#1OUT1
CLIENT: Sweet-Edwards/EMCON
LOCATION: Cedar Hills Landfill
SAMPLE LOCATION: Outlet of Flare #1 (PNL 101)
SAMPLE DATE: March 1, 1990
SAMPLE TIMES: 08:31-10:31
LAB NUMBER(S): G-0850-1
AIRFLOW: 34456.8 dscf/min

ANALYTE	Outlet Run 1 mg/min	Blank mg/min	DL Run 1 mg/min
Acetone	< DL	< DL	50.0
Benzene	20.5	< DL	6.7
Bromodichloromethane	< DL	< DL	13.9
Bromomethane	< DL	< DL	20.3
Bromoform	< DL	< DL	21.7
2-Butanone (MEK)	< DL	< DL	6.3
Carbon Disulfide	< DL	< DL	16.8
Carbon Tetrachloride	< DL	< DL	65.1
Chlorobenzene	< DL	< DL	9.8
Chloroethane	< DL	< DL	5.6
2-Chloroethylvinyl Ether	< DL	< DL	92.9
Chloroform	< DL	< DL	10.3
Chloromethane	< DL	< DL	4.4
Dibromochloromethane	< DL	< DL	17.7
1,1-Dichloroethane	< DL	< DL	8.5
1,2-Dichloroethane	< DL	< DL	8.5
1,1-Dichloroethene	< DL	< DL	8.5
c-1,2-Dichloroethene	< DL	< DL	8.5
t-1,2-Dichloroethene	< DL	< DL	8.5
Dichloromethane	< DL	< DL	7.5
1,2-Dichloropropane	< DL	< DL	9.8
cis-1,3-Dichloropropene	< DL	< DL	9.8
trans-1,3-Dichloropropene	< DL	< DL	9.8
Ethylbenzene	< DL	< DL	9.3
2-Hexanone	< DL	< DL	8.9
4-Methyl-2-Pentanone (MIBK)	< DL	< DL	8.9
Styrene	< DL	< DL	22.2
1,1,2,2-Tetrachloroethane	< DL	< DL	75.1
Tetrachloroethene (PCE)	156.1	< DL	34.9
Toluene	< DL	< DL	8.1
1,1,1-Trichloroethane (TCA)	< DL	< DL	11.5
1,1,2-Trichloroethane	< DL	< DL	11.5
Trichloroethene (TCE)	< DL	< DL	11.5
Vinyl Acetate	< DL	< DL	75.1
Vinyl Chloride	< DL	< DL	27.1
Xylenes	< DL	< DL	9.3

< DL designates that the compound was not detected, or was found at levels below the method detection limit.

mg/min = milligrams of analyte emitted per minute

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
ANALYZED BY GC/MS - EPA METHOD 8240
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 15\CH#1OUT2
CLIENT: Sweet-Edwards/EMCON
LOCATION: Cedar Hills Landfill
SAMPLE LOCATION: Outlet of Flare #1 (PNL 101)
SAMPLE DATE: March 1, 1990
SAMPLE TIMES: 11:00-13:00
LAB NUMBER(S): G-0850-2
AIRFLOW: 34337.7 dscf/min

ANALYTE	Outlet Run 2 mg/min	Blank mg/min	DL Run 2 mg/min
Acetone	< DL	< DL	49.9
Benzene	3.2	< DL	6.7
Bromodichloromethane	< DL	< DL	13.9
Bromomethane	< DL	< DL	20.3
Bromoform	< DL	< DL	21.6
2-Butanone (MEK)	< DL	< DL	6.3
Carbon Disulfide	< DL	< DL	16.8
Carbon Tetrachloride	< DL	< DL	64.8
Chlorobenzene	< DL	< DL	9.7
Chloroethane	< DL	< DL	5.6
2-Chloroethylvinyl Ether	< DL	< DL	92.6
Chloroform	< DL	< DL	10.2
Chloromethane	< DL	< DL	4.4
Dibromochloromethane	< DL	< DL	17.7
1,1-Dichloroethane	< DL	< DL	8.5
1,2-Dichloroethane	< DL	< DL	8.5
1,1-Dichloroethene	< DL	< DL	8.5
c-1,2-Dichloroethene	< DL	< DL	8.5
t-1,2-Dichloroethene	< DL	< DL	8.5
Dichloromethane	< DL	< DL	7.5
1,2-Dichloropropane	< DL	< DL	9.7
cis-1,3-Dichloropropene	< DL	< DL	9.7
trans-1,3-Dichloropropene	< DL	< DL	9.7
Ethylbenzene	< DL	< DL	9.3
2-Hexanone	< DL	< DL	8.8
4-Methyl-2-Pentanone (MIBK)	< DL	< DL	8.8
Styrene	< DL	< DL	22.1
1,1,2,2-Tetrachloroethane	< DL	< DL	74.8
Tetrachloroethene (PCE)	< DL	< DL	34.7
Toluene	13.6	< DL	8.1
1,1,1-Trichloroethane (TCA)	< DL	< DL	11.4
1,1,2-Trichloroethane	< DL	< DL	11.4
Trichloroethene (TCE)	< DL	< DL	11.4
Vinyl Acetate	< DL	< DL	74.8
Vinyl Chloride	< DL	< DL	27.0
Xylenes	< DL	< DL	9.3

< DL designates that the compound was not detected, or was found at levels below the method detection limit.

mg/min = milligrams of analyte emitted per minute

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
ANALYZED BY GC/MS - EPA METHOD 8240
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 15\CH#1OUT3
CLIENT: Sweet-Edwards/EMCON
LOCATION: Cedar Hills Landfill
SAMPLE LOCATION: Outlet of Flare #1 (PNL 101)
SAMPLE DATE: March 1, 1990
SAMPLE TIMES: 13:37-15:37
LAB NUMBER(S): G-0850-3
AIRFLOW: 32657.7 dscf/min

ANALYTE	Outlet Run 3 mg/min	Blank mg/min	DL Run 3 mg/min
Acetone	< DL	< DL	47.4
Benzene	< DL	< DL	6.4
Bromodichloromethane	< DL	< DL	13.2
Bromomethane	< DL	< DL	19.3
Bromoform	< DL	< DL	20.6
2-Butanone (MEK)	< DL	< DL	6.0
Carbon Disulfide	< DL	< DL	15.9
Carbon Tetrachloride	< DL	< DL	61.7
Chlorobenzene	< DL	< DL	9.2
Chloroethane	< DL	< DL	5.3
2-Chloroethylvinyl Ether	< DL	< DL	88.1
Chloroform	< DL	< DL	9.7
Chloromethane	< DL	< DL	4.2
Dibromochloromethane	< DL	< DL	16.8
1,1-Dichloroethane	< DL	< DL	8.0
1,2-Dichloroethane	< DL	< DL	8.0
1,1-Dichloroethene	< DL	< DL	8.0
c-1,2-Dichloroethene	< DL	< DL	8.0
t-1,2-Dichloroethene	< DL	< DL	8.0
Dichloromethane	< DL	< DL	7.1
1,2-Dichloropropane	< DL	< DL	9.2
cis-1,3-Dichloropropene	< DL	< DL	9.2
trans-1,3-Dichloropropene	< DL	< DL	9.2
Ethylbenzene	< DL	< DL	8.8
2-Hexanone	< DL	< DL	8.4
4-Methyl-2-Pentanone (MIBK)	< DL	< DL	8.4
Styrene	< DL	< DL	21.0
1,1,2,2-Tetrachloroethane	< DL	< DL	71.1
Tetrachloroethene (PCE)	16.6	< DL	33.0
Toluene	< DL	< DL	7.7
1,1,1-Trichloroethane (TCA)	< DL	< DL	10.9
1,1,2-Trichloroethane	< DL	< DL	10.9
Trichloroethene (TCE)	< DL	< DL	10.9
Vinyl Acetate	< DL	< DL	71.1
Vinyl Chloride	< DL	< DL	25.7
Xylenes	< DL	< DL	8.8

< DL designates that the compound was not detected, or was found at levels below the method detection limit.

mg/min = milligrams of analyte emitted per minute

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
ANALYZED BY GC/MS - EPA METHOD 8240
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 15\CH#2IN1
CLIENT: Sweet-Edwards/EMCON
LOCATION: Cedar Hills Landfill
SAMPLE LOCATION: Inlet to Flare #2 (PNL 201)
SAMPLE DATE: March 2, 1990
SAMPLE TIMES: 08:10-10:10
LAB NUMBER(S): G-0849-4
AIRFLOW: 2252.7 dscf/min

ANALYTE	Inlet Run 1 mg/min	Blank mg/min	DL Run 1 mg/min
Acetone	2552	< DL	16.4
Benzene	287	< DL	2.2
Bromodichloromethane	< DL	< DL	4.6
Bromomethane	< DL	< DL	5.3
Bromoform	< DL	< DL	7.1
2-Butanone (MEK)	< DL	< DL	2.1
Carbon Disulfide	< DL	< DL	4.4
Carbon Tetrachloride	< DL	< DL	21.3
Chlorobenzene	77	< DL	3.2
Chloroethane	6	< DL	1.8
2-Chloroethylvinyl Ether	< DL	< DL	30.4
Chloroform	< DL	< DL	3.4
Chloromethane	< DL	< DL	1.4
Dibromochloromethane	< DL	< DL	5.8
1,1-Dichloroethane	325	< DL	2.8
1,2-Dichloroethane	23	< DL	2.8
1,1-Dichloroethene	89	< DL	2.8
c-1,2-Dichloroethene	1212	< DL	2.8
t-1,2-Dichloroethene	83	< DL	2.8
Dichloromethane	< DL	< DL	2.8
1,2-Dichloropropane	13	< DL	2.5
cis-1,3-Dichloropropene	< DL	< DL	3.2
trans-1,3-Dichloropropene	< DL	< DL	3.2
Ethylbenzene	2552	< DL	3.2
2-Hexanone	< DL	< DL	3.0
4-Methyl-2-Pentanone (MIBK)	829	< DL	2.9
Styrene	1595	< DL	5.8
1,1,2,2-Tetrachloroethane	< DL	< DL	14.5
Tetrachloroethene (PCE)	2424	< DL	5.8
Toluene	19777	< DL	2.9
1,1,1-Trichloroethane (TCA)	29	< DL	4.9
1,1,2-Trichloroethane	< DL	< DL	4.6
Trichloroethene (TCE)	957	< DL	2.7
Vinyl Acetate	< DL	< DL	37.5
Vinyl Chloride	542	< DL	18.8
Xylenes	11484	< DL	3.8

< DL designates that the compound was not detected, or was found at levels below the method detection limit.

mg/min = milligrams of analyte emitted per minute

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
ANALYZED BY GC/MS - EPA METHOD 8240
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 15\CH#2IN2
CLIENT: Sweet-Edwards/EMCON
LOCATION: Cedar Hills Landfill
SAMPLE LOCATION: Inlet to Flare #2 (PNL 201)
SAMPLE DATE: March 2, 1990
SAMPLE TIMES: 10:25-12:25
LAB NUMBER(S): G-0849-5
AIRFLOW: 2212.4 dscf/min

ANALYTE	Inlet Run 2 mg/min	Blank mg/min	DL Run 2 mg/min
Acetone	3822	< DL	32.1
Benzene	320	< DL	4.3
Bromodichloromethane	< DL	< DL	9.0
Bromomethane	< DL	< DL	10.4
Bromoform	< DL	< DL	13.9
2-Butanone (MEK)	1190	< DL	4.0
Carbon Disulfide	< DL	< DL	43.2
Carbon Tetrachloride	< DL	< DL	41.8
Chlorobenzene	125	< DL	6.3
Chloroethane	9	< DL	3.6
2-Chloroethylvinyl Ether	< DL	< DL	6.0
Chloroform	< DL	< DL	6.6
Chloromethane	< DL	< DL	2.8
Dibromochloromethane	< DL	< DL	11.4
1,2-Dibromoethane (EDB)	< DL	< DL	---
1,1-Dichloroethane	207	< DL	5.4
1,2-Dichloroethane	53	< DL	5.4
1,1-Dichloroethene	75	< DL	5.4
c-1,2-Dichloroethene	1128	< DL	5.4
t-1,2-Dichloroethene	81	< DL	5.4
Dichloromethane	1754	< DL	48.2
1,2-Dichloropropane	< DL	< DL	6.3
cis-1,3-Dichloropropene	< DL	< DL	6.3
trans-1,3-Dichloropropene	< DL	< DL	6.3
Ethylbenzene	4887	< DL	6.0
Trichlorofluoromethane	100	< DL	---
1,1,2-Trichlorotrifluoroethane	39	< DL	---
2-Hexanone	< DL	< DL	5.7
4-Methyl-2-Pentanone (MIBK)	1754	< DL	5.7
Styrene	2882	< DL	5.7
1,1,2,2-Tetrachloroethane	< DL	< DL	48.2
Tetrachloroethene (PCE)	3383	< DL	17.9
Toluene	8772	< DL	10.4
1,1,1-Trichloroethane (TCA)	55	< DL	7.4
1,1,2-Trichloroethane	< DL	< DL	7.4
Trichloroethene (TCE)	1441	< DL	7.4
Vinyl Acetate	< DL	< DL	4.8
Vinyl Chloride	94	< DL	7.0
Xylenes	2506	< DL	11.9

< DL designates that the compound was not detected, or was found at levels below the method detection limit.

mg/min = milligrams of analyte emitted per minute

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
ANALYZED BY GC/MS - EPA METHOD 8240
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 15\CH#2IN3
CLIENT: Sweet-Edwards/EMCON
LOCATION: Cedar Hills Landfill
SAMPLE LOCATION: Inlet to Flare #2 (PNL 201)
SAMPLE DATE: March 2, 1990
SAMPLE TIMES: 12:44-14:44
LAB NUMBER(S): G-0849-6
AIRFLOW: 2214.6 dscf/min

ANALYTE	Inlet Run 3 mg/min	Blank mg/min	DL Run 3 mg/min
Acetone	2321	< DL	32.2
Benzene	119	< DL	4.3
Bromodichloromethane	< DL	< DL	9.0
Bromomethane	< DL	< DL	10.5
Bromoform	< DL	< DL	13.9
2-Butanone (MEK)	690	< DL	4.0
Carbon Disulfide	< DL	< DL	43.3
Carbon Tetrachloride	< DL	< DL	41.8
Chlorobenzene	58	< DL	6.3
Chloroethane	< DL	< DL	3.6
2-Chloroethylvinyl Ether	< DL	< DL	6.0
Chloroform	< DL	< DL	6.6
Chloromethane	< DL	< DL	2.9
Dibromochloromethane	< DL	< DL	11.4
1,2-Dibromoethane (EDB)	< DL	< DL	---
1,1-Dichloroethane	107	< DL	5.5
1,2-Dichloroethane	< DL	< DL	5.5
1,1-Dichloroethene	56	< DL	5.5
c-1,2-Dichloroethene	527	< DL	5.5
t-1,2-Dichloroethene	43	< DL	5.5
Dichloromethane	753	< DL	48.2
1,2-Dichloropropane	< DL	< DL	6.3
cis-1,3-Dichloropropene	< DL	< DL	6.3
trans-1,3-Dichloropropene	< DL	< DL	6.3
Ethylbenzene	2258	< DL	6.0
Trichlorofluoromethane	45	< DL	---
1,1,2-Trichlorotrifluoroethane	12	< DL	---
2-Hexanone	< DL	< DL	5.7
4-Methyl-2-Pentanone (MIBK)	6272	< DL	5.7
Styrene	1066	< DL	5.7
1,1,2,2-Tetrachloroethane	< DL	< DL	48.2
Tetrachloroethene (PCE)	1568	< DL	17.9
Toluene	4014	< DL	10.5
1,1,1-Trichloroethane (TCA)	< DL	< DL	7.4
1,1,2-Trichloroethane	< DL	< DL	7.4
Trichloroethene (TCE)	621	< DL	7.4
Vinyl Acetate	< DL	< DL	4.8
Vinyl Chloride	270	< DL	7.0
Xylenes	13798	< DL	11.9

< DL designates that the compound was not detected, or was found at levels below the method detection limit.

mg/min = milligrams of analyte emitted per minute

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
ANALYZED BY GC/MS - EPA METHOD 8240
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 15\CH#2OUT1
CLIENT: Sweet-Edwards/EMCON
LOCATION: Cedar Hills Landfill
SAMPLE LOCATION: Outlet of Flare #2 (PNL 201)
SAMPLE DATE: March 2, 1990
SAMPLE TIMES: 08:10-10:10
LAB NUMBER(S): G-0850-4
AIRFLOW: 28735.5 dscf/min

ANALYTE	Outlet Run 1 mg/min	Blank mg/min	DL Run 1 mg/min
Acetone	< DL	< DL	41.7
Benzene	18.7	< DL	5.6
Bromodichloromethane	< DL	< DL	11.6
Bromomethane	< DL	< DL	17.0
Bromoform	< DL	< DL	18.1
2-Butanone (MEK)	< DL	< DL	5.3
Carbon Disulfide	< DL	< DL	14.0
Carbon Tetrachloride	< DL	< DL	54.3
Chlorobenzene	< DL	< DL	8.1
Chloroethane	< DL	< DL	4.7
2-Chloroethylvinyl Ether	< DL	< DL	77.5
Chloroform	< DL	< DL	8.6
Chloromethane	< DL	< DL	3.7
Dibromochloromethane	< DL	< DL	14.8
1,1-Dichloroethane	< DL	< DL	7.1
1,2-Dichloroethane	< DL	< DL	7.1
1,1-Dichloroethene	< DL	< DL	7.1
c-1,2-Dichloroethene	< DL	< DL	7.1
t-1,2-Dichloroethene	< DL	< DL	7.1
Dichloromethane	< DL	< DL	6.3
1,2-Dichloropropane	< DL	< DL	8.1
cis-1,3-Dichloropropene	< DL	< DL	8.1
trans-1,3-Dichloropropene	< DL	< DL	8.1
Ethylbenzene	< DL	< DL	7.8
2-Hexanone	< DL	< DL	7.4
4-Methyl-2-Pentanone (MIBK)	< DL	< DL	7.4
Styrene	< DL	< DL	18.5
1,1,2,2-Tetrachloroethane	< DL	< DL	62.6
Tetrachloroethene (PCE)	12.2	< DL	29.1
Toluene	30.9	< DL	6.8
1,1,1-Trichloroethane (TCA)	< DL	< DL	9.6
1,1,2-Trichloroethane	< DL	< DL	9.6
Trichloroethene (TCE)	< DL	< DL	9.6
Vinyl Acetate	< DL	< DL	62.6
Vinyl Chloride	< DL	< DL	22.6
Xylenes	5.5	< DL	7.8

< DL designates that the compound was not detected, or was found at levels below the method detection limit.

mg/min = milligrams of analyte emitted per minute

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
ANALYZED BY GC/MS - EPA METHOD 8240
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 15\CH#2OUT2
CLIENT: Sweet-Edwards/EMCON
LOCATION: Cedar Hills Landfill
SAMPLE LOCATION: Outlet of Flare #2 (PNL 201)
SAMPLE DATE: March 2, 1990
SAMPLE TIMES: 10:25-12:25
LAB NUMBER(S): G-0850-5
AIRFLOW: 28263.9 dscf/min

ANALYTE	Outlet Run 2 mg/min	Blank mg/min	DL Run 2 mg/min
Acetone	< DL	< DL	20.5
Benzene	12.8	< DL	2.8
Bromodichloromethane	< DL	< DL	5.7
Bromomethane	< DL	< DL	6.7
Bromoform	< DL	< DL	8.9
2-Butanone (MEK)	< DL	< DL	2.6
Carbon Disulfide	< DL	< DL	5.5
Carbon Tetrachloride	< DL	< DL	26.7
Chlorobenzene	< DL	< DL	4.0
Chloroethane	< DL	< DL	2.3
2-Chloroethylvinyl Ether	< DL	< DL	38.1
Chloroform	< DL	< DL	4.2
Chloromethane	< DL	< DL	1.8
Dibromochloromethane	< DL	< DL	7.3
1,1-Dichloroethane	< DL	< DL	3.5
1,2-Dichloroethane	< DL	< DL	3.5
1,1-Dichloroethene	< DL	< DL	3.5
c-1,2-Dichloroethene	< DL	< DL	3.5
t-1,2-Dichloroethene	< DL	< DL	3.5
Dichloromethane	14.4	< DL	3.1
1,2-Dichloropropane	< DL	< DL	4.0
cis-1,3-Dichloropropene	< DL	< DL	4.0
trans-1,3-Dichloropropene	< DL	< DL	4.0
Ethylbenzene	< DL	< DL	3.8
2-Hexanone	< DL	< DL	3.6
4-Methyl-2-Pentanone (MIBK)	< DL	< DL	3.6
Styrene	< DL	< DL	7.3
1,1,2,2-Tetrachloroethane	< DL	< DL	30.8
Tetrachloroethene (PCE)	< DL	< DL	11.4
Toluene	22.4	< DL	3.3
1,1,1-Trichloroethane (TCA)	< DL	< DL	4.7
1,1,2-Trichloroethane	< DL	< DL	4.7
Trichloroethene (TCE)	< DL	< DL	4.7
Vinyl Acetate	< DL	< DL	30.8
Vinyl Chloride	< DL	< DL	11.1
Xylenes	5.4	< DL	3.8

< DL designates that the compound was not detected, or was found at levels below the method detection limit.

mg/min = milligrams of analyte emitted per minute

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
ANALYZED BY GC/MS - EPA METHOD 8240
AM TEST, INC. - AIR QUALITY DIVISION

FILE NAME: 15\CH#2OUT3
CLIENT: Sweet-Edwards/EMCON
LOCATION: Cedar Hills Landfill
SAMPLE LOCATION: Outlet of Flare #2 (PNL 201)
SAMPLE DATE: March 2, 1990
SAMPLE TIMES: 12:44-14:44
LAB NUMBER(S): G-0850-6
AIRFLOW: 29955.6 dscf/min

ANALYTE	Outlet Run 3 mg/min	Blank mg/min	DL Run 3 mg/min
Acetone	< DL	< DL	21.8
Benzene	9.3	< DL	2.9
Bromodichloromethane	< DL	< DL	6.1
Bromomethane	< DL	< DL	7.1
Bromoform	< DL	< DL	9.4
2-Butanone (MEK)	< DL	< DL	2.7
Carbon Disulfide	< DL	< DL	5.9
Carbon Tetrachloride	< DL	< DL	28.3
Chlorobenzene	< DL	< DL	4.2
Chloroethane	< DL	< DL	2.4
2-Chloroethylvinyl Ether	< DL	< DL	40.4
Chloroform	< DL	< DL	4.5
Chloromethane	< DL	< DL	1.9
Dibromochloromethane	< DL	< DL	7.7
1,1-Dichloroethane	< DL	< DL	3.7
1,2-Dichloroethane	< DL	< DL	3.7
1,1-Dichloroethene	< DL	< DL	3.7
c-1,2-Dichloroethene	< DL	< DL	3.7
t-1,2-Dichloroethene	< DL	< DL	3.7
Dichloromethane	< DL	< DL	3.3
1,2-Dichloropropane	< DL	< DL	4.2
cis-1,3-Dichloropropene	< DL	< DL	4.2
trans-1,3-Dichloropropene	< DL	< DL	4.2
Ethylbenzene	< DL	< DL	4.0
2-Hexanone	< DL	< DL	3.9
4-Methyl-2-Pentanone (MIBK)	< DL	< DL	3.9
Styrene	< DL	< DL	7.7
1,1,2,2-Tetrachloroethane	< DL	< DL	32.6
Tetrachloroethene (PCE)	< DL	< DL	12.1
Toluene	8.2	< DL	3.5
1,1,1-Trichloroethane (TCA)	< DL	< DL	5.0
1,1,2-Trichloroethane	< DL	< DL	5.0
Trichloroethene (TCE)	< DL	< DL	5.0
Vinyl Acetate	< DL	< DL	32.6
Vinyl Chloride	< DL	< DL	11.8
Xylenes	< DL	< DL	4.0

< DL designates that the compound was not detected, or was found at levels below the method detection limit.

mg/min = milligrams of analyte emitted per minute

APPENDIX B

Laboratory Results

Central Coast Analytical Services

Central Coast
Analytical Services, Inc.
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0849-1
Collected: 03/01/90
Received: 03/06/90
Tested: 03/07/90
Collected by: JMW/KSM

84

Inlet Flare #1 Run 1

SUBMITTED BY:
AMTest, Inc.
30545 S.E. 84th Street # 5
Preston, Washington 98050

GC/MS AMBIENT AIR ANALYSIS
Sample Description:
Bag 1000, # 1 Flare Inlet
PNL101, Run 1

HAZARDOUS SUBSTANCE LIST		Detection Limit		Concentration
Compound Analyzed	**(CAS RN)**	**ppbv**	**ug/cu M**	**ppbv**
Acetone	**(67641)**	**200.**	**140000.**	**53000.**
Benzene	(71432)	20.	8200.	2400.
Bromodichloromethane	(75274)	20.	not found	not found
Bromomethane	(74839)	40.	not found	not found
Bromoform	(75252)	20.	not found	not found
2-Butanone (MEK)	(78933)	20.	24000.	7600.
Carbon Disulfide	(75150)	200.	1400.	420.
Carbon Tetrachloride	(56235)	100.	not found	not found
Chlorobenzene	(108907)	20.	910.	180.
Chloroethane	(75003)	20.	740.	260.
2-Chloroethylvinyl Ether	(110758)	20.	not found	not found
Chloroform	(67663)	20.	200.	37.
Chloromethane	(107302)	20.	520.	230.
Dibromochloromethane	(124481)	20.	not found	not found
1,2-Dibromoethane (EDB)	(106934)	40.	not found	not found
1,1-Dichloroethane	(75343)	20.	24000.	5500.
1,2-Dichloroethane	(107062)	20.	1900.	440.
1,1-Dichloroethene	(75354)	20.	2200.	500.
c-1,2-Dichloroethene	(156694)	20.	20000.	4500.
t-1,2-Dichloroethene	(156605)	20.	1400.	310.
Dichloromethane	(75092)	200.	220000.	57000.
1,2-Dichloropropane	(78875)	20.	not found	not found
cis-1,3-Dichloropropene	(10061015)	20.	not found	not found
trans-1,3-Dichloropropene	(10061026)	20.	not found	not found
Ethylbenzene	(100414)	20.	74000.	16000.
Trichlorofluoromethane (F 11)		100.	11000.	1800.
1,1,2-Trichlorotrifluoroethane (F 11		100.	1200.	150.
2-Hexanone	(591786)	20.	not found	not found
4-Methyl-2-Pentanone (MIBK)	(108101)	20.	35000.	7900.
Styrene	(100425)	20.	59000.	13000.
1,1,2,2-Tetrachloroethane	(79345)	100.	not found	not found
Tetrachloroethene (PCE)	(127184)	40.	83000.	11000.
Toluene	(108883)	40.	150000.	37000.
1,1,1-Trichloroethane (TCA)	(71556)	20.	6100.	1000.
1,1,2-Trichloroethane	(79005)	20.	not found	not found
Trichloroethene (TCE)	(79016)	20.	31000.	5400.
Vinyl Acetate	(108054)	20.	not found	not found
Vinyl Chloride	(75014)	40.	15000.	5500.
Xylenes	(1330207)	40.	390000.	83000.

Percent Recovery of Sample-Specific Quality Assurance Spike is: 120.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES

Stephen C Havlicek

SCH/CRR/SCH
G0849-1.WR1/S-193

Stephen C. Havlicek, Ph.D.
Vice President

Inlet
Flare #1
Run 2

Central Coast Analytical Services

Central Coast
Analytical Services, Inc.
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0849-2
Collected: 03/01/90
Received: 03/06/90
Tested: 03/21/90
Collected by: JMW/KSM

SUBMITTED BY:
AMTest, Inc.
30545 S.E. 84th Street # 5
Preston, Washington 98050

GC/MS AMBIENT AIR ANALYSIS
Sample Description:
Bag 1132, # 2 Flare Inlet
PNL101, Run 2

HAZARDOUS SUBSTANCE LIST	Detection Limit		Concentration	
Compound Analyzed	(CAS RN)	ppbv	ug/cu M	ppbv
Acetone	(67641)	200.	110000.	44000.
Benzene	(71432)	20.	8600.	2500.
Bromodichloromethane	(75274)	20.	not found	not found
Bromomethane	(74839)	40.	not found	not found
Bromoform	(75252)	20.	not found	not found
2-Butanone (MEK)	(78933)	20.	13000.	4000.
Carbon Disulfide	(75150)	200.	160000.	46000.
Carbon Tetrachloride	(56235)	100.	240.	35.
Chlorobenzene	(108907)	20.	900.	180.
Chloroethane	(75003)	20.	590.	210.
2-Chloroethylvinyl Ether	(110758)	20.	not found	not found
Chloroform	(67663)	20.	150.	28.
Chloromethane	(107302)	20.	710.	310.
Dibromochloromethane	(124481)	20.	not found	not found
1,2-Dibromoethane (EDB)	(106934)	40.	not found	not found
1,1-Dichloroethane	(75343)	20.	24000.	5300.
1,2-Dichloroethane	(107062)	20.	1400.	310.
1,1-Dichloroethene	(75354)	20.	820.	190.
c-1,2-Dichloroethene	(156694)	20.	19000.	4400.
t-1,2-Dichloroethene	(156605)	20.	1400.	330.
Dichloromethane	(75092)	200.	190000.	50000.
1,2-Dichloropropane	(78875)	20.	not found	not found
cis-1,3-Dichloropropene	(10061015)	20.	not found	not found
trans-1,3-Dichloropropene	(10061026)	20.	not found	not found
Ethylbenzene	(100414)	20.	38000.	8000.
Trichlorofluoromethane (F 11)		100.	7400.	1200.
1,1,2-Trichlorotrifluoroethane (F 11		100.	1100.	330.
2-Hexanone	(591786)	20.	not found	not found
4-Methyl-2-Pentanone (MIBK)	(108101)	20.	30000.	6700.
Styrene	(100425)	20.	86000.	19000.
1,1,2,2-Tetrachloroethane	(79345)	100.	not found	not found
Tetrachloroethene (PCE)	(127184)	40.	81000.	11000.
Toluene	(108883)	40.	120000.	30000.
1,1,1-Trichloroethane (TCA)	(71556)	20.	4500.	760.
1,1,2-Trichloroethane	(79005)	20.	not found	not found
Trichloroethene (TCE)	(79016)	20.	32000.	5500.
Vinyl Acetate	(108054)	20.	not found	not found
Vinyl Chloride	(75014)	40.	11000.	4100.
Xylenes	(1330207)	40.	330000.	70000.

Percent Recovery of Sample-Specific Quality Assurance Spike is:89.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES

Stephen C. Havlicek

Stephen C. Havlicek, Ph.D.
Vice President

SCH/CRR/CO
G0849-2.WR1/S-193

Central Coast Analytical Services

Central Coast
Analytical Services, Inc.
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0849-2dup
Collected: 03/01/90
Received: 03/06/90
Tested: 03/21/90
Collected by: JMW/KSM

SUBMITTED BY:
AMTest, Inc.
30545 S.E. 84th Street # 5
Preston, Washington 98050

GC/MS AMBIENT AIR ANALYSIS
Sample Description:
Bag 1132, # 2 Flare Inlet
PNL101, Run 2, Duplicate Analysis

HAZARDOUS SUBSTANCE LIST		Detection Limit		Concentration
Compound Analyzed	(CAS RN)	ppbv	ug/cu M	ppbv
Acetone	(67641)	200.	100000.	39000.
Benzene	(71432)	20.	8400.	2400.
Bromodichloromethane	(75274)	20.	not found	not found
Bromomethane	(74839)	20.	not found	not found
Bromoform	(75252)	20.	not found	not found
2-Butanone (MEK)	(78933)	20.	20000.	6300.
Carbon Disulfide	(75150)	200.	190000.	55000.
Carbon Tetrachloride	(56235)	100.	not found	not found
Chlorobenzene	(108907)	20.	830.	170.
Chloroethane	(75003)	20.	830.	290.
2-Chloroethylvinyl Ether	(110758)	20.	not found	not found
Chloroform	(67663)	20.	220.	42.
Chloromethane	(107302)	20.	320.	140.
Dibromochloromethane	(124481)	20.	not found	not found
1,2-Dibromoethane (EDB)	(106934)	40.	not found	not found
1,1-Dichloroethane	(75343)	20.	19000.	4400.
1,2-Dichloroethane	(107062)	20.	2000.	260.
1,1-Dichloroethene	(75354)	20.	2500.	570.
c-1,2-Dichloroethene	(156694)	20.	21000.	4800.
t-1,2-Dichloroethene	(156605)	20.	1700.	390.
Dichloromethane	(75092)	200.	230000.	60000.
1,2-Dichloropropane	(78875)	20.	not found	not found
cis-1,3-Dichloropropene	(10061015)	20.	not found	not found
trans-1,3-Dichloropropene	(10061026)	20.	not found	not found
Ethylbenzene	(100414)	20.	61000.	13000.
Trichlorofluoromethane (F 11)		100.	10000.	1600.
1,1,2-Trichlorotrifluoroethane (F 11		100.	1300.	160.
2-Hexanone	(591786)	20.	not found	not found
4-Methyl-2-Pentanone (MIBK)	(108101)	20.	30000.	6800.
Styrene	(100425)	20.	36000.	7700.
1,1,2,2-Tetrachloroethane	(79345)	100.	not found	not found
Tetrachloroethene (PCE)	(127184)	40.	72000.	9800.
Toluene	(108883)	40.	180000.	44000.
1,1,1-Trichloroethane (TCA)	(71556)	20.	6000.	1000.
1,1,2-Trichloroethane	(79005)	20.	not found	not found
Trichloroethene (TCE)	(79016)	20.	32000.	5400.
Vinyl Acetate	(108054)	20.	not found	not found
Vinyl Chloride	(75014)	40.	12000.	4100.
Xylenes	(1330207)	40.	300000.	64000.

Percent Recovery of Sample-Specific Quality Assurance Spike is: 104.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES

Stephen C Havlicek

Stephen C. Havlicek, Ph.D.
Vice President

SCH/CRR/CO
G0849-2d.WR1/S-193

Central Coast Analytical Services

Central Coast
Analytical Services, Inc.
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0849-3
Collected: 03/01/90
Received: 03/06/90
Tested: 03/21/90
Collected by: JMW/KSM

Inlet
Flare #1
Run 3

SUBMITTED BY:
AMTest, Inc.
30545 S.E. 84th Street # 5
Preston, Washington 98050

GC/MS AMBIENT AIR ANALYSIS
Sample Description:
1347 Bag ~~1000~~, # 1 Flare Inlet
PNL101, Run 3

HAZARDOUS SUBSTANCE LIST Compound Analyzed	(CAS RN)	Detection Limit ppbv	Concentration ug/cu M	Concentration ppbv
Acetone	**(67641)**	**200.**	**98000.**	**38000.**
Benzene	(71432)	20.	8000.	2300.
Bromodichloromethane	(75274)	20.	not found	not found
Bromomethane	(74839)	40.	not found	not found
Bromoform	(75252)	20.	not found	not found
2-Butanone (MEK)	(78933)	20.	20000.	6300.
Carbon Disulfide	(75150)	200.	140000.	42000.
Carbon Tetrachloride	(56235)	100.	not found	not found
Chlorobenzene	(108907)	20.	830.	160.
Chloroethane	(75003)	20.	690.	240.
2-Chloroethylvinyl Ether	(110758)	20.	not found	not found
Chloroform	(67663)	20.	not found	not found
Chloromethane	(107302)	20.	240.	110.
Dibromochloromethane	(124481)	20.	not found	not found
1,2-Dibromoethane (EDB)	(106934)	40.	not found	not found
1,1-Dichloroethane	(75343)	20.	24000.	5500.
1,2-Dichloroethane	(107062)	20.	1600.	370.
1,1-Dichloroethene	(75354)	20.	2100.	480.
c-1,2-Dichloroethene	(156694)	20.	18000.	4100.
t-1,2-Dichloroethene	(156605)	20.	1300.	290.
Dichloromethane	(75092)	200.	190000.	51000.
1,2-Dichloropropane	(78875)	20.	not found	not found
cis-1,3-Dichloropropene	(10061015)	20.	not found	not found
trans-1,3-Dichloropropene	(10061026)	20.	not found	not found
Ethylbenzene	(100414)	20.	54000.	11000.
Trichlorofluoromethane (F 11)		100.	7500.	1200.
1,1,2-Trichlorotrifluoroethane (F 11		100.	1100.	130.
2-Hexanone	(591786)	20.	not found	not found
4-Methyl-2-Pentanone (MIBK)	(108101)	20.	29000.	6400.
Styrene	(100425)	20.	47000.	10000.
1,1,2,2-Tetrachloroethane	(79345)	100.	not found	not found
Tetrachloroethene (PCE)	(127184)	40.	62000.	8300.
Toluene	(108883)	40.	160000.	39000.
1,1,1-Trichloroethane (TCA)	(71556)	20.	5100.	860.
1,1,2-Trichloroethane	(79005)	20.	not found	not found
Trichloroethene (TCE)	(79016)	20.	29000.	4800.
Vinyl Acetate	(108054)	20.	not found	not found
Vinyl Chloride	(75014)	40.	9000.	3200.
Xylenes	(1330207)	40.	270000.	57000.

Percent Recovery of Sample-Specific Quality Assurance Spike is:98.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES

Stephen C Havlicek

Stephen C. Havlicek, Ph.D.
Vice President

SCH/CRR/CO
G0849-3.WR1/S-193

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services, Inc.
141 Suburban Road
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0850-1
Collected: 03/01/90
Received: 03/06/90
Tested: 03/15 & 06/12/90
Collected by: KM/JW/KH

58

Flare #1
Run 1
Outlet

ATTN: Kris Hansen
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

GC/MS AMBIENT AIR ANALYSIS
Sample Description:
Cedar Hills Landfill, North Flare #1, Run 1, Can #106, Air

HAZARDOUS SUBSTANCE LIST Compound Analyzed	(CAS RN)	Detection Limit ppbv	Concentration ug/cu M	Concentration ppbv
Acetone	(67641)	20.	not found	not found
Benzene	(71432)	2.	21.	6.0
Bromodichloromethane	(75274)	2.	not found	not found
Bromomethane	(74839)	5.	not found	not found
Bromoform	(75252)	2.	not found	not found
2-Butanone (MEK)	(78933)	2.	not found	not found
Carbon Disulfide	(75150)	5.	not found	not found
Carbon Tetrachloride	(56235)	10.	not found	not found
Chlorobenzene	(108907)	2.	not found	not found
Chloroethane	(75003)	2.	not found	not found
2-Chloroethylvinyl Ether	(110758)	20.	not found	not found
Chloroform	(67663)	2.	not found	not found
Chloromethane	(107302)	2.	not found	not found
Dibromochloromethane	(124481)	2.	not found	not found
1,1-Dichloroethane	(75343)	2.	not found	not found
1,2-Dichloroethane	(107062)	2.	not found	not found
1,1-Dichloroethene	(75354)	2.	not found	not found
c-1,2-Dichloroethene	(156605)	2.	not found	not found
t-1,2-Dichloroethene	(156605)	2.	not found	not found
Dichloromethane	(75092)	2.	not found	not found
1,2-Dichloropropane	(78875)	2.	not found	not found
cis-1,3-Dichloropropene	(10061015)	2.	not found	not found
trans-1,3-Dichloropropene	(10061026)	2.	not found	not found
Ethylbenzene	(100414)	2.	not found	not found
2-Hexanone	(591786)	2.	not found	not found
4-Methyl-2-Pentanone (MIBK)	(624839)	2.	not found	not found
Styrene	(100425)	5.	not found	not found
1,1,2,2-Tetrachloroethane	(79345)	10.	not found	not found
Tetrachloroethene (PCE)	(127184)	5.	not found	not found
Toluene	(108883)	2.	160.	39.
1,1,1-Trichloroethane (TCA)	(71556)	2.	not found	not found
1,1,2-Trichloroethane	(79005)	2.	not found	not found
Trichloroethene (TCE)	(79016)	2.	not found	not found
Vinyl Acetate	(108054)	20.	not found	not found
Vinyl Chloride	(75014)	10.	not found	not found
Xylenes	(1330207)	2.	not found	not found

Percent Recovery of Sample-Specific Quality Assurance Spike is: 83.

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Laurence R. Hilpert, Ph.D.
Vice President

MSD#1
06/13/90
G0850-1.wr1/HSL#7
LRH/jm/gd/co

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services, Inc.
141 Suburban Road
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0850-2
Collected: 03/01/90
Received: 03/06/90
Tested: 03/15 & 06/12/90
Collected by: KM/JW/KH

89

Flare #1
Run 2
Output

ATTN: Kris Hansen
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

GC/MS AMBIENT AIR ANALYSIS
Sample Description:
Cedar Hills Landfill, North Flare #1,
Run 2, Can #360, Air

HAZARDOUS SUBSTANCE LIST Compound Analyzed	(CAS RN)	Detection Limit ppbv	Concentration ug/cu M	Concentration ppbv
Acetone	(67641)	10.	not found	not found
Benzene	(71432)	1.	3.3	1.
Bromodichloromethane	(75274)	1.	not found	not found
Bromomethane	(74839)	2.	not found	not found
Bromoform	(75252)	1.	not found	not found
2-Butanone (MEK)	(78933)	1.	not found	not found
Carbon Disulfide	(75150)	2.	not found	not found
Carbon Tetrachloride	(56235)	5.	not found	not found
Chlorobenzene	(108907)	1.	not found	not found
Chloroethane	(75003)	1.	not found	not found
2-Chloroethylvinyl Ether	(110758)	10.	not found	not found
Chloroform	(67663)	1.	not found	not found
Chloromethane	(107302)	1.	not found	not found
Dibromochloromethane	(124481)	1.	not found	not found
1,1-Dichloroethane	(75343)	1.	not found	not found
1,2-Dichloroethane	(107062)	1.	not found	not found
1,1-Dichloroethene	(75354)	1.	not found	not found
c-1,2-Dichloroethene	(156605)	1.	not found	not found
t-1,2-Dichloroethene	(156605)	1.	not found	not found
Dichloromethane	(75092)	1.	not found	not found
1,2-Dichloropropane	(78875)	1.	not found	not found
cis-1,3-Dichloropropene	(10061015)	1.	not found	not found
trans-1,3-Dichloropropene	(10061026)	1.	not found	not found
Ethylbenzene	(100414)	1.	not found	not found
2-Hexanone	(591786)	1.	not found	not found
4-Methyl-2-Pentanone (MIBK)	(624839)	1.	not found	not found
Styrene	(100425)	2.	not found	not found
1,1,2,2-Tetrachloroethane	(79345)	5.	not found	not found
Tetrachloroethene (PCE)	(127184)	2.	not found	not found
Toluene	(108883)	1.	14.	3.
1,1,1-Trichloroethane (TCA)	(71556)	1.	not found	not found
1,1,2-Trichloroethane	(79005)	1.	not found	not found
Trichloroethene (TCE)	(79016)	1.	not found	not found
Vinyl Acetate	(108054)	10.	not found	not found
Vinyl Chloride	(75014)	5.	not found	not found
Xylenes	(1330207)	1.	not found	not found

Percent Recovery of Sample-Specific Quality Assurance Spike is: 92.

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Laurence R. Hilpert, Ph.D.
Vice President

MSD#1
06/13/90
G0850-2.wr1/HSL#7
LRH/jm/gd/co

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services, Inc.
141 Suburban Road
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0850-3
Collected: 03/01/90
Received: 03/06/90
Tested: 03/15 & 06/12/90
Collected by: KM/JW/KH

90

ATTN: Kris Hansen
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

GC/MS AMBIENT AIR ANALYSIS
Sample Description:
Cedar Hills Landfill, North Flare #1, Run 3, Can #407, Air

Flare #1 Run 3 Outlet

HAZARDOUS SUBSTANCE LIST Compound Analyzed	(CAS RN)	Detection Limit ppbv	Concentration ug/cu M	Concentration ppbv
Acetone	(67641)	10.	not found	not found
Benzene	(71432)	1.	not found	not found
Bromodichloromethane	(75274)	1.	not found	not found
Bromomethane	(74839)	2.	not found	not found
Bromoform	(75252)	1.	not found	not found
2-Butanone (MEK)	(78933)	1.	not found	not found
Carbon Disulfide	(75150)	2.	not found	not found
Carbon Tetrachloride	(56235)	5.	not found	not found
Chlorobenzene	(108907)	1.	not found	not found
Chloroethane	(75003)	1.	not found	not found
2-Chloroethylvinyl Ether	(110758)	10.	not found	not found
Chloroform	(67663)	1.	not found	not found
Chloromethane	(107302)	1.	not found	not found
Dibromochloromethane	(124481)	1.	not found	not found
1,1-Dichloroethane	(75343)	1.	not found	not found
1,2-Dichloroethane	(107062)	1.	not found	not found
1,1-Dichloroethene	(75354)	1.	not found	not found
c-1,2-Dichloroethene	(156605)	1.	not found	not found
t-1,2-Dichloroethene	(156605)	1.	not found	not found
Dichloromethane	(75092)	1.	not found	not found
1,2-Dichloropropane	(78875)	1.	not found	not found
cis-1,3-Dichloropropene	(10061015)	1.	not found	not found
trans-1,3-Dichloropropene	(10061026)	1.	not found	not found
Ethylbenzene	(100414)	1.	not found	not found
2-Hexanone	(591786)	1.	not found	not found
4-Methyl-2-Pentanone (MIBK)	(624839)	1.	not found	not found
Styrene	(100425)	2.	not found	not found
1,1,2,2-Tetrachloroethane	(79345)	5.	not found	not found
Tetrachloroethene (PCE)	(127184)	2.	not found	not found
Toluene	(108883)	1.	18.	4.
1,1,1-Trichloroethane (TCA)	(71556)	1.	not found	not found
1,1,2-Trichloroethane	(79005)	1.	not found	not found
Trichloroethene (TCE)	(79016)	1.	not found	not found
Vinyl Acetate	(108054)	10.	not found	not found
Vinyl Chloride	(75014)	5.	not found	not found
Xylenes	(1330207)	1.	not found	not found

Percent Recovery of Sample-Specific Quality Assurance Spike is: 82.

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Laurence R. Hilpert, Ph.D.
Vice President

MSD#1
06/13/90
G0850-3.wr1/HSL#7
LRH/jm/gd/co

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services, Inc.
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0849-4
Collected: 03/02/90
Received: 03/06/90
Tested: 03/08/90
Collected by: J.Widmeyer/K.Mackey

91

SUBMITTED BY:
AMTest Inc.
30545 S.E. 84th St. #5
Preston, WA 98050

GC/MS AMBIENT AIR ANALYSIS
Sample Description:
Cedar Hills Landfill, #2 Flare,
PNL201, Run1, Air

Inlet Flare #2 Run 1

HAZARDOUS SUBSTANCE LIST Compound Analyzed	(CAS RN)	Detection Limit ppbv	Concentration ug/cu M	Concentration ppbv
Acetone	(67641)	100.	40000.	1550.
Benzene	(71432)	10.	4500.	1300.
Bromodichloromethane	(75274)	10.	not found	not found
Bromomethane	(74839)	20.	not found	not found
Bromoform	(75252)	10.	not found	not found
2-Butanone (MEK)	(78933)	10.	not found	not found
Carbon Disulfide	(75150)	20.	not found	not found
Carbon Tetrachloride	(56235)	50.	not found	not found
Chlorobenzene	(108907)	10.	1200.	240.
Chloroethane	(75003)	10.	93.	32.
2-Chloroethylvinyl Ether	(110758)	100.	not found	not found
Chloroform	(67663)	10.	not found	not found
Chloromethane	(107302)	10.	not found	not found
Dibromochloromethane	(124481)	10.	not found	not found
1,1-Dichloroethane	(75343)	10.	5100.	1200.
1,2-Dichloroethane	(107062)	10.	360.	82.
1,1-Dichloroethene	(75354)	10.	1400.	320.
c-1,2-Dichloroethene	(156605)	10.	19000.	4400.
t-1,2-Dichloroethene	(156605)	10.	1300.	300.
Dichloromethane	(75092)	10.	not found	not found
1,2-Dichloropropane	(78875)	10.	210.	42.
cis-1,3-Dichloropropene	(10061015)	10.	not found	not found
trans-1,3-Dichloropropene	(10061026)	10.	not found	not found
Ethylbenzene	(100414)	10.	40000.	10000.
2-Hexanone	(591786)	10.	not found	not found
4-Methyl-2-Pentanone (MIBK)	(624839)	10.	13000.	2900.
Styrene	(100425)	20.	25000.	5400.
1,1,2,2-Tetrachloroethane	(79345)	50.	not found	not found
Tetrachloroethene (PCE)	(127184)	20.	38000.	5100.
Toluene	(108883)	10.	310000.	75000.
1,1,1-Trichloroethane (TCA)	(71556)	10.	450.	76.
1,1,2-Trichloroethane	(79005)	10.	not found	not found
Trichloroethene (TCE)	(79016)	10.	15000.	2600.
Vinyl Acetate	(108054)	100.	not found	not found
Vinyl Chloride	(75014)	50.	8500.	3000.
Xylenes	(1330207)	10.	180000.	38000.

Percent Recovery of Sample-Specific Quality Assurance Spike is: 71.

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Laurence R. Hilpert, Ph.D.
Vice President

MSD#1
04/16/90
G0849-4.wr1/HSL#2
LRH/crr/drc/co

Central Coast Analytical Services

Central Coast
Analytical Services, Inc.
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0849-5
Collected: 03/02/90
Received: 03/06/90
Tested: 03/21/90
Collected by: JMW/KSM

92

Inlet
Flare #2
Run 2

SUBMITTED BY:
AMTest, Inc.
30545 S.E. 84th Street # 5
Preston, Washington 98050

GC/MS AMBIENT AIR ANALYSIS
Sample Description:
Bag 1115, # 52 Flare Inlet
PNL201, Run 2

HAZARDOUS SUBSTANCE LIST Compound Analyzed	(CAS RN)	Detection Limit ppbv	Concentration ug/cu M	Concentration ppbv
Acetone	(67641)	200.	61000.	23000.
Benzene	(71432)	20.	5100.	1500.
Bromodichloromethane	(75274)	20.	not found	not found
Bromomethane	(74839)	40.	not found	not found
Bromoform	(75252)	20.	not found	not found
2-Butanone (MEK)	(78933)	20.	19000.	5800.
Carbon Disulfide	(75150)	200.	not found	not found
Carbon Tetrachloride	(56235)	100.	not found	not found
Chlorobenzene	(108907)	20.	2000.	400.
Chloroethane	(75003)	20.	150.	52.
2-Chloroethylvinyl Ether	(110758)	20.	not found	not found
Chloroform	(67663)	20.	not found	not found
Chloromethane	(107302)	20.	not found	not found
Dibromochloromethane	(124481)	20.	not found	not found
1,2-Dibromoethane (EDB)	(106934)	40.	not found	not found
1,1-Dichloroethane	(75343)	20.	3300.	740.
1,2-Dichloroethane	(107062)	20.	850.	190.
1,1-Dichloroethene	(75354)	20.	1200.	280.
c-1,2-Dichloroethene	(156694)	20.	18000.	4100.
t-1,2-Dichloroethene	(156605)	20.	1300.	310.
Dichloromethane	(75092)	200.	28000.	7500.
1,2-Dichloropropane	(78875)	20.	not found	not found
cis-1,3-Dichloropropene	(10061015)	20.	not found	not found
trans-1,3-Dichloropropene	(10061026)	20.	not found	not found
Ethylbenzene	(100414)	20.	78000.	17000.
Trichlorofluoromethane (F 11)		100.	1600.	260.
1,1,2-Trichlorotrifluoroethane (F 11		100.	620.	74.
2-Hexanone	(591786)	20.	not found	not found
4-Methyl-2-Pentanone (MIBK)	(108101)	20.	28000.	6200.
Styrene	(100425)	20.	46000.	10000.
1,1,2,2-Tetrachloroethane	(79345)	100.	not found	not found
Tetrachloroethene (PCE)	(127184)	40.	54000.	7300.
Toluene	(108883)	40.	140000.	34000.
1,1,1-Trichloroethane (TCA)	(71556)	20.	880.	150.
1,1,2-Trichloroethane	(79005)	20.	not found	not found
Trichloroethene (TCE)	(79016)	20.	23000.	3900.
Vinyl Acetate	(108054)	20.	not found	not found
Vinyl Chloride	(75014)	40.	15000.	5200.
Xylenes	(1330207)	40.	400000.	84000.

Percent Recovery of Sample-Specific Quality Assurance Spike is: 104.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES

Stephen C Havlicek

Stephen C. Havlicek, Ph.D.
Vice President

SCH/CRR/CO
G0849-5.WR1/S-194

Central Coast Analytical Services

Central Coast
Analytical Services, Inc.
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0849-6
Collected: 03/02/90
Received: 03/06/90
Tested: 03/21/90
Collected by: JMW/KSM

93

Inlet
Flare #2
Run 3

SUBMITTED BY:
AMTest, Inc.
30545 S.E. 84th Street # 5
Preston, Washington 98050

GC/MS AMBIENT AIR ANALYSIS
Sample Description:
Bag 1300, #6, Flare Inlet
PNL201, Run 3

HAZARDOUS SUBSTANCE LIST Compound Analyzed	(CAS RN)	Detection Limit ppbv	Concentration ug/cu M	Concentration ppbv
Acetone	(67641)	200.	37000.	14000.
Benzene	(71432)	20.	1900.	560.
Bromodichloromethane	(75274)	20.	not found	not found
Bromomethane	(74839)	40.	not found	not found
Bromoform	(75252)	20.	not found	not found
2-Butanone (MEK)	(78933)	20.	11000.	3400.
Carbon Disulfide	(75150)	200.	not found	not found
Carbon Tetrachloride	(56235)	100.	not found	not found
Chlorobenzene	(108907)	20.	930.	190.
Chloroethane	(75003)	20.	not found	not found
2-Chloroethylvinyl Ether	(110758)	20.	not found	not found
Chloroform	(67663)	20.	not found	not found
Chloromethane	(107302)	20.	not found	not found
Dibromochloromethane	(124481)	20.	not found	not found
1,2-Dibromoethane (EDB)	(106934)	40.	not found	not found
1,1-Dichloroethane	(75343)	20.	1700.	390.
1,2-Dichloroethane	(107062)	20.	not found	not found
1,1-Dichloroethene	(75354)	20.	890.	210.
c-1,2-Dichloroethene	(156694)	20.	8400.	2000.
t-1,2-Dichloroethene	(156605)	20.	680.	160.
Dichloromethane	(75092)	200.	12000.	3300.
1,2-Dichloropropane	(78875)	20.	not found	not found
cis-1,3-Dichloropropene	(10061015)	20.	not found	not found
trans-1,3-Dichloropropene	(10061026)	20.	not found	not found
Ethylbenzene	(100414)	20.	36000.	7500.
Trichlorofluoromethane (F 11)		100.	710.	110.
1,1,2-Trichlorotrifluoroethane (F 11		100.	190.	22.
2-Hexanone	(591786)	20.	not found	not found
4-Methyl-2-Pentanone (MIBK)	(108101)	20.	100000.	23000.
Styrene	(100425)	20.	17000.	3600.
1,1,2,2-Tetrachloroethane	(79345)	100.	not found	not found
Tetrachloroethene (PCE)	(127184)	40.	25000.	3400.
Toluene	(108883)	40.	64000.	15000.
1,1,1-Trichloroethane (TCA)	(71556)	20.	not found	not found
1,1,2-Trichloroethane	(79005)	20.	not found	not found
Trichloroethene (TCE)	(79016)	20.	9900.	1700.
Vinyl Acetate	(108054)	20.	not found	not found
Vinyl Chloride	(75014)	40.	4300.	1500.
Xylenes	(1330207)	40.	220000.	47000.

Percent Recovery of Sample-Specific Quality Assurance Spike is:78.

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES

Stephen C Havlicek

Stephen C. Havlicek, Ph.D.
Vice President

SCH/CRR/CO
G0849-6.WR1/S-194

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services, Inc.
141 Suburban Road
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0850-4
Collected: 03/02/90
Received: 03/06/90
Tested: 03/15 & 06/12/90
Collected by: KM/JW/KH

94

ATTN: Kris Hansen
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

GC/MS AMBIENT AIR ANALYSIS
Sample Description:
Cedar Hills Landfill, North Flare #2,
Run 1, Can #116, Air

Flare # 2
Run 1
Outlet

HAZARDOUS SUBSTANCE LIST Compound Analyzed	(CAS RN)	Detection Limit ppbv	Concentration ug/cu M	Concentration ppbv
Acetone	(67641)	10.	not found	not found
Benzene	(71432)	1.	23.	7.
Bromodichloromethane	(75274)	1.	not found	not found
Bromomethane	(74839)	2.	not found	not found
Bromoform	(75252)	1.	not found	not found
2-Butanone (MEK)	(78933)	1.	not found	not found
Carbon Disulfide	(75150)	2.	not found	not found
Carbon Tetrachloride	(56235)	5.	not found	not found
Chlorobenzene	(108907)	1.	not found	not found
Chloroethane	(75003)	1.	not found	not found
2-Chloroethylvinyl Ether	(110758)	10.	not found	not found
Chloroform	(67663)	1.	not found	not found
Chloromethane	(107302)	1.	not found	not found
Dibromochloromethane	(124481)	1.	not found	not found
1,1-Dichloroethane	(75343)	1.	not found	not found
1,2-Dichloroethane	(107062)	1.	not found	not found
1,1-Dichloroethene	(75354)	1.	not found	not found
c-1,2-Dichloroethene	(156605)	1.	not found	not found
t-1,2-Dichloroethene	(156605)	1.	not found	not found
Dichloromethane	(75092)	1.	not found	not found
1,2-Dichloropropane	(78875)	1.	not found	not found
cis-1,3-Dichloropropene	(10061015)	1.	not found	not found
trans-1,3-Dichloropropene	(10061026)	1.	not found	not found
Ethylbenzene	(100414)	1.	not found	not found
2-Hexanone	(591786)	1.	not found	not found
4-Methyl-2-Pentanone (MIBK)	(624839)	1.	not found	not found
Styrene	(100425)	2.	not found	not found
1,1,2,2-Tetrachloroethane	(79345)	5.	not found	not found
Tetrachloroethene (PCE)	(127184)	2.	15.	2.
Toluene	(108883)	1.	38.	9.
1,1,1-Trichloroethane (TCA)	(71556)	1.	not found	not found
1,1,2-Trichloroethane	(79005)	1.	not found	not found
Trichloroethene (TCE)	(79016)	1.	not found	not found
Vinyl Acetate	(108054)	10.	not found	not found
Vinyl Chloride	(75014)	5.	not found	not found
Xylenes	(1330207)	1.	6.7	1.

Percent Recovery of Sample-Specific Quality Assurance Spike is: 87.

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Laurence R. Hilpert, Ph.D.
Vice President

MSD#1
06/13/90
G0850-4.wr1/HSL#7
LRH/jm/gd/co

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services, Inc.
141 Suburban Road
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0850-5
Collected: 03/02/90
Received: 03/06/90
Tested: 03/15 & 06/12/90
Collected by: KM/JW/KH

95

Flare #2
Run 2
Outlet

ATTN: Kris Hansen
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

GC/MS AMBIENT AIR ANALYSIS
Sample Description:
Cedar Hills Landfill, North Flare #2, Run 2, Can #415, Air

HAZARDOUS SUBSTANCE LIST Compound Analyzed	(CAS RN)	Detection Limit ppbv	Concentration ug/cu M	Concentration ppbv
Acetone	(67641)	10.	not found	not found
Benzene	(71432)	1.	16.	5.
Bromodichloromethane	(75274)	1.	not found	not found
Bromomethane	(74839)	2.	not found	not found
Bromoform	(75252)	1.	not found	not found
2-Butanone (MEK)	(78933)	1.	not found	not found
Carbon Disulfide	(75150)	2.	not found	not found
Carbon Tetrachloride	(56235)	5.	not found	not found
Chlorobenzene	(108907)	1.	not found	not found
Chloroethane	(75003)	1.	not found	not found
2-Chloroethylvinyl Ether	(110758)	10.	not found	not found
Chloroform	(67663)	1.	not found	not found
Chloromethane	(107302)	1.	not found	not found
Dibromochloromethane	(124481)	1.	not found	not found
1,1-Dichloroethane	(75343)	1.	not found	not found
1,2-Dichloroethane	(107062)	1.	not found	not found
1,1-Dichloroethene	(75354)	1.	not found	not found
c-1,2-Dichloroethene	(156605)	1.	not found	not found
t-1,2-Dichloroethene	(156605)	1.	not found	not found
Dichloromethane	(75092)	1.	18.	5.
1,2-Dichloropropane	(78875)	1.	not found	not found
cis-1,3-Dichloropropene	(10061015)	1.	not found	not found
trans-1,3-Dichloropropene	(10061026)	1.	not found	not found
Ethylbenzene	(100414)	1.	not found	not found
2-Hexanone	(591786)	1.	not found	not found
4-Methyl-2-Pentanone (MIBK)	(624839)	1.	not found	not found
Styrene	(100425)	2.	not found	not found
1,1,2,2-Tetrachloroethane	(79345)	5.	not found	not found
Tetrachloroethene (PCE)	(127184)	2.	not found	not found
Toluene	(108883)	1.	28.	7.
1,1,1-Trichloroethane (TCA)	(71556)	1.	not found	not found
1,1,2-Trichloroethane	(79005)	1.	not found	not found
Trichloroethene (TCE)	(79016)	1.	not found	not found
Vinyl Acetate	(108054)	10.	not found	not found
Vinyl Chloride	(75014)	5.	not found	not found
Xylenes	(1330207)	1.	not found	not found

Percent Recovery of Sample-Specific Quality Assurance Spike is: 92.

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Laurence R. Hilpert, Ph.D.
Vice President

MSD#1
06/13/90
G0850-5.wr1/HSL#7
LRH/jm/gd/co

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services, Inc.
141 Suburban Road
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0850-6
Collected: 03/02/90
Received: 03/06/90
Tested: 03/15 & 06/12/90
Collected by: KM/JW/KH

96

ATTN: Kris Hansen
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

GC/MS AMBIENT AIR ANALYSIS
Sample Description:
Cedar Hills Landfill, North Flare #2, Run 3, Can #124, Air

Flare #2 Run 3 Outlet

HAZARDOUS SUBSTANCE LIST Compound Analyzed	(CAS RN)	Detection Limit ppbv	Concentration ug/cu M	Concentration ppbv
Acetone	(67641)	10.	not found	not found
Benzene	(71432)	1.	11.	3.
Bromodichloromethane	(75274)	1.	not found	not found
Bromomethane	(74839)	2.	not found	not found
Bromoform	(75252)	1.	not found	not found
2-Butanone (MEK)	(78933)	1.	not found	not found
Carbon Disulfide	(75150)	2.	not found	not found
Carbon Tetrachloride	(56235)	5.	not found	not found
Chlorobenzene	(108907)	1.	not found	not found
Chloroethane	(75003)	1.	not found	not found
2-Chloroethylvinyl Ether	(110758)	10.	not found	not found
Chloroform	(67663)	1.	not found	not found
Chloromethane	(107302)	1.	not found	not found
Dibromochloromethane	(124481)	1.	not found	not found
1,1-Dichloroethane	(75343)	1.	not found	not found
1,2-Dichloroethane	(107062)	1.	not found	not found
1,1-Dichloroethene	(75354)	1.	not found	not found
c-1,2-Dichloroethene	(156605)	1.	not found	not found
t-1,2-Dichloroethene	(156605)	1.	not found	not found
Dichloromethane	(75092)	1.	not found	not found
1,2-Dichloropropane	(78875)	1.	not found	not found
cis-1,3-Dichloropropene	(10061015)	1.	not found	not found
trans-1,3-Dichloropropene	(10061026)	1.	not found	not found
Ethylbenzene	(100414)	1.	not found	not found
2-Hexanone	(591786)	1.	not found	not found
4-Methyl-2-Pentanone (MIBK)	(624839)	1.	not found	not found
Styrene	(100425)	2.	not found	not found
1,1,2,2-Tetrachloroethane	(79345)	5.	not found	not found
Tetrachloroethene (PCE)	(127184)	2.	not found	not found
Toluene	(108883)	1.	9.7	2.
1,1,1-Trichloroethane (TCA)	(71556)	1.	not found	not found
1,1,2-Trichloroethane	(79005)	1.	not found	not found
Trichloroethene (TCE)	(79016)	1.	not found	not found
Vinyl Acetate	(108054)	10.	not found	not found
Vinyl Chloride	(75014)	5.	not found	not found
Xylenes	(1330207)	1.	not found	not found

Percent Recovery of Sample-Specific Quality Assurance Spike is: 89.

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Laurence R. Hilpert, Ph.D.
Vice President

MSD#1
06/13/90
G0850-6.wr1/HSL#7
LRH/jm/gd/co

Central Coast Analytical Services

Central Coast
Analytical Services, Inc.
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: BLANK
Collected: 03/07/90
Received: 03/07/90
Tested: 03/07/90
Collected by: CCAS

SUBMITTED BY:

GC/MS AMBIENT AIR ANALYSIS
Sample Description:
ZERO AIR FULL METHOD BLANK
PNL101, Run 1

HAZARDOUS SUBSTANCE LIST		Detection Limit	Concentration	
Compound Analyzed	(CAS RN)	ppbv	ug/cu M	ppbv
Acetone	**(67641)**	**1.0**	**not found**	**not found**
Benzene	(71432)	0.1	not found	not found
Bromodichloromethane	(75274)	0.1	not found	not found
Bromomethane	(74839)	0.2	not found	not found
Bromoform	(75252)	0.1	not found	not found
2-Butanone (MEK)	(78933)	0.1	not found	not found
Carbon Disulfide	(75150)	1.	not found	not found
Carbon Tetrachloride	(56235)	0.5	not found	not found
Chlorobenzene	(108907)	0.1	not found	not found
Chloroethane	(75003)	0.1	not found	not found
2-Chloroethylvinyl Ether	(110758)	0.1	not found	not found
Chloroform	(67663)	0.1	not found	not found
Chloromethane	(107302)	0.1	not found	not found
Dibromochloromethane	(124481)	0.1	not found	not found
1,2-Dibromoethane (EDB)	(106934)	0.2	not found	not found
1,1-Dichloroethane	(75343)	0.1	not found	not found
1,2-Dichloroethane	(107062)	0.1	not found	not found
1,1-Dichloroethene	(75354)	0.1	not found	not found
c-1,2-Dichloroethene	(156694)	0.1	not found	not found
t-1,2-Dichloroethene	(156605)	0.1	not found	not found
Dichloromethane	(75092)	1.	not found	not found
1,2-Dichloropropane	(78875)	0.1	not found	not found
cis-1,3-Dichloropropene	(10061015)	0.1	not found	not found
trans-1,3-Dichloropropene	(10061026)	0.1	not found	not found
Ethylbenzene	(100414)	0.1	not found	not found
Trichlorofluoromethane (F 11)		0.5	not found	not found
1,1,2-Trichlorotrifluoroethane (F 113)		0.5	not found	not found
2-Hexanone	(591786)	0.1	not found	not found
4-Methyl-2-Pentanone (MIBK)	(108101)	0.1	not found	not found
Styrene	(100425)	0.1	not found	not found
1,1,2,2-Tetrachloroethane	(79345)	0.5	not found	not found
Tetrachloroethene (PCE)	(127184)	0.2	not found	not found
Toluene	(108883)	0.2	not found	not found
1,1,1-Trichloroethane (TCA)	(71556)	0.1	not found	not found
1,1,2-Trichloroethane	(79005)	0.1	not found	not found
Trichloroethene (TCE)	(79016)	0.1	not found	not found
Vinyl Acetate	(108054)	0.1	not found	not found
Vinyl Chloride	(75014)	0.2	not found	not found
Xylenes	(1330207)	0.2	not found	not found

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES

Stephen C Havlicek

Stephen C. Havlicek, Ph.D.
Vice President

SCH/CRR/SCH
G0849-1.WR1/S-193

Central Coast Analytical Services

Central Coast
Analytical Services, Inc.
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: SPIKE
Collected: 03/07/90
Received: 03/07/90
Tested: 03/07/90
Collected by: CCAS

SUBMITTED BY:

Certified Reference Spike
Benzene 5.3, CCl4 4.9, CHCl3 5.1, EDB 6.7,
EDC 5.3, CH2Cl2 5.1, PCE 5.0, TCA 5.5,
TCE 5.2, Vinyl Chloride 5.0 ppbv.

HAZARDOUS SUBSTANCE LIST	Detection Limit		Concentration	
Compound Analyzed	**(CAS RN)**	**ppbv**	**ug/cu M**	**ppbv**
Acetone	**(67641)**	**1.0**	**no spike**	**no spike**
Benzene	(71432)	0.1	18.	5.2
Bromodichloromethane	(75274)	0.1	no spike	no spike
Bromomethane	(74839)	0.2	no spike	no spike
Bromoform	(75252)	0.1	no spike	no spike
2-Butanone (MEK)	(78933)	0.1	no spike	no spike
Carbon Disulfide	(75150)	1.	no spike	no spike
Carbon Tetrachloride	(56235)	0.5	33.	4.8
Chlorobenzene	(108907)	0.1	no spike	no spike
Chloroethane	(75003)	0.1	no spike	no spike
2-Chloroethylvinyl Ether	(110758)	0.1	no spike	no spike
Chloroform	(67663)	0.1	28.	5.2
Chloromethane	(107302)	0.1	no spike	no spike
Dibromochloromethane	(124481)	0.1	no spike	no spike
1,2-Dibromoethane (EDB)	(106934)	0.2	52.	6.2
1,1-Dichloroethane	(75343)	0.1	no spike	no spike
1,2-Dichloroethane	(107062)	0.1	23.	5.2
1,1-Dichloroethene	(75354)	0.1	no spike	no spike
c-1,2-Dichloroethene	(156694)	0.1	no spike	no spike
t-1,2-Dichloroethene	(156605)	0.1	no spike	no spike
Dichloromethane	(75092)	1.	18.	4.8
1,2-Dichloropropane	(78875)	0.1	no spike	no spike
cis-1,3-Dichloropropene	(10061015)	0.1	no spike	no spike
trans-1,3-Dichloropropene	(10061026)	0.1	no spike	no spike
Ethylbenzene	(100414)	0.1	no spike	no spike
Trichlorofluoromethane (F 11)		0.5	no spike	no spike
1,1,2-Trichlorotrifluoroethane (F 113)		0.5	no spike	no spike
2-Hexanone	(591786)	0.1	no spike	no spike
4-Methyl-2-Pentanone (MIBK)	(108101)	0.1	no spike	no spike
Styrene	(100425)	0.1	no spike	no spike
1,1,2,2-Tetrachloroethane	(79345)	0.5	no spike	no spike
Tetrachloroethene (PCE)	(127184)	0.1	35.	4.7
Toluene	(108883)	0.2	no spike	no spike
1,1,1-Trichloroethane (TCA)	(71556)	0.1	34.	5.6
1,1,2-Trichloroethane	(79005)	0.1	no spike	no spike
Trichloroethene (TCE)	(79016)	0.1	29.	5.0
Vinyl Acetate	(108054)	0.1	no spike	no spike
Vinyl Chloride	(75014)	0.2	13.	4.8
Xylenes	(1330207)	0.2	no spike	no spike

The mean percent recovery is 97. The standard deviation is 3.1

Respectfully submitted,
CENTRAL COAST ANALYTICAL SERVICES

Stephen C Havlicek

Stephen C. Havlicek, Ph.D.
Vice President

S030790.WR1/S-193
SCH/CRR/SCH

99

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0849-1
Collected: 03/01/90 @ 1000
Received: 03/06/90 @ 1000
Tested: 03/08/90
Collected by: JMW/KSM

Inlet Flare #1 Run 1

SAMPLE DESCRIPTION:
Cedar Hills Landfill, #1 Flare,
PNL101 - Run 1

Attn: Kris Hansen
AMTest Inc.
30545 SE 84th St., #5
Preston, WA 98050

REPORT

FIXED GASES AND METHANE TESTED BY GC/TCD

CONSTITUENT	DETECTION LIMIT PERCENT	LEVEL FOUND PERCENT
CARBON DIOXIDE	0.1	32.
OXYGEN	0.01	3.3
NITROGEN	0.02	30.
METHANE	0.005	35.
CARBON MONOXIDE	0.1	<0.1
TOTAL		100.

Respectfully Submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Stephen C. Havlicek

Stephen C. Havlicek, Ph.D.
Vice President

TCD
03/12/90
G08491FG.WR1/FG7
SCH/ss

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0849-1dup
Collected: 03/01/90 @ 1000
Received: 03/06/90 @ 1000
Tested: 03/08/90
Collected by: JMW/KSM

Attn: Kris Hansen
AMTest Inc.
30545 SE 84th St., #5
Preston, WA 98050

SAMPLE DESCRIPTION:
Cedar Hills Landfill, #1 Flare,
PNL101 - Run 1
Duplicate Analysis

REPORT

FIXED GASES AND METHANE TESTED BY GC/TCD

CONSTITUENT	DETECTION LIMIT PERCENT	LEVEL FOUND PERCENT
CARBON DIOXIDE	0.1	32.
OXYGEN	0.01	3.3
NITROGEN	0.02	30.
METHANE	0.005	35.
CARBON MONOXIDE	0.1	<0.1
TOTAL		100.

Respectfully Submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Stephen C. Havlicek

Stephen C. Havlicek, Ph.D.
Vice President

TCD
03/12/90
G08491du.WR1/FG7
SCH/ss

101

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0849-2
Collected: 03/01/90 @ 1132
Received: 03/06/90 @ 1000
Tested: 03/08/90
Collected by: JMW/KSM

SAMPLE DESCRIPTION:
Cedar Hills Landfill, #1 Flare,
PNL101 - Run 2

Inlet
Flare #1
Run 2

Attn: Kris Hansen
AMTest Inc.
30545 SE 84th St., #5
Preston, WA 98050

REPORT

FIXED GASES AND METHANE TESTED BY GC/TCD

CONSTITUENT	DETECTION LIMIT PERCENT	LEVEL FOUND PERCENT
CARBON DIOXIDE	0.1	31.
OXYGEN	0.01	3.0
NITROGEN	0.02	28.
METHANE	0.005	38.
CARBON MONOXIDE	0.1	<0.1
TOTAL		100.

Respectfully Submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Stephen C Havlicek

Stephen C. Havlicek, Ph.D.
Vice President

TCD
03/12/90
G08492FG.WR1/FG7
SCH/ss

102

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0849-3
Collected: 03/01/90 @ 1347
Received: 03/06/90 @ 1000
Tested: 03/08/90
Collected by: JMW/KSM

Attn: Kris Hansen
AMTest Inc.
30545 SE 84th St., #5
Preston, WA 98050

SAMPLE DESCRIPTION:
Cedar Hills Landfill, #1 Flare,
PNL101 - Run 3

Inlet Flare #1 Run 3

REPORT

FIXED GASES AND METHANE TESTED BY GC/TCD

CONSTITUENT	DETECTION LIMIT PERCENT	LEVEL FOUND PERCENT
CARBON DIOXIDE	0.1	27.
OXYGEN	0.01	7.1
NITROGEN	0.02	39.
METHANE	0.005	27.
CARBON MONOXIDE	0.1	<0.1
TOTAL		100.

Respectfully Submitted,
COAST-TO-COAST ANALYTICAL SERVICES

TCD
03/12/90
G08493FG.WR1/FG7
SCH/ss

Stephen C. Havlicek, Ph.D.
Vice President

103

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0849-4
Collected: 03/02/90 @ 0835
Received: 03/06/90 @ 1000
Tested: 03/08/90
Collected by: JMW/KSM

Attn: Kris Hansen
AMTest Inc.
30545 SE 84th St., #5
Preston, WA 98050

SAMPLE DESCRIPTION:
Cedar Hills Landfill, #2 Flare,
PNL201 - Run 1

Inlet Flare #2 Run 1

REPORT

FIXED GASES AND METHANE TESTED BY GC/TCD

CONSTITUENT	DETECTION LIMIT PERCENT	LEVEL FOUND PERCENT
CARBON DIOXIDE	0.1	22.
OXYGEN	0.01	5.5
NITROGEN	0.02	23.
METHANE	0.005	49.
CARBON MONOXIDE	0.1	<0.1
TOTAL		100.

Respectfully Submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Stephen C. Havlicek, Ph.D.
Vice President

TCD
03/12/90
G08494FG.WR1/FG7
SCH/ss

104

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0849-5
Collected: 03/02/90 @ 1115
Received: 03/06/90 @ 1000
Tested: 03/08/90
Collected by: JMW/KSM

Attn: Kris Hansen
AMTest Inc.
30545 SE 84th St., #5
Preston, WA 98050

SAMPLE DESCRIPTION:
Cedar Hills Landfill, #2 Flare,
PNL201 - Run 2

Inlet
Flare #2
Run 2

REPORT

FIXED GASES AND METHANE TESTED BY GC/TCD

CONSTITUENT	DETECTION LIMIT PERCENT	LEVEL FOUND PERCENT
CARBON DIOXIDE	0.1	29.
OXYGEN	0.01	3.0
NITROGEN	0.02	18.
METHANE	0.005	50.
CARBON MONOXIDE	0.1	<0.1
TOTAL		100.

Respectfully Submitted,
COAST-TO-COAST ANALYTICAL SERVICES

TCD
03/12/90
G08495FG.WR1/FG7
SCH/ss

Stephen C. Havlicek, Ph.D.
Vice President

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0849-6
Collected: 03/02/90 @ 1300
Received: 03/06/90 @ 1000
Tested: 03/08/90
Collected by: JMW/KSM

SAMPLE DESCRIPTION:
Cedar Hills Landfill, #2 Flare,
PNL201 - Run 3

Inlet
Flare #2
Run 3

Attn: Kris Hansen
AMTest Inc.
30545 SE 84th St., #5
Preston, WA 98050

REPORT

FIXED GASES AND METHANE TESTED BY GC/TCD

CONSTITUENT	DETECTION LIMIT PERCENT	LEVEL FOUND PERCENT
CARBON DIOXIDE	0.1	29.
OXYGEN	0.01	3.0
NITROGEN	0.02	17.
METHANE	0.005	51.
CARBON MONOXIDE	0.1	<0.1
TOTAL		100.

Respectfully Submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Stephen C. Havlicek

Stephen C. Havlicek, Ph.D.
Vice President

TCD
03/12/90
G08496FG.WR1/FG7
SCH/ss

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0849-6dup
Collected: 03/02/90 @ 1300
Received: 03/06/90 @ 1000
Tested: 03/08/90
Collected by: JMW/KSM

Attn: Kris Hansen
AMTest Inc.
30545 SE 84th St., #5
Preston, WA 98050

SAMPLE DESCRIPTION:
Cedar Hills Landfill, #2 Flare,
PNL201 - Run 3
Duplicate Analysis

REPORT

FIXED GASES AND METHANE TESTED BY GC/TCD

CONSTITUENT	DETECTION LIMIT PERCENT	LEVEL FOUND PERCENT
CARBON DIOXIDE	0.1	29.
OXYGEN	0.01	2.9
NITROGEN	0.02	18.
METHANE	0.005	50.
CARBON MONOXIDE	0.1	<0.1
TOTAL		100.

Respectfully Submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Stephen C. Havlicek

Stephen C. Havlicek, Ph.D.
Vice President

TCD
03/12/90
G08496du.WR1/FG7
SCH/ss

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: QS-030800
Collected:
Received:
Tested: 03/08/90
Collected by:

Sample Description:

CCAS

SPIKE

REPORT

FIXED GASES AND METHANE TESTED BY GC/TCD

CONSTITUENT	DETECTION LIMIT PERCENT	LEVEL FOUND PERCENT	TRUE VALUE PERCENT	PERCENT RECOVERY
CARBON DIOXIDE	0.1	15.	15.	100.
OXYGEN	0.01	7.0	7.0	100.
NITROGEN	0.02	66.	66.	100.
METHANE	0.005	4.6	4.5	102.
CARBON MONOXIDE	0.1	7.0	7.0	100.
TOTAL		100.	100.	

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Stephen C. Havlicek

Stephen C. Havlicek, Ph.D.
Vice President

TCD
02/05/90
QS0308FG.WR1/FG7
SCH/ss

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: 0-9805-1
Collected: 03/01/95
Received: 03/06/95
Tested: 03/23/95
Collected by: KM/JW/KH

Attn: Kris Hansen
AMTest Inc.
35545 S. E. 84th Street #5
Preston, WA 98050

Sample Description:
Cedar Hills Landfill, North Flare #1
Run #1, Can #1108 Outlet

REPORT

FIXED GASES AND METHANE TESTED BY GC/TCD

CONSTITUENT	DETECTION LIMIT PERCENT	LEVEL FOUND PERCENT
CARBON DIOXIDE	0.1	8.2
OXYGEN	0.01	13.
NITROGEN	0.02	79.
METHANE	0.005	<0.005
CARBON MONOXIDE	0.1	<0.1
TOTAL		100.

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Laurence R. Hilpert
Vice President

TCD
06/12/95
C9805\1FG.wr1/FG12
LRH/ss/mk

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: 0-9859-2
Collected: 03/01/95
Received: 03/06/95
Tested: 03/23/95
Collected by: KM/JW/KH

Attn: Kris Hansen
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98059

Sample Description:
Cedar Hills Landfill, North Flare #1
Run #2, Can #369 outlet

REPORT

FIXED GASES AND METHANE TESTED BY GC/TCD

CONSTITUENT	DETECTION LIMIT PERCENT	LEVEL FOUND PERCENT
CARBON DIOXIDE	0.1	8.2
OXYGEN	0.01	13.
NITROGEN	0.02	79.
METHANE	0.005	<0.005
CARBON MONOXIDE	0.1	<0.1
TOTAL		100.

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Laurence R. Hilpert
Vice President

TCD
03/12/95
09859F0.wr1/FQ12
LRH/ss/mk

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-0805-3
Collected: 03/01/90
Received: 03/08/90
Tested: 03/23/90
Collected by: KM/JW/KH

Attn: Kris Hansen
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Sample Description:
Cedar Hills Landfill, North Flare #1
Run #3, Can #407 Outlet

REPORT

FIXED GASES AND METHANE TESTED BY GC/TCD

CONSTITUENT	DETECTION LIMIT PERCENT	LEVEL FOUND PERCENT
CARBON DIOXIDE	0.1	8.3
OXYGEN	0.01	13.
NITROGEN	0.02	79.
METHANE	0.005	<0.005
CARBON MONOXIDE	0.1	<0.1
TOTAL		100.

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Laurence R. Hilpert
Vice President

TCD
03/12/90
G0805F3.wr1/F012
LRH/ss/mk

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: 0-9859-4
Collected: 03/02/95
Received: 03/06/95
Tested: 03/23/95
Collected by: KM/JW/KH

Attn: Kris Hansen
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98059

Sample Description:
Cedar Hills Landfill, North Flare #2
Run #1, Can #118 Outlet

REPORT

FIXED GASES AND METHANE TESTED BY GC/TCD

CONSTITUENT	DETECTION LIMIT PERCENT	LEVEL FOUND PERCENT
CARBON DIOXIDE	0.1	5.7
OXYGEN	0.01	15.
NITROGEN	0.02	79.
METHANE	0.005	<0.005
CARBON MONOXIDE	0.1	<0.1
TOTAL		100.

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Laurence R. Hilpert
Vice President

TCD
03/12/95
09859-4FG.wr1/FG12
LRH/ss/mk

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-9859-5
Collected: 03/02/99
Received: 03/08/99
Tested: 03/23/99
Collected by: KM/JW/KH

Attn: Kris Hansen
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98059

Sample Description:
Cedar Hills Landfill, North Flare #2
Run #2, Can #415 Outlet

REPORT

FIXED GASES AND METHANE TESTED BY GC/TCD

CONSTITUENT	DETECTION LIMIT PERCENT	LEVEL FOUND PERCENT
CARBON DIOXIDE	0.1	5.5
OXYGEN	0.01	15.
NITROGEN	0.02	79.
METHANE	0.005	<0.005
CARBON MONOXIDE	0.1	<0.1
TOTAL		100.

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Laurence R. Hilpert
Vice President

TCD
03/12/99
G9859FG.wr1/FG12
LRH/ss/mk

Coast-to-Coast Analytical Services

Coast-to-Coast
Analytical Services
141 Suburban Road, Suite C-4
San Luis Obispo, California 93401
(805) 543-2553

Lab Number: G-9809-8
Collected: 03/02/98
Received: 03/06/98
Tested: 03/23/98
Collected by: KM/JW/KH

Attn: Kris Hansen
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98059

Sample Description:
Cedar Hills Landfill, North Flare #2
Run #3, Can #124 Outlet

REPORT

FIXED GASES AND METHANE TESTED BY GC/TCD

CONSTITUENT	DETECTION LIMIT PERCENT	LEVEL FOUND PERCENT
CARBON DIOXIDE	0.1	5.8
OXYGEN	0.01	15.
NITROGEN	0.02	79.
METHANE	0.005	<0.005
CARBON MONOXIDE	0.1	<0.1
TOTAL		100.

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES

Laurence R. Hilpert
Vice President

TCD
03/12/98
G9809FG.wr1/FG12
LRH/as/mk

AM TEST Professional Analytical Services
14603 N.E. 87th St. Redmond, WA
Fax: 206 883 3493
Tel: [illegible] 885 1[illegible]

CHAIN OF CUSTODY

PROJ. NO.	PROJECT NAME
	Cedar Hills Landfill

SAMPLERS: (Signature)
Jan M. Widmeyer
K. Steven Mackey

Client Name: Am Test Inc.
Client Address: 30545 S.E. 84th St, #S, Preston WA 9805
Client Phone: 206-222-7746
Contact Person: Kris Hansen
P.O. No.: NA

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	10-liter Tedlar bag	Back-up bag *	SUMMA		
#1 Flare	3/1/90	1100		✓	PNL 101 - Run 1	2	1	1			-1
↓	↓	1132		✓	PNL 101 - Run 2	2	1	1			-2
↓	↓	1347		✓	PNL 101 - Run 3	2	1	1			-3
#2 Flare	3/2/90	0835		✓	PNL 201 - Run 1	2	1	1			-4
↓	↓	1115		✓	PNL 201 - Run 2	2	1	1			-5
↓	↓	1300		✓	PNL 201 - Run 3	2	1	1			-6

-1 01 - Inlet to landfill combustor
-2 02 - Inlet
-3 03 - Inlet
-4 04 - Inlet
-5 05 - Inlet
-6 06 - Inlet

Analyze each sample for TO-14 (8240 compounds)
Fixed Gases - methane, nitrogen, oxygen, carbon monoxide, carbon dioxide

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Angela Blaisdell	3/5/90 am				
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: (Signature)	Date/Time	Remarks	
		Whellie Hoyt	3-6-90 1000	* only analyze the back-up bag if the primary bag is flat or you need more sample	

sealed & intact

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

AMTEST

AMTest Inc.
Pro[illegible]al
Analytical
Services
[illegible]3 N.E. [illegible] St. F[illegible] 883 [illegible]
Redmond, WA
98052
Tel: 206 885 1664

CHAIN OF CUSTODY RECORD

PROJ. NO.

PROJECT NAME: Cedar Hills Landfill

SAMPLERS: *(Signature)*
K Steven Kinskey
Jan M. Mollhoyen
Kris Hansen

Client Name: Am Test Inc.
Client Address: 30545 SE 84th St. Preston, [illegible]
Client Phone: 206 222-7746
Contact Person: Kris Hansen
P.O. No.: N/A

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	TO-14 (canister)	8240	8250		
	3/1/90				North Flare #1 - Run1	1	1			-1	Canister # 106
	↓				- Run2	1	1			-2	360
	↓				- Run3	1	1			-3	407
	3/2/90				North Flare #2 - Run1	1	1			-4	116
	↓				Run2	1	1			-5	415
	↓				Run3	1	1			-6	↓ 124
											All Canisters are from the outlets of landfill gas combustors. Perform TO14 (8240) analysis on all samples.
					per Dave Pierotti 3-13-90 client wants Fixed gases also.						
					per Shelli St Clair- No Fixed gases 3-13-90						

Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*	Relinquished by: *(Signature)*	Date/Time	Received by: *(Signature)*
[signature]	3/3/90 2040				
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: *(Signature)*	Date/Time	Remarks	
		[signature]	3-6-90 1000	Seals intact	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

AMTEST

AmTest Inc

Professional
Analytical
Services

14603 N.E. 87th St
Redmond, WA
98052

Fax: 206 883 3495

Tel: 206 885 1664

ANALYSIS REPORT

CLIENT: Am Test, Inc. - Air Quality Division

DATE RECEIVED: 3/6/90

REPORT TO: Kris Hansen

DATE REPORTED: 3/13/90

CEDAR HILL LANDFILL

Laboratory Sample Nos.	Client Identification	Chloride (ug/ml)
004525	Run 1 - #1 Stack	20.4
004526	Run 2 - #1 Stack	98.1
004527	Run 3 - #1 Stack	35.8
004528	Run 1 - #2 Stack	9.4
004529	Run 2 - #2 Stack	8.1
004530	Run 3 - #2 Stack	9.4
004531	BLANK H_2O	<2.0

KF/pb

REPORTED BY Kathy Fugiel

APPENDIX C

Example Calculations

Example Calculation of Retention Time
Flare #1 - Cedar Hills Landfill

Length of combustion zone = 35 feet to test port
area of combustion zone = 103.87 ft^2
Average airflow at test port = 140927.6 acfm

$$\frac{\text{area} \times \text{length} \times 60\ \text{sec/min}}{\text{acfm}} = \text{seconds of retention}$$

$$\frac{103.87\ ft^2 * 35\ ft * 60\ \text{sec/min}}{140927.6\ ft^3/\text{min}} = 1.55 \text{ seconds}$$

based on combustion to the height of the test port and acfm @ an average temperature of 1567°F

SAMPLE CALCULATION SHEET
METHODS 1-5

CLIENT: Sweet Edwards / Emcon Cedar Hills Land Fill DATE OF TEST: 3-2-90

LOCATION: PNL 201 - Flare Inlet RUN #: 1-M4

Particulate Matter Emission Concentration - Equation 5-1

Vm_{std} = 17.647°R/"Hg * 8.552 ft^3 * .998 * (29.61 "Hg + (28.2 "H_2O/13.6))/(460 + 80.9° F)

= 8.822 dscf

dscm = 8.822 dscf/35.31 ft^3/m^3

= 0.250 dscm

Substitution of Equation 5-4 into 5-5

W_a = _____ mg * _____ ml /_____ ml

= _____ mg

M_n = (net weight filter catch) + (net weight "B" section) - Wa + Back-half

= _____ mg = _____ mg + _____ mg - _____ mg +_____ mg

C_s= (0.001 g/mg) * (15.43 grains/gram) * _____ mg /_____ dscf

= _____ gr/dscf (Equation 5-6)

gr/dscf @7% O_2 = _____ gr/dscf * (20.9% - 7%O_2)/(20.9% - _____ %O_2)

= _____ gr/dscf @ 7% O_2

gr/dscf @ 12% CO_2 = _____ gr/dscf * 12% / _____ %CO_2

= _____ gr/dscf @ 12% CO_2

mg/dscm = _____ mg/_____ dscm

= _____ mg/dscm

Particulate Matter Emission Rate

pounds/hour = _____ gr/dscf * _____ dscf/min * 60 min/hr * 1 lb/7000 grains

= _____ lb/hr

Moisture - Equation 5-2 and 5-3

Vw_{std} = 0.04715 ft^3/g * 3.5454 grams of H_2O collected in impingers

= 0.17 scf

SAMPLE CALCULATION SHEET (continued)
METHODS 1-5

B_{ws} = (0.17 scf)/(0.17 scf + 8.822 dscf)

= 0.0186

%Moisture = 0.0186 * 100

= 1.86 %

Molecular weight - Equation 3-2

M_d = 0.440 * (22.0 $\%CO_2$) + 0.320 * (5.5 $\%O_2$) + 0.280 * (72.5 % CO + $\%N_2$)

M_d = 31.74 g/g-mole (dry)

M_s = 31.74 g/g-mole * (1 - .0186) + 18.0g/g-mole * .0186

M_s = 31.48 g/g-mole (wet)

Stack gas velocity and volumetric flow rate - Equation 2-9 and 2-10

V_s = 85.49 * .99 * 0.7637* $\sqrt{551.9}$° R / 31.48 g/g-mole / 31.68 "Hg

V_s = 48.1 ft/sec (std)

Q_{sd} = 3600 * (1 - .0186) * 48.1 ft/sec * .785 ft^2 * (528 ° R/ 5519° R) * (31.68 "Hg/ 29.92 "Hg)

= 135162 dscf/hr / 60 min/hr

= 2252.7 dscf/min (dry standard cubic feet per minute)

acfm = 48.1 ft/sec * .785 ft^2* 60 sec/min

= 2265.7 acfm (actual cubic feet per minute)

Isokinetic variation - Equation 5-8

I = 0.09450 * _____ dscf * _____° R/(_____ "Hg * _____ ft/sec * _____ min * _____ ft^2 *(1 - _____))

I = _____ %

All of the above numbered equations are from the 40 CFR 60 and assume English units.

SAMPLE CALCULATION SHEET
METHODS 1-5

CLIENT: Sweet Edwards/Emcon DATE OF TEST: 3/2/90

LOCATION: @ Cedar Hills Landfill RUN #: 1 M4/HCl
N. Flare #2 Outlet

Particulate Matter Emission Concentration - Equation 5-1

Vm_{std} = 17.647°R/"Hg * 40.57 ft³ * 1.017 * (29.61 "Hg + (.500 "H_2O/13.6))/(460 + 63.6° F)

= 41.227 dscf

dscm = 41.227 dscf/35.31 ft³/m³

= 1.168 dscm

Substitution of Equation 5-4 into 5-5

W_a = _____ mg * _____ ml / _____ ml

= _____ mg

M_n = (net weight filter catch) + (net weight "B" section) - Wa + Back-half

= _____ mg = _____ mg + _____ mg - _____ mg + _____ mg

C_s = (0.001 g/mg) * (15.43 grains/gram) * _____ mg / _____ dscf

= _____ gr/dscf (Equation 5-6)

gr/dscf @7% O_2 = _____ gr/dscf * (20.9% - 7%O_2)/(20.9% - _____ %O_2)

= _____ gr/dscf @ 7% O_2

gr/dscf @ 12% CO_2 = _____ gr/dscf * 12% / _____ %CO_2

= _____ gr/dscf @ 12% CO_2

mg/dscm = _____ mg/_____ dscm

= _____ mg/dscm

Particulate Matter Emission Rate

pounds/hour = _____ gr/dscf * _____ dscf/min * 60 min/hr * 1 lb/7000 grains

= _____ lb/hr

Moisture - Equation 5-2 and 5-3

Vw_{std} = 0.04715 ft³/g * 56.4 grams of H_2O collected in impingers

= 2.66 scf

SAMPLE CALCULATION SHEET (continued)
METHODS 1-5

B_{ws} = (2.66 scf)/(2.66 scf + 41.227 dscf)

= 0.01606

%Moisture = .01606 * 100

= 6.06 %

Molecular weight - Equation 3-2

M_d = 0.440 * (4.4 $\%CO_2$) + 0.320 * (14.7 $\%O_2$) + 0.280 * (80.9 % CO + $\%N_2$)

M_d = 29.29 g/g-mole (dry)

M_s = 29.29 g/g-mole * (1 - .01606) + 18.0g/g-mole * .01606

M_s = 28.61 g/g-mole (wet)

Stack gas velocity and volumetric flow rate - Equation 2-9 and 2-10

V_s = 85.49 * .84 * 0.1643 * $\sqrt{1858.8}$° R / 28.61 g/g-mole / 29.54 "Hg

V_s = 17.50 ft/sec (std)

Q_{sd} = 3600 * (1 - .01606) * 17.50 ft/sec * 103.87 ft^2 * (528 ° R/ 1858.8 R) * (29.54 "Hg/ 29.92 "Hg)

= 1724134 dscf/hr / 60 min/hr

= 28735.5 dscf/min (dry standard cubic feet per minute)

acfm = 17.50 ft/sec * 103.87 ft^2* 60 sec/min

= 109055.7 acfm (actual cubic feet per minute)

Isokinetic variation - Equation 5-8

I = 0.09450 * _____ dscf * _____° R/(_____ "Hg * _____ ft/sec * _____ min * _____ ft^2 *(1 - _____))

I = _____ %

All of the above numbered equations are from the 40 CFR 60 and assume English units.

JPM

Sample Calculation

Hydrochloric Acid Emissions

Client: Sweet Edwards/Emcon Location: N. Flare #2 - Outlet
Date: @ Cedar Hills Landfill Run #: 1 HCl
3/2/90

milligrams/dscm = ~~mg/liter * ml of solution/1000 ml/dscm~~
$\mu g/ml * ml\ of\ soln * \frac{1\ mg}{1000\ \mu g} / dscm * ratio\ of\ \frac{HCl}{+Cl}$

$= 9.4\ \mu g/ml * 320\ ml * \frac{1\ mg}{1000\ \mu g} / 1.168\ dscm * \frac{36.46\ mole\ wt.\ HCl}{35.45\ mole\ wt.\ Cl}$

$= \underline{2.65}\ mg/dscm$

$ppm = mg/dscm * \frac{22.414\ ml/m\text{-}mole}{36.46\ mg/m\text{-}mole} * \frac{293.15\ °K}{273.15\ °K} * \frac{m^3}{10^6\ ml} * 10^6\ ppm$

$= 2.65\ mg/dscm * \frac{22.414\ ml/m\text{-}mole}{36.46\ mg/m\text{-}mole} * \frac{293.15\ °K}{273.15\ °K} * \frac{m^3}{10^6\ ml} * 10^6\ ppm$

$= \underline{1.75}\ ppm$

$ppm @ 7\%\ O_2 = ppm * (20.9\%\ O_2 - 7\%\ O_2)/(20.9\%\ O_2 - \underline{measured}\ \%\ O_2)$

$= 1.75\ ppm * (20.9\%\ O_2 - 7\%\ O_2)/(20.9\%\ O_2 - 14.7\%\ O_2)$

$= 3.92\ ppm\ @\ 7\%\ O_2$

$lb/hr = mg/dscm * dscf/min * .0019/mg * \frac{1\ lb}{453.6\ g} * .02832\ m^3/ft^3 * \frac{60\ min}{hr}$

$= 2.65\ mg/dscm * 28735.5\ dscf/min * .0019/mg * \frac{1\ lb}{453.6\ g} * .02832\ m^3/ft^3 * \frac{60\ min}{hr}$
$= 0.29\ lb/hr$

EXAMPLE CALCULATION OF GASEOUS EMISSION RATES

RUN 1

CLIENT Sweet Edwards LOCATION Cedar Hills Landfill

SAMPLE SITE Flare #1 Outlet DATE March 1, 1990

SULFUR DIOXIDE (SO_2)

instrument averaged 0.5 ppm during the run

ppm x 1.660×10^{-7} = lb/dscf SO_2 (from 40 CFR 60, Appendix A, Method 19)

conversion factor

0.5 ppm x 1.660×10^{-7} = 8.3×10^{-8} lb/dscf

8.3×10^{-8} lb/dscf x 34456.8 dscf/min x 60 min/hr = 0.17 lb/hr

0.17 lb/hr * 24 hr/day x 365 day/yr * $\frac{1 \text{ ton}}{2000 \text{ lb}}$ = 0.75 ton/yr

NITROGEN OXIDES (NO_x as NO_2)

instrument averaged 11.8 ppm during the run

ppm x 1.194×10^{-7} = lb/dscf NO_x (from Method 19)

conversion factor

11.8 ppm x 1.194×10^{-7} = 1.41×10^{-6} lb/dscf

1.41×10^{-6} lb/dscf x 34456.8 dscf/min x 60 min/hr = 2.91 lb/hr

2.91 lb/hr * 24 hr/day * 365 day/yr * $\frac{1 \text{ ton}}{2000 \text{ lb}}$ = 12.8 ton/yr

Example Calculation
VOC Emission Rates

Run 1 - Inlet - Flare #1

Compound = Benzene

8200 ug/m³ found in sample

$$8200\ \mu g/m^3 * \frac{1\ m^3}{35.31\ ft^3} * 3042.2\ \frac{dscf}{min} * \frac{1\ mg}{1000\ \mu g}$$

$$= \underline{706\ mg/min}$$

Run 1 - Outlet - Flare #1

Compound = Benzene

$$21\ \mu g/m^3 * \frac{1\ m^3}{35.31\ ft^3} * 34456.8\ dscf/min * \frac{1\ mg}{1000\ \mu g}$$

$$= \underline{20.5\ mg/min}$$

Destruction Efficiency

$$\frac{\text{Average inlet } 714\ mg/min - \text{Average outlet } 7.9\ mg/min}{714\ mg/min_{inlet}} * 100\% = \underline{98.89\%}$$

APPENDIX D

Field Data Sheets

AT

G-08949-1

TRAVERSE SAMPLING DATA

Page 1 of 1

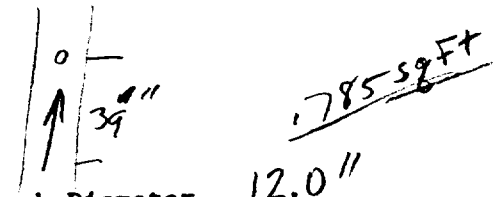
Client Sweet Edwards
Date 3-1-90
Sample Location PNL-101
Cedar Hills- Inlet
Operators KAH
Sample Box #
Run# 1-Inat

EQUIPMENT CHECKS

Initial/Final

Leak Rate Cfm ____/____
Leak Test Vac ____/____
____ Pitots, Pretest
____ Pitots, Postest
____ Orsat Sampling System
____ Tedlar Bag
____ Thermocouple @____°F

SCHEMATIC TRAVERSE LAYOUT



Stack Diameter 12.0"
Distance Upstream 39"
Distance Downstream 39"

Filter #____ tare____ mgs

	Final Wt.		Initial Wt.		Net Wt.
#1 Bubbler	____	-	____	=	____
#2 Impinger	____	-	____	=	____
#3 Bubbler	____	-	____	=	____
#4 Silica Gel	100.2847	-	95.573%	=	____

TOTAL WATER VOLUME ____

Start Time 0959
Stop Time 1100
Barometric Pressure "Hg 29.73
Static Pres "H_2O +11.0
Production Rate ____

NOMOGRAPH SETUP

% Moisture ____
Meter Temp. ____
Stack Temp. ____
ΔH@____ Y .998
Pitot#____ Side#____
Cp .99
Nozzle Diameter ____
K Factor ____
Reference ΔP ____

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu. Ft.	Pitot Reading (ΔP), In. H_2O	Orifice Setting (ΔH), In H_2O Ideal	Orifice Setting (ΔH), In H_2O Actual	Gas Meter Temp°F In	Gas Meter Temp°F Out	Pump Vacuum In. Hg Gauge	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	
	0	195934	8130		11"40		69	0	0	50	86	
	10		8100				74			50	86	=636 CFM
	20		8170				77			50	86	
	30		8060				82			50	86	
	40		7990				84			50	87	
	50		8120				86			50	87	
1100	60	209408	8240				82			50	87	
		13.474					79.1			86.4		

AT

G-08949-2 TRAVERSE SAMPLING DATA

Page 1 of 1

Client Sweet Edwards
Date 3-1-90
Sample Location Cedar Hills #1 - North Flare
Operators KAH / JMW
Sample Box #
Run# 2

EQUIPMENT CHECKS

Initial/Final

Leak Rate Cfm ____/____
Leak Test Vac ____/____
____ Pitots, Pretest
____ Pitots, Postest
____ Orsat Sampling System
____ Tedlar Bag
____ Thermocouple @____°F

SCHEMATIC TRAVERSE LAYOUT

Stack Diameter 12.0"
Distance Upstream
Distance Downstream

Filter #____ tare____ mgs

	Final Wt.		Initial Wt.		Net Wt.
#1 Bubbler	____	-	____	=	____
#2 Impinger	____	-	____	=	____
#3 Bubbler	____	-	____	=	____
#4 Silica Gel	____	-	____	=	____

TOTAL WATER VOLUME ____

Start Time 1100
Stop Time 1300
Barometric Pressure "Hg 29.73
Static Pres "H_2O +11.0
Production Rate

NOMOGRAPH SETUP

% Moisture
Meter Temp.
Stack Temp.
ΔH@____ Y .998
Pitot#____ Side#____
Cp .99
Nozzle Diameter
K Factor
Reference ΔP

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu. Ft.	Pitot Reading (ΔP), In. H_2O	Orifice Setting (ΔH), In H_2O Ideal	Orifice Setting (ΔH), In H_2O Actual	Gas Meter Temp°F In	Gas Meter Temp°F Out	Pump Vacuum In. Hg Gauge	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F
	0		8240 "H_2O								87
	10		8150								87
	20		7980								87
	30		8190								87
	40		8000								88
	50		7920								87
20	60		8000								86
	70		7500	1.1							88
	80		7600	1.1							88
	90		7800	1.1							88
	100		8000	1.1							90
	110		7950								89
end	120										

AT

G-08949-3 TRAVERSE SAMPLING DATA

Page 1 of 1

Client Sweet Edwards
Date 3-1-90
Sample Location Cedar Hills North Flare #1 Inlet
Operators JMW
~~Sample~~ Box #
Run# 3

EQUIPMENT CHECKS

Initial/Final

Leak Rate Cfm ____/____
Leak Test Vac ____/____
____ Pitots, Pretest
____ Pitots, Postest
____ Orsat Sampling System
____ Tedlar Bag
____ Thermocouple @____°F

SCHEMATIC TRAVERSE LAYOUT

Stack Diameter
Distance Upstream
Distance Downstream

Filter #____ tare____ mgs

	Final Wt.		Initial Wt.		Net Wt.
#1 Bubbler	____	-	____	=	____
#2 Impinger	____	-	____	=	____
#3 Bubbler	____	-	____	=	____
#4 Silica Gel	____	-	____	=	____

TOTAL WATER VOLUME

Start Time 1335
Stop Time 1535
Barometric Pressure "Hg 29.66
Static Pres "H_2O +11.0
Production Rate

NOMOGRAPH SETUP

% Moisture
Meter Temp.
Stack Temp.
ΔH@ ____ Y ____
Pitot# ____ Side# ____
Cp .99
Nozzle Diameter
K Factor
Reference ΔP

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu. Ft.	Pitot Reading (ΔP), In. H_2O	Orifice Setting (ΔH), In H_2O Ideal	Orifice Setting (ΔH), In H_2O Actual	Gas Meter Temp°F In	Gas Meter Temp°F Out	Pump Vacuum In. Hg Gauge	~~Filter Box~~ Temp °F	Imp. Exit Temp °F	Stack Temp °F
	0		1.15						1551		87
	10		1.15						1550		87
	20		1.15						1547		87
	30		1.15						1524		87
	40		1.15						1522		87
	50		1.15						1510		88
	60		1.15						1547		87
	70		1.15						1540		87
	80		1.15						1530		87
	90		1.15						1537		87
	100		1.15	8000					1535		86
	110		1.15						1532		87
	120										

1.15 87.0

AT

0041525

TRAVERSE SAMPLING DATA

Page 1 of 1

Client Sweet Edwards/Emcon
Date 3-1-90
Sample Location Cedar Hills Landfill - North Flare #1
Operators KSM / JMW
Sample Box # 1
Run# 1 - NA/Inlet (outlet)

SCHEMATIC TRAVERSE LAYOUT

Stack Diameter 138" ID
Distance Upstream 6'
Distance Downstream 35'

Start Time 0831
Stop Time 1031
Barometric Pressure "Hg 29.73
Static Pres "H_2O -.95
Production Rate

EQUIPMENT CHECKS

Initial/Final

Leak Rate Cfm < .01 / < .01
Leak Test Vac 15 / 15
_____ Pitots, Pretest
_____ Pitots, Postest
_____ Orsat Sampling System
_____ Tedlar Bag
_____ Thermocouple @ _____ °F

Filter # _____ tare _____ mgs

	Final Wt.	Initial Wt.	Net Wt.
#1 Bubbler	614.9	579.8	
#2 Impinger	574.0	571.4	
#3 Bubbler	556.1	527.0	
#4 Silica Gel	787.0	780.5	

TOTAL WATER VOLUME 43.3

NOMOGRAPH SETUP

% Moisture
Meter Temp.
Stack Temp.
ΔH@ _____ Y 1.017
Pitot# _____ Side# _____
Cp .84
Nozzle Diameter NA
K Factor
Reference ΔP

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu. Ft.	Pitot Reading (ΔP), In. H_2O	Orifice Setting (ΔH), In H_2O Ideal	Orifice Setting (ΔH), In H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vacuum In. Hg Gauge	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	Ambient °F
CP	0	210.766			.30	52	52	1	NA	52	1570	52
	30				.30	71	61	1		45	1575	55
	60				.30	81	73	1		49	1605	57
	90				.30	89	83	1		54	1610	57
end	120	238.418										

	1605		1610	
Temp	SW	NW	NE	SE
Inlet	.037	.037	.023	.028
	.062	.04	.03	.053
	.06	.04	.035	.055
	.058	.05	.04	.05
	.05	.05	.045	.05
	.042	.048	.042	.046

227.652 .043 70.3

AT

004526 TRAVERSE SAMPLING DATA

Page 1 of 1

Client Sweet Edwards
Date 3-1-90
Sample Location Cedar Hills #1 North Flare outlet
Operators RSM/JWW
Sample Box # 2
Run# 2 - M4/HCl

EQUIPMENT CHECKS

Initial/Final

Leak Rate Cfm OK / .026
Leak Test Vac 15" / 15"
_____ Pitots, Pretest
_____ Pitots, Postest
_____ Orsat Sampling System
_____ Tedlar Bag
_____ Thermocouple @ _____ °F

SCHEMATIC TRAVERSE LAYOUT

Stack Diameter 138"
Distance Upstream _____
Distance Downstream _____

Filter # ~~HC-#5~~ tare _____ mgs

	Final Wt.	Initial Wt.	Net Wt.
#1 Bubbler	676.8	- 598.8	=
#2 Impinger	608.3	- 598.3	=
#3 Bubbler	518.0	- 518.4	=
#4 Silica Gel	761.2	- 751.9	=
TOTAL WATER VOLUME			96.9

Start Time 1100
Stop Time 1300
Barometric Pressure "Hg 29.75
Static Pres "H_2O -.95
Production Rate _____

NOMOGRAPH SETUP

% Moisture _____
Meter Temp. _____
Stack Temp. _____
ΔH@ _____ Y 1.017
Pitot# _____ Side# _____
Cp .84
Nozzle Diameter _____
K Factor _____
Reference ΔP _____

SE

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu. Ft.	Pitot Reading (ΔP), In. H_2O		Orifice Setting (ΔH), In H_2O Ideal	Orifice Setting (ΔH), In H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vacuum In. Hg Gauge	Honeywell ~~Filter~~ ~~Box~~ Temp °F (10 min)	Imp. Exit Temp °F	Stack Temp °F	Ambient °F
CP	0	238.826				0.8	83	81	2	1500	61	1575	66
	30					0.8	94	85	2	1478	53	1540	82
	60					0.8	98	87	2	1498		1550	
	90					0.8	97	88	2	1522		1534	
end	120	298.772								1512			
										1514			
										1477			
										1541			
										1540			
										1534			
										1544			
			SW	NW	NE	SE							
		Velocity	.035	.025	.015	.027							
			.06	.021	.025	.052							
			.06	.04	.04	.055							
			.055	.042	.045	.05							
			.05	.042	.05	.05							
			.05	.04	.05	.045							

57.746 .0426 (ΔH) 89.1

AT

004527 TRAVERSE SAMPLING DATA

Page 1 of 1

Client Sweet Edwards
Date 3-1-90
Sample Location Cedar Hills North Flare #1 - outlet
Operators JMW/ISM
Sample Box # 3
Run# 3 M4/HC1

EQUIPMENT CHECKS

Initial/Final

Leak Rate Cfm <.001/____
Leak Test Vac 15 /____
____ Pitots, Pretest
____ Pitots, Postest
____ Orsat Sampling System
____ Tedlar Bag
____ Thermocouple @____ °F

SCHEMATIC TRAVERSE LAYOUT

Stack Diameter____
Distance Upstream____
Distance Downstream____

Filter #____ tare____ mgs

	Final Wt.	Initial Wt.	Net Wt.
#1 Bubbler	690.9	636.7	____
#2 Impinger	634.1	631.4	____
#3 Bubbler	538.2	538.9	____
#4 Silica Gel	808.1	801.4	____

TOTAL WATER VOLUME 62.9

Start Time 1337
Stop Time 1537
Barometric Pressure "Hg 29.06
Static Pres "H_2O -.95
Production Rate____

NOMOGRAPH SETUP

% Moisture____
Meter Temp.____
Stack Temp.____
ΔH@____ Y____
Pitot#____ Side#____
Cp____
Nozzle Diameter____
K Factor____
Reference ΔP____

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu. Ft.	Pitot Reading (ΔP), In. H_2O		Orifice Setting (ΔH), In H_2O Ideal	Orifice Setting (ΔH), In H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vacuum In. Hg Gauge	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	Ambient
CP	0	300.263				0.5	83	83	1.5	NA	62	1540	89
	30					0.5	90	82			51	1565	
	60					0.5	90	83			53	1570	93
	90					0.5	90	82	↓		55	1575	89
	120	341.196											
			15-17										
			SW	NW	NE	SE							
		Velocity	.02	.02	.02	.028							
			.05	.032	.03	.052							
			.055	.032	.04	.055							
			.052	.04	.04	.05							
			.05	.037	.04	.05							
			.047	.037	.038	.045							
		40.933	.0392										

85.4

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G-08949-4 TRAVERSE SAMPLING DATA

Page 1 of 1

Client Sweet Edwards
Date 3-2-90
Sample Location Cedar Hills
N. Flare Inlet - PNL-201
Operators JMW
Sample Box #
Run# 1 - Inlet

SCHEMATIC TRAVERSE LAYOUT

Stack Diameter 12"
Distance Upstream 39"
Distance Downstream 39"

Start Time 0810
Stop Time 1010
Barometric Pressure "Hg 29.61
Static Pres "H_2O -28.2
Production Rate

EQUIPMENT CHECKS

Initial/Final

Leak Rate Cfm ____/____
Leak Test Vac ____/____
____ Pitots, Pretest
____ Pitots, Postest
____ Orsat Sampling System
____ Tedlar Bag
____ Thermocouple @____ °F

Filter #____ tare____ mgs

	Final Wt.		Initial Wt.		Net Wt.
#1 Bubbler		-		=	
#2 Impinger		-		=	
#3 Bubbler		-		=	
#4 Silica Gel		-		=	

TOTAL WATER VOLUME

NOMOGRAPH SETUP

% Moisture
Meter Temp.
Stack Temp.
ΔH@ Y .958
Pitot# Side#
Cp .99
Nozzle Diameter
K Factor
Reference ΔP

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu. Ft.	Pitot Reading (ΔP), In. H_2O	~~Orifice Setting~~ (ΔH), In H_2O Ideal	Actual	Gas Meter Temp °F In	Out	Pump Vacuum In. Hg Gauge	~~Filter~~ Box Temp °F Outlet	Imp. Exit Temp °F	Stack Temp °F
CP	0		.58	4900	FPM				1403		90
	10		.58	5010					1401		90
	20		.58	5000					1403		90
	30		.58	5080					1413		91
	40		.58	5050					1416		91
	50		.58						1415		92
	100		.58						1427		92
	70		.58						1429		93
	80		.58						1420		93
	90		.58						1430		93
	100		.60						1433		94
	110		.60						1441		94
	120										
			.583						1419.3		

AT

G-08949-5 TRAVERSE SAMPLING DATA

Page 1 of 1

Client Sunset Edwards
Date 3-2-90
Sample Location Cut n Hills Landfill N. Flare #2 (PNL 201)
Operators JMH/KSM
Sample Box #
Run# 2 - Inlet

SCHEMATIC TRAVERSE LAYOUT

Stack Diameter
Distance Upstream
Distance Downstream

Start Time 1025
Stop Time 1225
Barometric Pressure "Hg 29.57
Static Pres "H_2O 28.2"
Production Rate

EQUIPMENT CHECKS

Initial/Final

Leak Rate Cfm ____/____
Leak Test Vac ____/____
____ Pitots, Pretest
____ Pitots, Postest
____ Orsat Sampling System
____ Tedlar Bag
____ Thermocouple @____ °F

Filter #____ tare____ mgs

	Final Wt.		Initial Wt.		Net Wt.
#1 Bubbler		-		=	
#2 Impinger		-		=	
#3 Bubbler		-		=	
#4 Silica Gel		-		=	

TOTAL WATER VOLUME

NOMOGRAPH SETUP

% Moisture
Meter Temp.
Stack Temp.
ΔH@ ____ Y .998
Pitot# ____ Side# ____
Cp .99
Nozzle Diameter
K Factor
Reference ΔP

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu. Ft.	Pitot Reading (ΔP), In. H_2O	Orifice Setting (ΔH), In H_2O Ideal	Orifice Setting (ΔH), In H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vacuum In. Hg Gauge	Outlet Ammonia Filter ~~Box~~ Temp °F	Imp. Exit Temp °F	Stack Temp °F
	0		.60						1445		95
	10		.60						1450		95
	20		.58						1450		95
	30		.58						1448		95
	40		.58						1447		95
	50		.60						1436		95
	60		.58						1414		95
	70		.58						1419		96
	80		.58						1400		96
	90		.58	4800					1397		96
	100		.58						1452		96
	110		.58						1448		96
	120										

AT

TRAVERSE SAMPLING DATA

Page 1 of 1

Client Sweet Edwards
Date 3-2-90
Sample Location Cedar Hills N. Plant #2 Fruit PHL 201
Operators JMW
Sample Box #
Run# 3 Moisture

EQUIPMENT CHECKS

Initial/Final

Leak Rate Cfm ____/____
Leak Test Vac ____/____
____ Pitots, Pretest
____ Pitots, Postest
____ Orsat Sampling System
____ Tedlar Bag
____ Thermocouple @____ °F

SCHEMATIC TRAVERSE LAYOUT

Moisture 1304 - 1404
65 minutes

Stack Diameter
Distance Upstream
Distance Downstream

Filter #____ tare____ mgs

	Final Wt.		Initial Wt.		Net Wt.
#1 Bubbler	____	-	____	=	____
#2 Impinger	____	-	____	=	____
#3 Bubbler	____	-	____	=	____
#4 Silica Gel	103.318	-	99.7727		____

TOTAL WATER VOLUME

Start Time 1244
Stop Time 1444
Barometric Pressure "Hg 29.55
Static Pres "H_2O -28.2
Production Rate

NOMOGRAPH SETUP

% Moisture
Meter Temp.
Stack Temp.
ΔH@____ Y .998
Pitot#____ Side#____
Cp .99
Nozzle Diameter
K Factor
Reference ΔP

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu. Ft.	Pitot Reading (ΔP), In. H_2O	Orifice Setting (ΔH), In H_2O Ideal	Orifice Setting (ΔH), In H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vacuum In. Hg Gauge	Outlet Thermocouple ~~Filter~~ ~~Box~~ Temp °F	Imp. Exit Temp °F	Stack Temp °F
44	0		.60						1438		97
54	10		.58						1456		97
1304	20	209.911	.58				77		1463		97
14	30		.58				79		1427		97
24	40		.59				77		1441		97
34	50		.59				79		1429		98
44	60		.59				85		1425		98
54	70		.59				85		1433		98
1404	80	217.963	.59				84		1394		99
14	90		.60				—		1444		99
24	100		.60				—		1433		99
34	110		.58				—		1426		99
	120										
			.589				80.9				97.9

AT

004528

TRAVERSE SAMPLING DATA

Client Sweet Edwards
Date 3-2-90
Sample Location Ceylon Hills landfill - N. Flare Outlet
Operators KSM
Sample Box # 3
Run# 1 M4/HCl

EQUIPMENT CHECKS

Initial/Final

Leak Rate Cfm OK / OK
Leak Test Vac ____ / ____
____ Pitots, Pretest
____ Pitots, Postest
____ Orsat Sampling System
____ Tedlar Bag
____ Thermocouple @ ____ °F

SCHEMATIC TRAVERSE LAYOUT

#2

Stack Diameter 138"
Distance Upstream ____
Distance Downstream ____

Filter # ____ tare ____ mgs

	Final Wt.		Initial Wt.		Net Wt.
#1 Bubbler	682.5	-	634.4	=	____
#2 Impinger	635.2	-	632.6	=	____
#3 Bubbler	537.0	-	536.6	=	____
#4 Silica Gel	805.5	-	800.0	=	____

TOTAL WATER VOLUME 56.4

Start Time 0810
Stop Time 1010
Barometric Pressure "Hg 29.61
Static Pres "H_2O -.90
Production Rate ____

NOMOGRAPH SETUP

% Moisture ____
Meter Temp. ____
Stack Temp. ____
ΔH@ ____ Y 1.017
Pitot# ____ Side# ____
Cp .84
Nozzle Diameter N/A
K Factor ____
Reference ΔP ____

NW Port Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu. Ft.	Pitot Reading (ΔP), In. H_2O	Orifice Setting (ΔH), In H_2O Ideal	Orifice Setting (ΔH), In H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vacuum In. Hg Gauge	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	Ambient
CP	0	341.332			0.5	49	49	1	NA	48	1390	
	30				0.5	69	60	1		42	1400	
	60				0.5	72	63	1		42	1385	
	90				0.5	78	69	1		44	1420	67°
	120	381.903										

42.571 .5 163.6 NB

AT

TRAVERSE SAMPLING DATA

Page 1 of 1

Client Sweet Edwards
Date 3-2-90
Sample Location Cedar Hills
N. Plant #2 Stack (PNL201)
Operators JMW/KSM
Sample Box # 1
Run# 2 M4/HCl

EQUIPMENT CHECKS

Initial/Final

Leak Rate Cfm ____/____
Leak Test Vac ____/____
____ Pitots, Pretest
____ Pitots, Postest
____ Orsat Sampling System
____ Tedlar Bag
____ Thermocouple @____°F

SCHEMATIC TRAVERSE LAYOUT

Stack Diameter____
Distance Upstream____
Distance Downstream____

Filter #____ tare____ mgs

	Final Wt.	Initial Wt.	Net Wt.
#1 Bubbler	616.2	600.1	= ____
#2 Impinger	601.6	599.1	= ____
#3 Bubbler	517.3	517.7	= ____
#4 Silica Gel	756.7	750.4	= ____

TOTAL WATER VOLUME 54.5

Start Time 1025
Stop Time 1225
Barometric Pressure "Hg 29.57
Static Pres "H_2O -.90
Production Rate____

NOMOGRAPH SETUP

% Moisture____
Meter Temp.____
Stack Temp.____
ΔH@____ Y 1.017
Pitot#____ Side#____
Cp .84
Nozzle Diameter____
K Factor____
Reference ΔP____

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu. Ft.	Pitot Reading (ΔP), In. H_2O		Orifice Setting (ΔH), In H_2O Ideal	Orifice Setting (ΔH), In H_2O Actual	Gas Meter Temp°F In	Gas Meter Temp°F Out	Pump Vacuum In. Hg Gauge	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	Honeywell °F
CR	0	382.055				.5	69	69	1	NA	58	1475	
	30					.5	82	72	1	2	53	1487	
	60	"				.5	90	81	1		53	1425	1426
	90	"				.5	92	83	1		53	1445	1446
	120	422.867											
		Honeywell	1430										
			NE	SE	SW								
		Velocity	.01	.02									
			.02	.035									
			.028	.035									
			.03	.035									
			.032	.032									
			.03	.03									

46.812 .027 79.8

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AT

TRAVERSE SAMPLING DATA

Page 1 of 1

Client Stuart Edward
Date 3-2
Sample Location Cedar Hills N. Unit #2 Stroke Unit #1
Operators KSM / Jones
Sample Box # 2
Run# 3 - M4/HCl

EQUIPMENT CHECKS

Initial/Final

Leak Rate Cfm ____/____
Leak Test Vac ____/____
____ Pitots, Pretest
____ Pitots, Postest
____ Orsat Sampling System
____ Tedlar Bag
____ Thermocouple @____°F

SCHEMATIC TRAVERSE LAYOUT

Stack Diameter____
Distance Upstream____
Distance Downstream____

Filter #____ tare____ mgs

	Final Wt.	Initial Wt.	Net Wt.
#1 Bubbler	625.4	580.1	= ____
#2 Impinger	632.4	629.9	= ____
#3 Bubbler	471.4	471.4	= ____
#4 Silica Gel	784.5	778.4	= ____

TOTAL WATER VOLUME 53.9

Start Time 1244
Stop Time 1444
Barometric Pressure "Hg 29.55
Static Pres "H_2O −.90
Production Rate____

NOMOGRAPH SETUP

% Moisture____
Meter Temp.____
Stack Temp.____
ΔH@____ Y 1.017
Pitot#____ Side#____
Cp .84
Nozzle Diameter NA
K Factor____
Reference ΔP____

NW Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu. Ft.	Pitot Reading (ΔP), In. H_2O		Orifice Setting (ΔH), In H_2O Ideal	Actual	Gas Meter Temp°F In	Out	Pump Vacuum In. Hg Gauge	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F
CP	0	423.068				.5	86	85	1	NA		1436
	30					.5	98	90	1			1436
	60					.5	100	91	1			1380
	90					.5	103	95	1			
	120	463.663										1450
			SE	NE	NW	SW						
		Velocity	.02	.01	.02	Port						
			.04	.018	.03	cover						
			.045	.02	.035	Stuck						
			.045	.022	.047							
			.035	.028	.047							
			.032	.03	.042							

40.395 0.030 93.5 103

CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: North Flare #1
SITE ADDRESS: Cedar Hills Land Fill (SE Port)
SAMPLING DATE: 3-1-90

SHIPPING DATE: 3-5-90
CANISTER SERIAL NO.
SAMPLER ID: 10 to - Run 1 (Ambient Tank
OPERATOR: KSM
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START	1543	80	X	X
STOP	1540	78		

PRESSURE

CANISTER PRESSURE	
PSI	0
X	29.1

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	1222	
STOP	1305	

@ 1738 = 16 PSI

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT

SAMPLING SYSTEM CERTIFICATION DATE:
QUARTERLY RECERTIFICATION DATE:

C. LABORATORY INFORMATION

DATE RECEIVED: 3/6/90
RECEIVED BY:
INITIAL PRESSURE: 27 PSIG
FINAL PRESSURE:
DILUTION FACTOR:
ANALYSIS
GC-FID-ECD DATE:
GC-MSD-SCAN DATE: 3/15/90 & 6/12/90
GC-MSD-SIM DATE:
RESULTS :

GC-FID-ECD:
GC-MSD-SCAN:
GC-MSD-SIM:

R Hayes, VP
SIGNATURE/TITLE

CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: North Flare outlet
SITE ADDRESS: Simi Hills SE Post
SAMPLING DATE: 3-1-90

SHIPPING DATE: _____
CANISTER SERIAL NO. _____
SAMPLER ID: 360 - Run 2 Ambient Test
OPERATOR: KSM
CANISTER LEAK CHECK DATE: _____

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START	1540	82	X	X
STOP	1570	73		

PRESSURE

CANISTER PRESSURE	
PS1	0
X	28.0

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	1350	
STOP	1455	

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT

SAMPLING SYSTEM CERTIFICATION DATE: _____
QUARTERLY RECERTIFICATION DATE: _____

C. LABORATORY INFORMATION

DATE RECEIVED: 3/6/90
RECEIVED BY: CCAS
INITIAL PRESSURE: 27 psig
FINAL PRESSURE: _____
DILUTION FACTOR: _____
ANALYSIS
GC-FID-ECD DATE: _____
GC-MSD-SCAN DATE: 3/15/90 & 6/12/90
GC-MSD-SIM DATE: _____
RESULTS : _____

GC-FID-ECD: _____
GC-MSD-SCAN: _____
GC-MSD-SIM: _____

[signature] VP
SIGNATURE/TITLE

CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: North Flare Outlet
SITE ADDRESS: Cedar Hills SE Post
SAMPLING DATE: 5-1-90

SHIPPING DATE:
CANISTER SERIAL NO.
SAMPLER ID: 407 Run 3 (Source tank)
OPERATOR: KSM
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START	1570	79	X	X
STOP	1520	77		

PRESSURE

CANISTER PRESSURE	
	0
X	26.0

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	1505	
STOP	1544	

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT

SAMPLING SYSTEM CERTIFICATION DATE:
QUARTERLY RECERTIFICATION DATE:

C. LABORATORY INFORMATION

DATE RECEIVED: 3/6/90
RECEIVED BY: CAS
INITIAL PRESSURE: 23 PSIG
FINAL PRESSURE:
DILUTION FACTOR:
ANALYSIS
GC-FID-ECD DATE:
GC-MSD-SCAN DATE: 3/15/90 & 6/12/90
GC-MSD-SIM DATE:
RESULTS :

GC-FID-ECD:
GC-MSD-SCAN:
GC-MSD-SIM:

J R Hayes, VP
SIGNATURE/TITLE

CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: N. Pine #2 Stack (PNL 201)
SITE ADDRESS: Cedar Hills NW Post
SAMPLING DATE: 3-2-90

SHIPPING DATE:
CANISTER SERIAL NO.
SAMPLER ID: #116 Run 1 (Ambient tan
OPERATOR: KSM
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START	1385	62	X	X
STOP	1436	66		

PRESSURE

CANISTER PRESSURE	
PSI	0
X	19.9

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	0908	
STOP	1012	

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT

SAMPLING SYSTEM CERTIFICATION DATE:
QUARTERLY RECERTIFICATION DATE:

C. LABORATORY INFORMATION

DATE RECEIVED: 3/6/90
RECEIVED BY: CCAS
INITIAL PRESSURE: 15 psig
FINAL PRESSURE:
DILUTION FACTOR:
ANALYSIS
GC-FID-ECD DATE:
GC-MSD-SCAN DATE: 3/15/90 & 6/12/90
GC-MSD-SIM DATE:
RESULTS :

GC-FID-ECD:
GC-MSD-SCAN:
GC-MSD-SIM:

R Hayes, VP
SIGNATURE/TITLE

CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: N. Pine #2 Stack
SITE ADDRESS: Clean Hills NW Post
SAMPLING DATE: 3-2-90

SHIPPING DATE: _____
CANISTER SERIAL NO. _____
SAMPLER ID: #415 - Run 2 (Source tank
OPERATOR: KSM
CANISTER LEAK CHECK DATE: _____

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START	1425	69	X	X
STOP	1445	71		

PRESSURE

CANISTER PRESSURE	
PSI	0
X	24.3

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	1125	
STOP	1225	

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT

SAMPLING SYSTEM CERTIFICATION DATE: _____
QUARTERLY RECERTIFICATION DATE: _____

C. LABORATORY INFORMATION

DATE RECEIVED: 3/6/90
RECEIVED BY: CAS
INITIAL PRESSURE: 20 psig
FINAL PRESSURE: _____
DILUTION FACTOR: _____
ANALYSIS
GC-FID-ECD DATE: _____
GC-MSD-SCAN DATE: 3/15/90 & 6/12/90
GC-MSD-SIM DATE: _____
RESULTS : _____

GC-FID-ECD: _____
GC-MSD-SCAN: _____
GC-MSD-SIM: _____

R Hi VP
SIGNATURE/TITLE

CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: N. flow #2 outlet
SITE ADDRESS: Cedar Hill, NW Port
SAMPLING DATE: 3-2-90

SHIPPING DATE:
CANISTER SERIAL NO.
SAMPLER ID: #124 Run 3 (bonus tank)
OPERATOR: KSM
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START	1436	83	X	X
STOP	1380	82		

PRESSURE

CANISTER PRESSURE	
	0
X	24.3

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	1248	
STOP	1342	

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT

SAMPLING SYSTEM CERTIFICATION DATE:
QUARTERLY RECERTIFICATION DATE:

C. LABORATORY INFORMATION

DATE RECEIVED: 3/6/90
RECEIVED BY: CAS
INITIAL PRESSURE: 20.5 psig
FINAL PRESSURE:
DILUTION FACTOR:
ANALYSIS
GC-FID-ECD DATE:
GC-MSD-SCAN DATE: 3/15/90 & 6/12/90
GC-MSD-SIM DATE:
RESULTS :

GC-FID-ECD:
GC-MSD-SCAN:
GC-MSD-SIM:

R Hayes, VP
SIGNATURE/TITLE

APPENDIX E

Miscellaneous Supporting Information

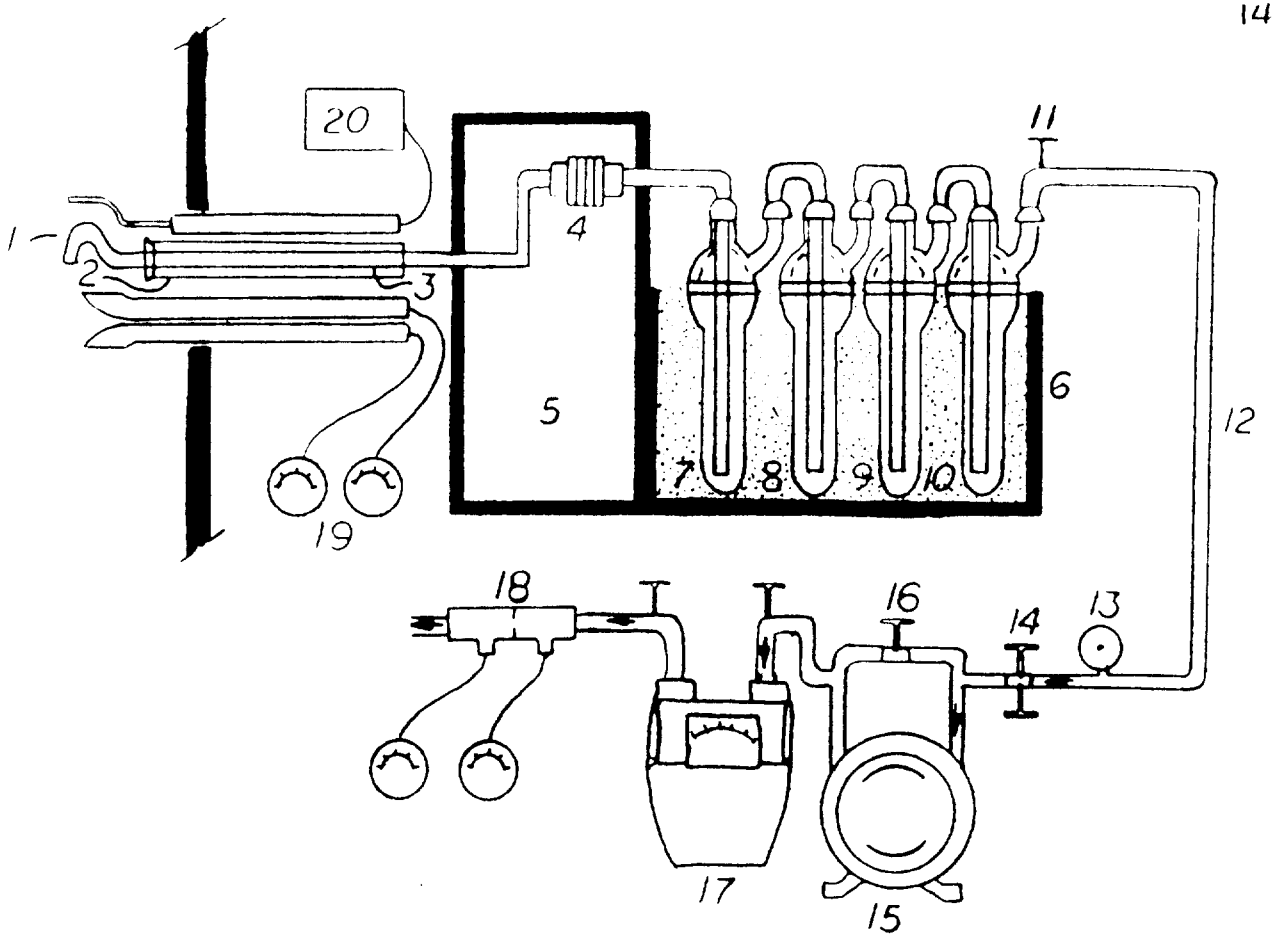


Figure 1. EPA Method 4 Moisture Sample Train.

1. Sampling nozzle
2. Sampling probe sheath
3. Heated sample probe liner
4. Connective glassware
5. Heated compartment
6. Impinger case - contains ice during sampling
7. First impinger containing 100 ml H_2O
8. Modified Greenburg-Smith impinger containing 100 ml H_2O
9. Third impinger - empty
10. Fourth impinger containing indicating silica gel desiccant
11. Impinger exit gas temperature sensor
12. Umbilical cord - vacuum line
13. Vacuum gauge
14. Fine and coarse adjustment valves
15. Leak free pump
16. By-pass valve
17. Dry gas meter with inlet and outlet temperature sensors
18. Orifice meter with magnehelic gauges
19. S-type pitot tube with magnehelic gauges
20. Fluke multi-channel digital thermocouple indicator

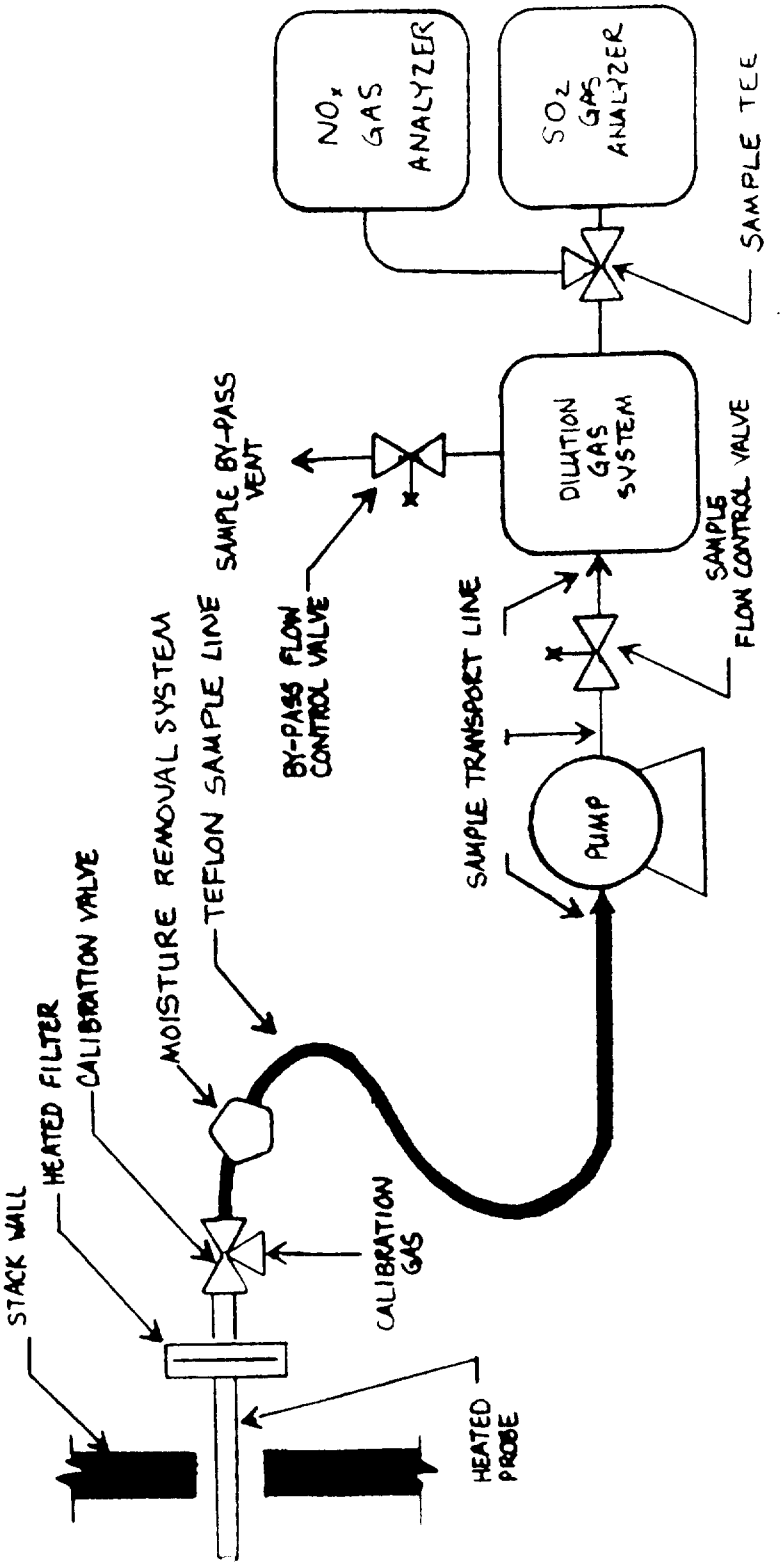


Figure 2. Method 6C/7E sampling system schematic.

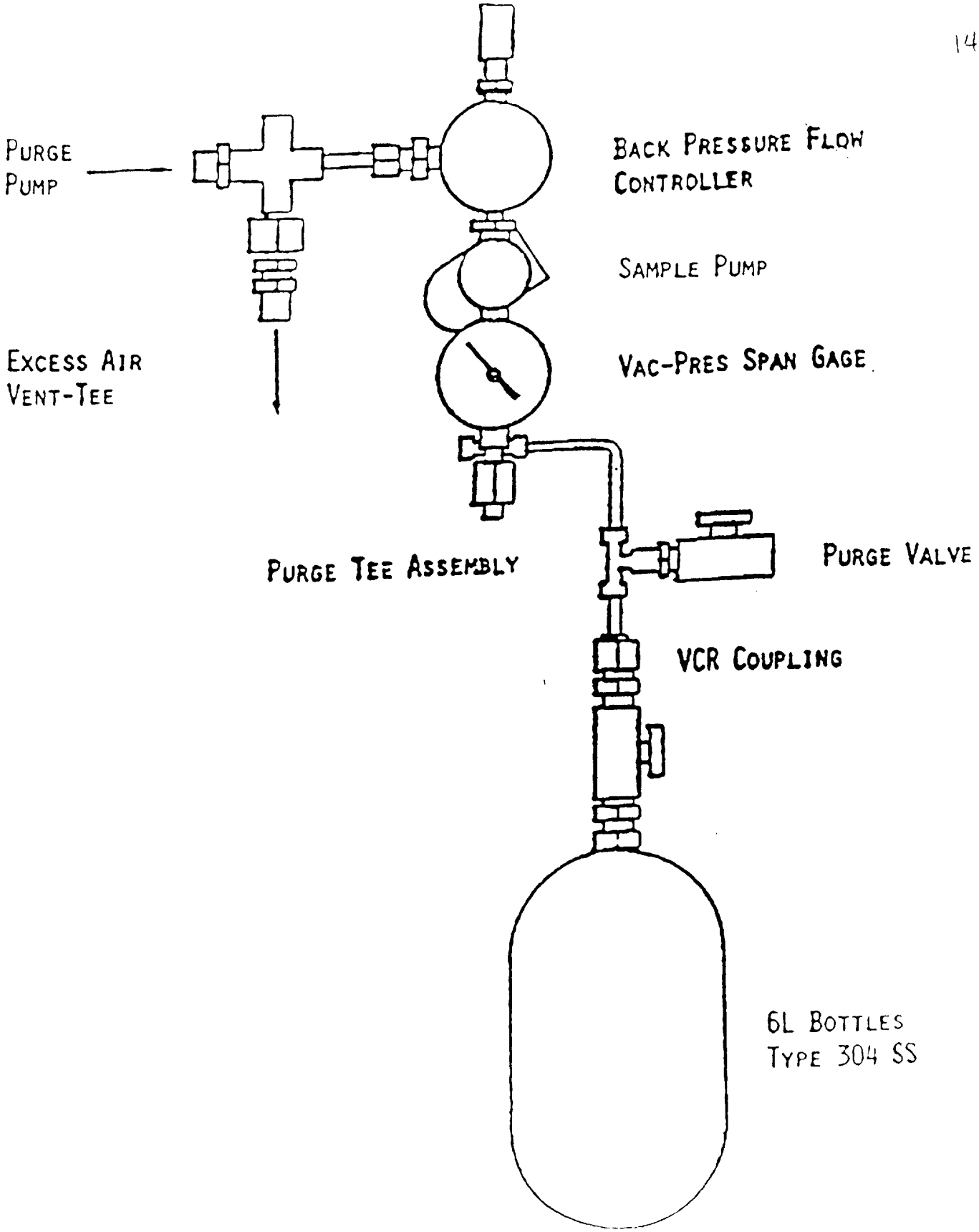


Figure 3. TO-14 Sample System Schematic.

METHOD 1 - LOCATION OF TRAVERSE POINTS

Circular Stacks

TRAVERSE POINT	DISTANCE % of diameter
1	4.4
2	14.7
3	29.5
4	70.5
5	85.3
6	95.6

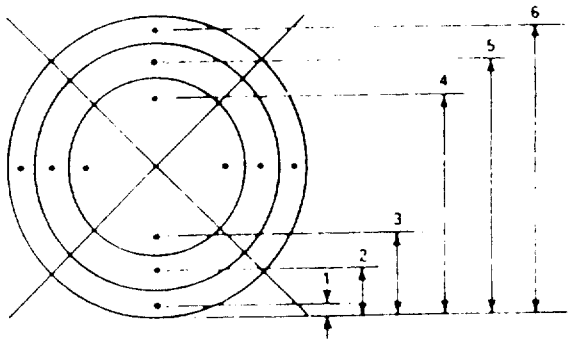


Figure 1-3. Example showing circular stack cross section divided into 12 equal areas, with location of traverse points indicated.

TABLE 1-2. LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS

(Percent of stack diameter from inside wall to traverse point)

Traverse point number on a diameter	Number of traverse points on a diameter—											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8				96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10					97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.8	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9

Rectangular Stacks

For a rectangular cross section, an equivalent diameter (D_e) shall be calculated from the following equation, to determine the upstream and downstream distances:

$$D_e = \frac{2LW}{(L+W)}$$

where L = length and W = width.

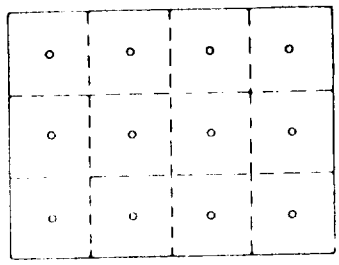


Figure 1-4. Example showing rectangular stack cross section divided into 12 equal areas, with a traverse point at centroid of each area.

METHOD 1 - MINIMUM NUMBER OF TRAVERSE POINTS

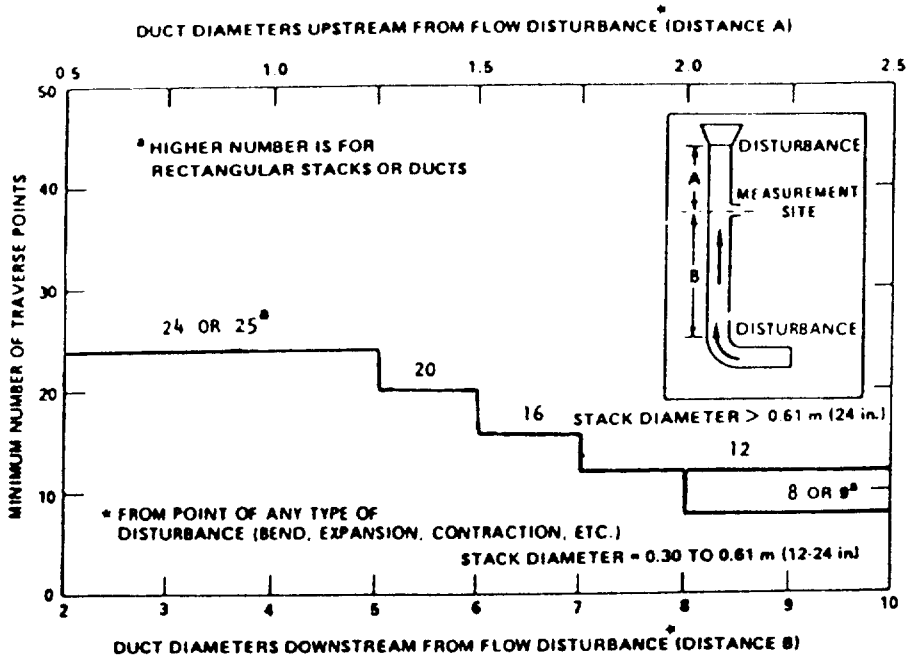


Figure 1-1. Minimum number of traverse points for particulate traverses.

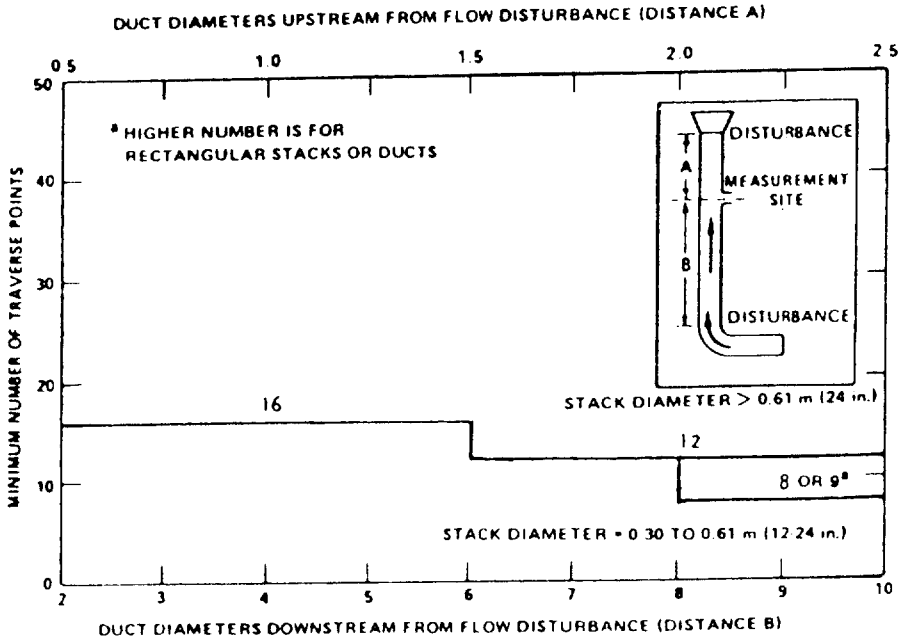


Figure 1-2. Minimum number of traverse points for velocity (nonparticulate) traverses.

METHOD 2 - STACK GAS VELOCITY AND VOLUMETRIC FLOW CALCULATIONS

5.1 Nomenclature.

A = Cross-sectional area of stack, m² (ft²).
B_{ws} = Water vapor in the gas stream (from Method 5 or Reference Method 4), proportion by volume.
C_p = Pitot tube coefficient, dimensionless.
K_p = Pitot tube constant,

$$34.97 \frac{\text{m}}{\text{sec}} \left[\frac{(g/g\text{-mole})(\text{mm Hg})}{(^\circ\text{K})(\text{mm H}_2\text{O})} \right]^{1/2}$$

for the metric system and

$$85.49 \frac{\text{ft}}{\text{sec}} \left[\frac{(\text{lb/lb-mole})(\text{in. Hg})}{(^\circ\text{R})(\text{in. H}_2\text{O})} \right]^{1/2}$$

for the English system.

M_d = Molecular weight of stack gas, dry basis (see Section 3.6) g/g-mole (lb/lb-mole).
M_s = Molecular weight of stack gas, wet basis, g/g-mole (lb/lb-mole).

$$= M_d (1 - B_{ws}) + 18.0\, B_{ws}$$

Eq. 2-5

P_{bar} = Barometric pressure at measurement site, mm Hg (in. Hg).
P_g = Stack static pressure, mm Hg (in. Hg).
P_s = Absolute stack gas pressure, mm Hg (in. Hg).

$$= P_{bar} + P_g$$

Eq. 2-6

P_{std} = Standard absolute pressure, 760 mm Hg (29.92 in. Hg).
Q_{std} = Dry volumetric stack gas flow rate corrected to standard conditions, dscm/hr (dscf/hr).
t_s = Stack temperature, °C (°F).
T_s = Absolute stack temperature, °K, (°R).

$$= 273 + t_s \text{ for metric.}$$

Eq. 2-7

$$= 460 + t_s \text{ for English.}$$

Eq. 2-8

T_{std} = Standard absolute temperature, 293 °K (528° R).
v_s = Average stack gas velocity, m/sec (ft/sec).
Δ_p = Velocity head of stack gas, mm H_2O (in. H_2O).
3,600 = Conversion factor, sec/hr.
18.0 = Molecular weight of water, g/g-mole (lb/lb-mole).

5.2 Average Stack Gas Velocity.

$$v_s = K_p C_p (\sqrt{\Delta p})_{avg} \sqrt{\frac{T_{s(avg)}}{P_s M_s}}$$

Equation 2-9

5.3 Average Stack Gas Dry Volumetric Flow Rate.

$$Q_{std} = 3{,}600(1 - B_{ws}) v_s A \left(\frac{T_{std}}{T_{s\,(avg)}} \right) \left(\frac{P_s}{P_{std}} \right)$$

Eq. 2-10

METHOD 3 - MOLECULAR WEIGHT AND EXCESS AIR CALCULATIONS

6.1 Nomenclature.

M_d = Dry molecular weight, g/g-mole (lb/lb-mole).
%EA = Percent excess air.
$\%CO_2$ = Percent CO_2 by volume (dry basis).
$\%O_2$ = Percent O_2 by volume (dry basis).
%CO = Percent CO by volume (dry basis).
$\%N_2$ = Percent N_2 by volume (dry basis).
0.264 = Ratio of O_2 to N_2 in air, v/v.
0.280 = Molecular weight of N_2 or CO, divided by 100.
0.320 = Molecular weight of O_2 divided by 100.
0.440 = Molecular weight of CO_2 divided by 100.

6.2 Percent Excess Air. Calculate the percent excess air (if applicable), by substituting the appropriate values of percent O_2, CO, and N_2 (obtained from Section 4.1.3 or 4.2.4) into Equation 3-1.

$$\%\,EA = \frac{\%O_2 - 0.5\%\ CO}{0.264\%\ N_2 (\%O_2 - 0.5\%\ CO)} \times 100$$

Eq. 3-1

NOTE: The equation above assumes that ambient air is used as the source of O_2 and that the fuel does not contain appreciable amounts of N_2 (as do coke oven or blast furnace gases). For those cases when appreciable amounts of N_2 are present (coal, oil, and natural gas do not contain appreciable amounts of N_2) or when oxygen enrichment is used, alternate methods, subject to approval of the Administrator, are required.

6.3 Dry Molecular Weight. Use Equation 3-2 to calculate the dry molecular weight of the stack gas

$$M_d = 0.440(\%CO_2) + 0.320(\%O_2) + 0.280(\%N_2 + \%CO)$$

Eq. 3-2

METHOD 4 - STACK GAS MOISTURE CALCULATIONS

2.3.1 Nomenclature.

B_{ws} = Proportion of water vapor, by volume, in the gas stream.

M_w = Molecular weight of water, 18.0 g/g-mole (18.0 lb/lb-mole).

P_m = Absolute pressure (for this method, same as barometric pressure) at the dry gas meter, mm Hg (in. Hg).

P_{std} = Standard absolute pressure, 760 mm Hg (29.92 in. Hg).

R = Ideal gas constant, 0.06236 (mm Hg) (m^3)/(g-mole) (°K) for metric units and 21.85 (in. Hg) (ft^3)/(lb-mole) (°R) for English units.

T_m = Absolute temperature at meter, °K (°R).

T_{std} = Standard absolute temperature, 293° K (528°R).

V_m = Dry gas volume measured by dry gas meter, dcm (dcf).

ΔV_m = Incremental dry gas volume measured by dry gas meter at each traverse point, dcm (dcf).

$V_{m(std)}$ = Dry gas volume measured by the dry gas meter, corrected to standard conditions, dscm (dscf).

$V_{wc(std)}$ = Volume of water vapor condensed corrected to standard conditions, scm (scf).

$V_{wsg(std)}$ = Volume of water vapor collected in silica gel corrected to standard conditions, scm (scf).

V_f = Final volume of condenser water, ml.

V_i = Initial volume, if any, of condenser water, ml.

W_f = Final weight of silica gel or silica gel plus impinger, g.

W_i = Initial weight of silica gel or silica gel plus impinger, g.

Y = Dry gas meter calibration factor.

ρ_w = Density of water, 0.9982 g/ml (0.002201 lb/ml).

2.3.2 Volume of Water Vapor Condensed.

$$V_{wc(std)} = \frac{(V_f - V_i)\rho_w R T_{std}}{P_{std} M_w}$$

$$= K_1 (V_f - V_i)$$

Eq. 4-1

K_1 = 0.001333 m^3/ml for metric units
= 0.04707 ft^3/ml for English units

2.3.3 Volume of Water Vapor Collected in Silica Gel.

$$V_{wsg(std)} = \frac{(W_f - W_i) R T_{std}}{P_{std} M_w}$$

$$= K_2 (W_f - W_i)$$

Eq. 4-2

Where:

K_2 = 0.001335 m^3/g for metric units
= 0.04715 ft^3/g for English units

2.3.4 Sample Gas Volume.

$$V_{m(std)} = V_m Y \frac{(P_m)(T_{std})}{(P_{std})(T_m)}$$

$$= K_3 Y \frac{V_m P_m}{T_m}$$

Eq. 4-3

Where:

K_3 = 0.3858 °K/mm Hg for metric units
= 17.64 °R/in. Hg for English units

NOTE: If the post-test leak rate (Section 2.2.6) exceeds the allowable rate, correct the value of V_m in Equation 4-3, as described in Section 6.3 of Method 5.

2.3.5 Moisture Content.

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

Eq. 4-4

NOTE: In saturated or moisture droplet-laden gas streams, two calculations of the moisture content of the stack gas shall be made, one using a value based upon the saturated conditions (see Section 1.2), and another based upon the results of the impinger analysis. The lower of these two values of B_{ws} shall be considered correct.

METHOD 5 - PARTICULATE EMISSION CALCULATIONS - (1)

6.1 Nomenclature.

A_n = Cross-sectional area of nozzle, m^2 (ft^2).

B_{ws} = Water vapor in the gas stream, proportion by volume.

C_a = Acetone blank residue concentration, mg/g.

c_s = Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, g/dscm (g/dscf).

I = Percent of isokinetic sampling.

L_a = Maximum acceptable leakage rate for either a pretest leak check or for a leak check following a component change; equal to 0.0057 m^3/min (0.02 cfm) or 4 percent of the average sampling rate, whichever is less.

L_i = Individual leakage rate observed during the leak check conducted prior to the "i^{th}" component change ($i = 1, 2, 3 \ldots n$), m^3/min (cfm).

L_p = Leakage rate observed during the post-test leak check, m^3/min (cfm).

m_a = Mass of residue of acetone after evaporation, mg.

m_n = Total amount of particulate matter collected, mg.

M_w = Molecular weight of water, 18.0 g/g-mole (18.0lb/lb-mole).

P_{bar} = Barometric pressure at the sampling site, mm Hg (in. Hg).

P_s = Absolute stack gas pressure, mm Hg (in. Hg).

P_{std} = Standard absolute pressure, 760 mm Hg (29.92 in. Hg).

R = Ideal gas constant, 0.06236 mm Hg-m^3/°K-g-mole (21.85 in. Hg-ft^3/°R-lb-mole).

T_m = Absolute average dry gas meter temperature (see Figure 5-2), °K (°R).

T_s = Absolute average stack gas temperature (see Figure 5-2), °K (°R).

T_{std} = Standard absolute temperature, 293° K (528° R).

V_a = Volume of acetone blank, ml.

V_{aw} = Volume of acetone used in wash, ml.

V_{lc} = Total volume of liquid collected in impingers and silica gel (see Figure 5-3), ml.

V_m = Volume of gas sample as measured by dry gas meter, dcm (dscf).

$V_{m(std)}$ = Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscm (dscf).

$V_{w(std)}$ = Volume of water vapor in the gas sample, corrected to standard conditions, scm (scf).

v_s = Stack gas velocity, calculated by Method 2, Equation 2-9, using data obtained from Method 5, m/sec (ft/sec).

W_a = Weight of residue in acetone wash, mg.

Y = Dry gas meter calibration factor.

ΔH = Average pressure differential across the orifice meter (see Figure 5-2), mm H_2O (in. H_2O).

ρ_a = Density of acetone, mg/ml (see label on bottle).

ρ_w = Density of water, 0.9982 g/ml (0.002201 lb/ml).

θ = Total sampling time, min.

θ_1 = Sampling time interval, from the beginning of a run until the first component change, min.

θ_i = Sampling time interval, between two successive component changes, beginning with the interval between the first and second changes, min.

θ_p = Sampling time interval, from the final (n^{th}) component change until the end of the sampling run, min.

13.6 = Specific gravity of mercury.

60 = Sec/min.

100 = Conversion to percent.

6.2 Average Dry Gas Meter Temperature and Average Orifice Pressure Drop. See data sheet (Figure 5-2).

6.3 Dry Gas Volume. Correct the sample volume measured by the dry gas meter to standard conditions (20° C, 760 mm Hg or 68° F, 29.92 in. Hg) by using Equation 5-1.

$$V_{m(std)} = V_m Y \left(\frac{T_{std}}{T_m}\right)\left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{P_{std}}\right]$$

$$= K_1 V_m Y \frac{P_{bar} + (\Delta H/13.6)}{T_m}$$

Equation 5-1

Where:

K_1 = 0.3858 °K/mm Hg for metric units
= 17.64 °R/in. Hg for English units

NOTE: Equation 5-1 can be used as written unless the leakage rate observed during any of the mandatory leak checks (i.e., the post-test leak check or leak checks conducted prior to component changes) exceeds L_a. If L_p or L_i exceeds L_a, Equation 5-1 must be modified as follows:

(a) Case I. No component changes made during sampling run. In this case, replace V_m in Equation 5-1 with the expression:

$$[V_m - (L_p - L_a)\theta]$$

(b) Case II. One or more component changes made during the sampling run. In this case, replace V_m in Equation 5-1 by the expression:

$$\left[V_m - (L_1 - L_a)\theta_1 - \sum_{i=2}^{n} (L_i - L_a)\theta_i - (L_p - L_a)\theta_p\right]$$

and substitute only for those leakage rates (L_i or L_p) which exceed L_a.

6.4 Volume of Water Vapor.

METHOD 5 - PARTICULATE EMISSION CALCULATIONS - (2)

Equation 5-2

$$V_{w(std)} = V_{lc}\left(\frac{\rho_w}{M_w}\right)\left(\frac{RT_{std}}{P_{std}}\right) = K_2 V_{lc}$$

Where:

$K_2 = 0.001333$ m³/ml for metric units

$= 0.04707$ ft³/ml for English units.

6.5 Moisture Content.

$$B_{ws} = \frac{V_{w(std)}}{V_{m(std)} + V_{w(std)}}$$

Eq. 5-3

NOTE: In saturated or water droplet-laden gas streams, two calculations of the moisture content of the stack gas shall be made, one from the impinger analysis (Equation 5-3), and a second from the assumption of saturated conditions. The lower of the two values of B_{ws} shall be considered correct. The procedure for determining the moisture content based upon assumption of saturated conditions is given in the Note of Section 1.2 of Method 4. For the purposes of this method, the average stack gas temperature from Figure 5-2 may be used to make this determination, provided that the accuracy of the in-stack temperature sensor is ±1° C (2° F).

6.6 Acetone Blank Concentration.

$$C_a = \frac{m_a}{V_a \rho_a}$$

Eq. 5-4

6.7 Acetone Wash Blank.

$$W_a = C_a V_{aw} \rho_a$$

Eq. 5-5

6.8 Total Particulate Weight. Determine the total particulate catch from the sum of the weights obtained from Containers 1 and 2 less the acetone blank (see Figure 5-3).

NOTE: Refer to Section 4.1.5 to assist in calculation of results involving two or more filter assemblies or two or more sampling trains.

6.9 Particulate Concentration.

$$c_s = (0.001\ g/mg)\,(m_n / V_{m(std)})$$

Eq. 5-6

6.10 Conversion Factors:

From	To	Multiply by
scf	m³	0.02832
g/ft³	gr/ft³	15.43
g/ft³	lb/ft³	2.205×10^{-3}
g/ft³	g/m³	35.31

6.11 Isokinetic Variation.

6.11.1 Calculation From Raw Data

$$I = \frac{100\, T_s [K_3 V_{lc} + (P_m / T_m)(P_{bar} + \Delta H/13.6)]}{60\theta v_s P_s A_n}$$

Eq. 5-7

Where:

$K_3 = 0.003454$ mm Hg-m³/ml-°K for metric units.

$= 0.002669$-in. Hg-ft³/ml-°R for English units.

6.11.2 Calculation From Intermediate Values.

$$I = \frac{T_s V_{m(std)} P_{std} 100}{T_{std} v_s \theta A_n P_s 60(1 - B_{ws})} = K_4 \frac{T_s V_{m(std)}}{P_s V_s A_n \theta (1 - B_{ws})}$$

Equation 5-8

where:

$K_4 = 4.320$ for metric units

$= 0.09450$ for English units.

6.12 Acceptable Results. If 90 percent < I < 110 percent, the results are acceptable. If the particulate results are low in comparison to the standard, and I is over 110 percent or less than 90 percent, the Administrator may accept the results.

NOMENCLATURE
METHOD 5 CALCULATIONS

Vm_{std} = Volume of gas sample measured by the dry gas meter, corrected to standard conditions, dscm (dscf).

Y = Dry gas meter calibration factor

P_b = Barometric pressure at the sampling site, mm Hg (in. Hg)

H = Average pressure differential across the orifice meter, mm H_2O (in. H_2O)

T_m = Absolute average dry gas meter temperature, ° K (° R)

dscm = Dry standard cubic meters

dscf = Dry standard cubic feet

W_a = Weight of residue in acetone wash

M_a = Mass of residue of acetone after evaporation, mg

C_a = Acetone blank residue concentration, mg/g

V_a = Volume of acetone blank

V_{aw} = Volume of acetone used in wash, ml

M_n = Total amount of particulate matter collected, mg

C_s = Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, mg/dscm (gr/dscf)

gr/dscf = grains per dry standard cubic foot

Vw_{std} = Volume of water vapor in the gas sample, corrected to standard conditions, scm (scf)

B_{ws} = Water vapor in the gas stream, proportion by volume

M_d = Molecular weight of stack gas, g/g-mole on dry basis

M_s = Molecular weight of stack gas, g/g-mole on wet basis

V_s = Stack gas velocity, calculated by Method 2, Equation 2-9, using data obtained from Method 5, m/sec (ft/sec)

C_p = Pitot tube coefficient, dimensionless

Δ_p = Velocity head of stack gas, mm H_2O (in. H_2O)

P_s = Absolute stack gas pressure, mm Hg (in. Hg)

NOMENCLATURE (continued)
METHOD 5 CALCULATIONS

Q_{std} = Dry volumetric stack gas flow rate corrected to standard conditions, dscm/hr (dscf/hr)

dscf/min = dry standard cubic feet per minute (also identified as dcfm or scfm)

acfm = actual cubic feet per minute

I = Percent of isokinetic sampling

A_n = Cross-sectional area of nozzle, m^2 (ft^2)

DESCRIPTION

The two-channel phase-detection system in the Monitor Labs Model 8850 Fluorescent SO_2 Analyzer achieves measurement stability never before possible. The lamp intensity is monitored continuously and variations in source intensity are electronically compensated.

Proper source and filter selection have eliminated water vapor interference from the measurement. Measurement accuracy is significantly improved while maintenance is reduced as compared to units with air driers in the sample line.

Aromatic hydrocarbons are removed using the unique "Kicker". This system incorporates a differential partial pressure technique to selectively remove aromatics across a permeable membrane without influencing the SO_2 sample. This further improves accuracy and reduces maintenance over units with chemical adsorbers.

Built-in front-panel test functions allow the operator to easily verify proper operation of critical parameters including optical system response, electronic response, lamp intensity, chopper operation and high-voltage power supply.

All measuring and control circuits are on a single PC card with numbered test points for quick fault location.

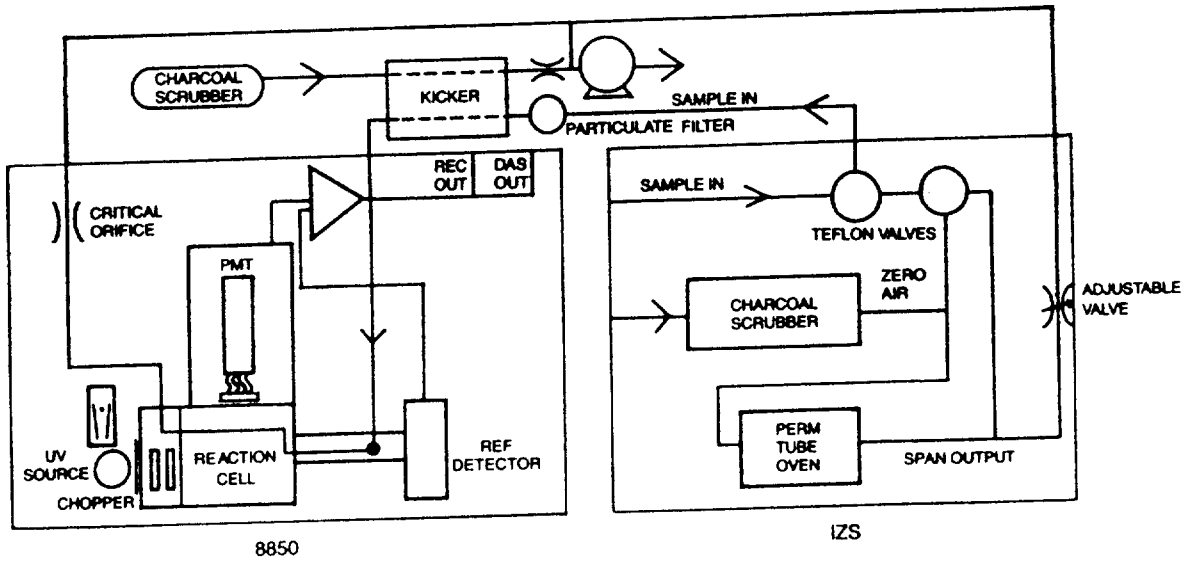
Instrument calibration adjustment time is reduced by the 8850's CALTRACK™ "instant response" zero control.

An optional, internally mounted span/zero check system (IZS) is available. This consists of an NBS-traceable permeation source in a temperature-controlled oven, built-in zero air scrubber and Teflon switching valves.

SPECIFICATIONS:

USEPA Reference Method Designation EQSA-0779-039
FRG Umwelt Bundesamt Equivalency Designation

RANGES	.25, .5, 1.0, 5.0, 10.0 ppm
Noise — ppm at zero	.0005 ppm
ppm at 80%	.001 ppm
Lower Detectable Limit	.001 ppm
Total Interference Equivalent	Less than .012 ppm
Zero Drift	Less than 3 ppb/7 days
	Less than 2 ppb/24 hours
Span Drift	Less than 1%/7 days average
	Less than 0.5%/24 hours
Lag Time	20 sec
Rise Time	Less than 260 sec to 95%
Fall Time	Less than 260 sec to 95%
Precision	.001 ppm
Sample Flow Rate	500 cc/min
Temperature Range	5°C - 40°C (EPA equivalent range 20°C - 30°C)
Dimensions (H × W × D)	8.75" × 17" × 23" (22.2 cm × 43.2 cm × 58.4 cm)
Weight	Analyzer 50 lbs (22.7 kg); Pump 11 lbs (5 kg)
Power	300 VA; 400 VA
	115VAC 50/60Hz
	220VAC 50 Hz
Data Outputs (Switch Selectable)	
DAS	10 mV, 100 mV, 1V, 2V, 5V, 10V
Recorder	100 mV, 100 mV, 1V, 2V, 5V, 10V



Monitor Labs Model 8850 Sulfur Dioxide Diagram

ML MONITOR LABS — A Division of LEAR SIEGLER MEASUREMENT CONTROLS CORPORATION

74 INVERNESS DRIVE EAST ENGLEWOOD CO 80112 5189 (303) 792 3300
Toll Free 1-800-422-1499

MONITOR TECHNOLOGIES GmbH, Kammerfeldstrasse 2, D-8051, Allershausen, FRG.
TEL 49 8166 370, TLX 526785, FAX 49-8166-3720

DESCRIPTION

The single chopper, dual channel Model 8840 is the most accurate, simplest chemiluminescent NO_x analyzer available. The ML dual channel technique eliminates the need for valves, timers, pressure balancing and other problems associated with other systems.

In the 8840, the sample is divided into two paths, one leading through the NO_2-to-NO converter and the other leading directly to the reaction chamber. The difference between the two channels' readings is NO_2.

A single chopper with the two photomultiplier tubes operated from a common power supply minimizes detector differential drift. Each detector has its own zero and span adjustments for calibration. An optical chopper simultaneously zeros both channels of the instrument about 90 times per second, thus eliminating zero drift.

Monitor Labs' exclusive molycon converter selectively converts NO_2 to NO without interference from ammonia.

Nine built-in front-panel test functions allow the operator to easily verify proper operation of critical parameters without use of external test equipment.

Instrument calibration adjustment time is reduced by the 8840's CALTRACK instant response and zero and span controls.

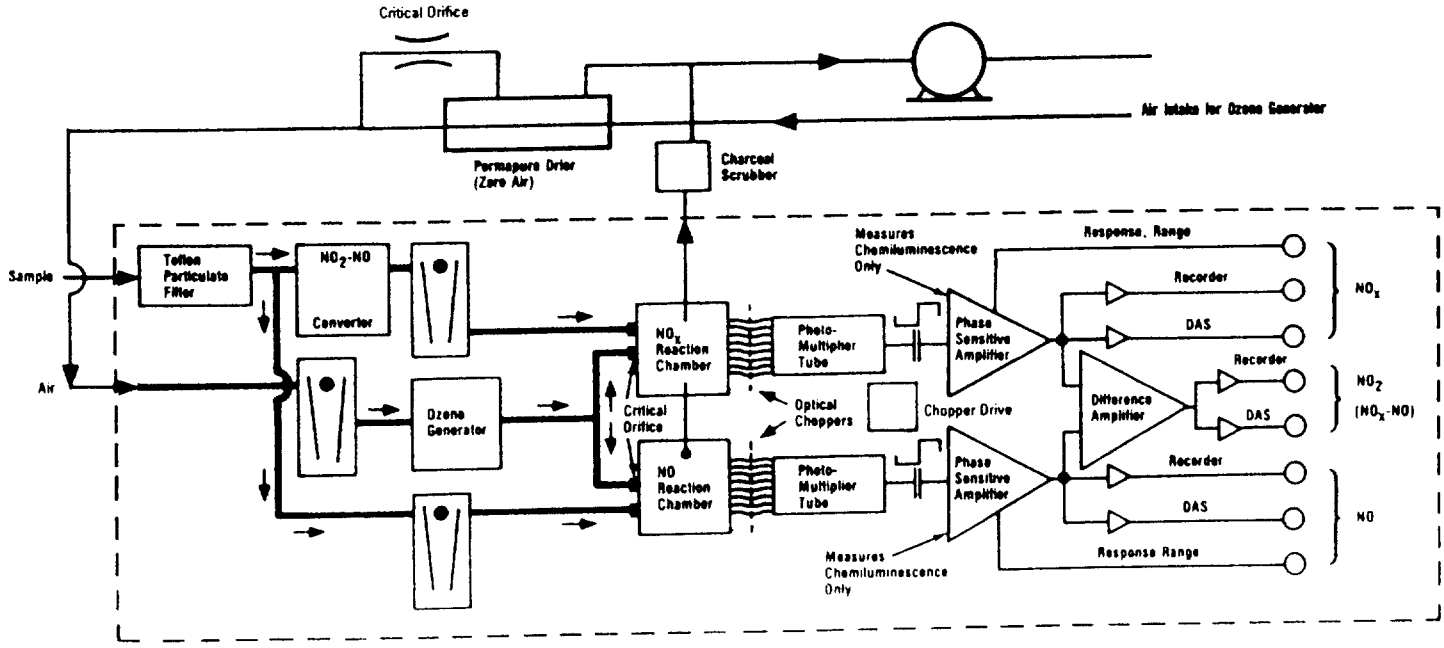
There are two isolated analog outputs at the rear for recorders and data acquisition systems for each output (NO_x, NO, and NO_2).

The 8840 is truly a second generation dual channel NO_x analyzer which combines accuracy of dual channel measurement with simplicity of operation and maintenance.

SPECIFICATIONS:

USEPA Reference Method Designation RFNA-0280-042
FRG Umwelt Bundesamt Equivalency Designation

Ranges	0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10 ppm full scale standard
Precision	± 1%
Noise (at zero)	1 ppb, 60 second time constant
Minimum detectable concentration	2 ppb
Zero stability	± 0.4% of full scale/24 hours ± 0.5% of full scale/7 days
Span stability (25°C, Nominal line voltage)	± 1% of full scale/24 hours ± 2% of full scale/7 days
Interference	Less than 2 ppb
Linearity	± 1%
Lag time (from step change at input)	10 seconds
Rise or fall time (step change in sample conc.)	3 minutes to 95% of reading change
Normal operating temperature	5°C - 40°C (EPA equivalent range 20°C - 30°C)
Humidity tolerance	0 – 95% (non-condensing)
Sample flowrate	250 cc/minute (nominal) each channel on Reference Method Model 700 cc/minute optional (not approved as Reference Method).
Data Outputs (Switch Selectable)	
DAS	10mV, 100mV, 1V, 2V, 5V, 10V
Recorder	10mV, 100mV, 1V, 2V, 5V, 10V
Status outputs (optional)	Range, Function, Power Fail
Unattended operation	7 days
Power requirements	115V ± 10V, 220VAC-20V, 240VAC ± 25V, 50/60 Hz standard 420 watts maximum (turn on) 320 watts typical (operating)
Weight	59 pounds (26.8 kg)
Dimensions (H × W × D)	Bench: 9.5" × 17" × 23" (24.1cm × 43.2cm × 58.4cm) Rack: 8.25" × 17" × 23" (21cm × 43.2cm × 58.4cm)



Model 8840 Oxides of Nitrogen Analyzer Schematic

Prices and specifications subject to change without prior notice

ML A Division of LEAR SIEGLER
74 INVERNESS DRIVE EAST ENGLEWOOD CO 80112 5189 (303) 792-3300
Toll Free 1-800-422-1499
MONITOR TECHNOLOGIES GmbH Kammerfeldstrasse 2 D 8051 Allershausen FRG

DESCRIPTION

Monitor Labs' Gas Dilution Systems provides the ideal approach to high level SO_2 and NO_x measurements. The sample is diluted 20:1 with clean air. The system is designed to operate on ambient air with no other furnished sample conditioning equipment. The dilutor technique allows use of low ranged, ambient level analyzers eliminating problems associated with direct sample measurements that require pressurized samples.

The dilution ratio is controlled by critical orifice to ensure long term stability. The orifices are well protected by filters which stop particles 30 times smaller than the orifice diameter so changing dilution ratio due to orifice plugging will not be a problem. Since the orifices operate beyond the critical point a sonic self cleaning effect is present.

The system requires a particulate free sample with a dewpoint of less than 30°C.

ML has developed a new NO_2 to NO converter HI-CON, which will handle up to 200 ppm NO_2 continuously with no ammonia interference. The HI-CON replaces the MOLYCON in the 8840HL for high level applications.

The ML dilutor pump has enough power to provide sampling vacuum for the 8850HL plus the 8840HL. The pump is Teflon coated to prevent sample loss.

The dilutor also eliminates the CO$_2$ and water quenching often found in chemiluminescent NO, and SO measurements.

SPECIFICATIONS

Sample Conditioning Requirements

	8850, SO_2	8840, NO_2
Dewpoint	Ambient (20-30°C)	Ambient (20-30°C)
Temperature of sample	20-50°C	20-50°C
Particulates	7 µm Filtered	7 µm Filtered

Interference Response

Test Gas Concentration		
NO—288-384 ppm	<1%	N/A
NO_2—12-16 ppm	<1%	N/A
CO_2—10-18%	<1%	<1%
O_2—0.25-4%	<1%	<1%
NH_3—5-20 ppm	<1%	<1%
CO—7-100 ppm	<1%	<1%

Dilution Method

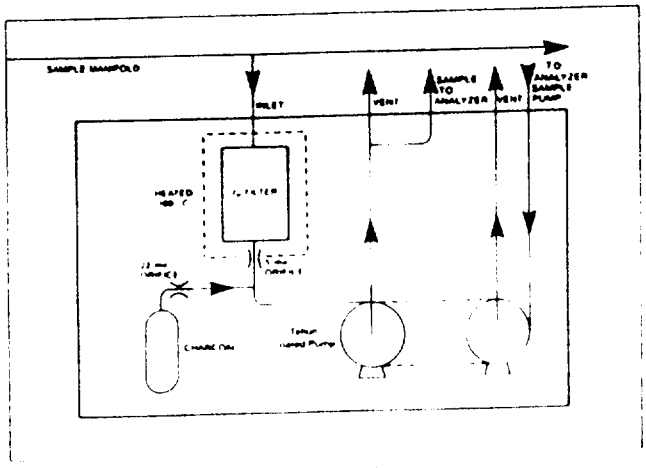
	20:1 Active Dilution Using Orifices	20:1 Active Dilution Using Orifices

Operational Performances

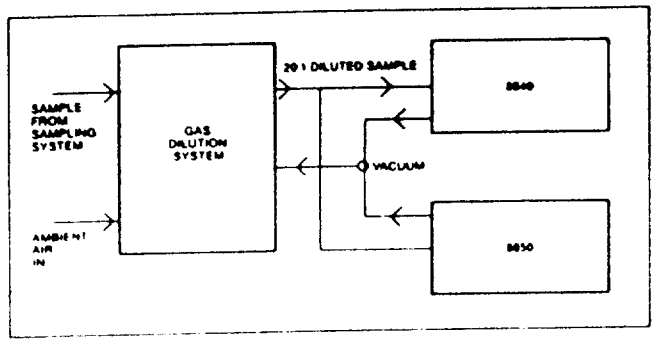
Ranges	0-25, 0-500, 0-100, 0-50, 0-1000ppm SO_2	0-50, 0-100, 0-200, 0-500, 0-1000, 0-2500 0-5000ppm NO_x
Detection Limit	1 ppm	1 ppm
Linearity	± 1%	± 1%
Span Drift	< 2%/wk	< 2%/wk
Zero Drift	< 2%/wk	< 2%/wk
Response Time/Range	< 5 min to 95%	< 60 sec to 95%
Time Constants	60 sec.	55 sec.
Lag Time	<10 sec.	< 10 sec
Noise	1% F.S.	1% F.S.

Operational Requirements

Dimensions (W × H × D) Analyzer	19 × 8.75 × 24 (48.3cm × 22.2cm × 61cm)	19 × 8.75 × 24 (48.3cm × 22.2cm × 61cm)
Dilutor Pump	19 × 8.75 × 10 (48.3cm × 22.2cm × 25.4cm)	19 × 8.75 × 10 (48.3cm × 22.2cm × 25.4cm)
Voltage	110/220 VAC	110/220 VAC
Power Required	325 Watts	325 Watts
Sample Flow Required / Pressure	500cc/min	500cc/min



DILUTION MODULE



SYSTEM DIAGRAM

Prices and specifications subject to change without prior notice

ML MONITOR LABS

MONITOR LABS, INC., 10180 Scripps Ranch Blvd., San Diego, CA 92131 Ph. (619) 578-5060 Telex: 182794
Continental U.S. 800-637-7730 In California, (619) 578-5060.

Printed in U.S.A. 8708 5KS

AMTEST

DRY GAS METER CALIBRATION
AM TEST, INC. - AIR QUALITY DIVISION

METER BOX #: WHITE ANDERSON BOX
CALIBRATION DATE: MARCH 20, 1990
METHOD OF CALIB.: STANDARD DRY GAS METER (Method 5 Section 7.1)

TOTAL TIME min	DELTA H "H2O	METER VOL V1 cf	METER VOL V2 cf	TEMP IN deg F	TEMP OUT deg F	BARO. PRES. "Hg	STD DGM V1	STD DGM V2	ST.DGM TEMP IN deg F	ST.DGM TEMP OUT deg F	ST.DGM Yds FACTOR	Y FACTOR	DELTA Ha
10.414	1.0	954.383	960.002	87.0	73.0	29.96	266.200	271.700	61.5	63.0	0.998	1.0076	1.95
10.179	1.5	961.334	968.170	93.5	76.0	29.96	273.000	279.700	62.0	63.0	0.998	1.0161	1.87
10.585	2.0	973.082	981.271	97.0	79.0	29.96	284.500	292.500	62.0	63.0	0.998	1.0176	1.88
10.583	2.5	982.290	991.485	99.5	80.5	29.96	293.500	302.500	62.0	63.0	0.998	1.0220	1.85
11.843	3.0	992.809	1004.049	101.0	81.5	29.96	303.800	314.800	62.5	63.0	0.998	1.0224	1.86
AVERAGE												1.017	1.89

DRY STANDARD GAS METER CALIBRATION
AM TEST, INC. - AIR QUALITY DIVISION

METER BOX #: ROCKWELL #1528828 CALIBRATION METER
CALIBRATION DATE: OCTOBER 20,1889
LOCATION: AIR QUALITY OFFICE
METHOD OF CALIB.: WET TEST METER (Method 5 Section 7.1)

		DRY STANDARD GAS METER DATA							WET TEST METER DATA					
FLOW RATE scfm	TIME min	METER PRESS "H2O	METER VOL V1 cf	METER VOL V2 cf	TEMP OUT deg F	TEMP IN deg F	BARO. PRES. "Hg	VOLUME METER dscf	WTM VOL V1 cf	WTM VOL V2 cf	WTM TEMP deg. F	WTM PRESS in. H2O	VOLUME WTM dscf	Yds FACTOR
0.172	12.159	-0.28	37.771	39.898	73.0	70.5	29.72	2.096	24.100	26.200	65.0	-0.20	2.097	1.00020
0.172	11.029	-0.29	40.300	42.225	73.0	70.0	29.72	1.898	26.600	28.500	65.0	-0.18	1.897	0.99951
0.171	9.913	-0.28	42.530	44.249	73.0	70.0	29.72	1.695	28.800	30.500	65.0	-0.19	1.697	1.00141
0.136	10.252	-0.25	45.229	46.647	73.0	70.5	29.72	1.398	31.200	32.600	65.0	-0.16	1.398	1.00022
0.136	10.259	-0.25	46.850	48.267	73.0	71.0	29.72	1.396	32.800	34.200	65.0	-0.20	1.398	1.00130
0.136	10.257	-0.25	48.368	49.789	73.0	71.0	29.72	1.400	34.300	35.700	65.1	-0.16	1.398	0.99839
0.083	11.950	-0.18	49.989	51.001	73.0	71.0	29.65	0.995	35.900	36.900	65.3	-0.09	0.996	1.00106
0.083	10.741	-0.18	51.107	52.017	73.0	71.0	29.65	0.895	37.000	37.900	65.4	-0.08	0.896	1.00178
0.083	10.759	-0.18	52.117	53.033	73.0	71.0	29.65	0.901	38.000	38.900	65.5	-0.13	0.896	0.99481
0.251	9.876	-0.40	54.446	56.980	71.0	70.0	29.62	2.494	40.300	42.800	65.7	-0.28	2.484	0.99598
0.249	11.155	-0.40	57.378	60.219	71.0	70.0	29.62	2.796	43.200	46.000	65.8	-0.28	2.782	0.99477
0.248	10.410	-0.41	60.823	63.458	71.0	70.0	29.62	2.594	46.600	49.200	65.9	-0.27	2.582	0.99569
0.285	9.734	-0.52	64.368	67.204	72.0	70.5	29.58	2.783	50.100	52.900	66.1	-0.36	2.776	0.99746
0.284	10.116	-0.51	67.410	70.348	71.5	70.0	29.58	2.886	53.100	56.000	66.1	-0.36	2.875	0.99616
0.283	10.842	-0.51	70.750	73.888	70.0	70.5	29.58	3.085	56.400	59.500	66.1	-0.36	3.073	0.99615

CALIBRATION SUMMARY:

Flow Rate (scfm)	Average Ysd Factor
.083	0.99922
.136	0.99997
.172	1.00037
.250	0.99548
.284	0.99659

AVERAGE Ysd FACTOR = 0.998