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SOURCE

EMISSION

EVALUATION

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JUL 26 1993
PUGET SOUND AIR POLLUTION
CONTROL AGENCY

FEBRUARY 28, 1992

Prepared For:

PARAMETRIX, INC.
MIDWAY SANITARY LANDFILL
LANDFILL GAS FLARE TESTING
SEATTLE, WASHINGTON
NOVEMBER 7-8, 1991
FEBRUARY 7, 1992

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

TABLE OF CONTENTS

		Pages
1.0	INTRODUCTION	1-3
2.0	SUMMARY OF RESULTS	4-15
2.1	EPA Methods 1 and 2 - Velocity, Temperature and Airflow	4-5
2.2	EPA Method 3A, 10 and Fixed Gases Analysis	5-6
2.3	EPA Method 4 - Moisture and Hydrochloric Acid	6
2.4	EPA Method 6C and 7E - Sulfur Dioxide and Nitrogen Oxides	6-7
	Summary of Results - Airflow and Moisture Information, Inlet	8
	Summary of Results - Airflow and Moisture Information, Outlet	9
	Summary of Results - Methods 1, 2, 3A, 4, 6C, 7E and HCl, Outlet	10
2.5	Volatile Organic Compounds (VOCs)	11-15
	VOC Emission Rate Summary Table - Inlet	12
	VOC Emission Rate Summary Table - Outlet	13
2.6	Destruction Efficiency of VOCs	14-15
	VOC Destruction Efficiency Evaluation Table	15
3.0	SOURCE OPERATION	16
4.0	METHODOLOGY REFERENCES	17
5.0	SAMPLING AND ANALYSIS PROCEDURES	18-26
5.1	EPA Methods 1 and 2 - Velocity, Temperature and Airflow	18-19
5.2	EPA Method 3A and Fixed Gases Analysis	19
5.3	EPA Method 4 - Moisture and Hydrochloric Acid	19-21
5.4	EPA Method 6C - Sulfur Dioxide	21-23
5.5	EPA Method 7E - Nitrogen Oxides	23-24
5.6	EPA Method 10 - Carbon Monoxide	25
5.7	Method TO-14 - Volatile Organic Compounds	25-26
6.0	CALCULATION OF RESULTS	27
7.0	QUALITY ASSURANCE PLAN	28-32
7.1	Calibration Procedures and Frequency	28-30
7.2	Sample Recovery and Field Documentation	30
7.3	Chain of Custody	31
7.4	Transfer of Custody and Shipment	31-32
7.5	Data Reduction, Validation and Reporting	32
APPENDIX A - Computer Printouts of Results		33-51
	Airflow and Moisture Information, Inlet, Runs 1-3	34-36
	Airflow and Moisture Information, Outlet, Runs 1-3	37-39
	Methods 1, 2, 3A, 4 and Chloride, Outlet, Runs 1-3	40-42
	Methods 3A, 6C, 7E and 10 Results (Bias Corrected)	43-45
	Inlet VOC Emission Rate Results, Runs 1-3	46-48
	Outlet VOC Emission Rate Results, Runs 1-3	49-51
APPENDIX B - Laboratory Analysis Results		52-83
	Fixed Gases Analysis Results - Inlet Samples - Coast-to-Coast	53-57
	Volatile Organic Compound Mass Spectrometry Results - Coast-to-Coast	58-81
	Chain of Custody Form for TO-14 Samples	82
	Chlorides Results - Am Test Water Chemistry Division	83

TABLE OF CONTENTS (continued)

	Pages
APPENDIX C - Example Calculations	84-92
Example Calculation - Inlet Airflow, Run 2	85
Psychrometric Chart	86
Example Calculation - Outlet Airflow, Run 2	87-88
Example Calculation of HCl Emissions, Outlet, Run 2	89
Example Calc. of SO_2/NO_x Emission Rates, Outlet, Run 2	90
Example Calculation - VOC Emission Rate and Destruction Efficiency	91
Example Calculation - Retention Time	92
APPENDIX D - Field Data Sheets	93-119
Inlet Data Sheets, Flare #3, Runs 1-3, 2/7/92	94-96
Stack Schematic Field Data Sheet	97
Outlet Data Sheets, Method 2, Runs 1-3, 2/7/92	98-100
Outlet Data Sheets, Methods 1-4 and HCl, Runs 1-3, 11/7-8/91	101-103
Sample Train Information Data Sheet	104
Gas Measurements and Sampling System Bias Checks	103-113
TO-14 Canister Field Data Sheet, Inlet Samples	114-116
TO-14 Canister Field Data Sheet, Outlet Samples	117-119
APPENDIX E - Miscellaneous Supporting Information	120-189
Figure 1 - Stack Schematic	121
Figure 2 - EPA Method 4 Moisture Sample Train Schematic	122
Figure 3 - Method 6C/7E Sample Train Schematic	123
Figure 4 - TO-14 Sample System Schematic	124
Method 1 - Location of Traverse Points	125
Method 1 - Minimum Number of Traverse Points	126
Method 2 - Velocity & Volumetric Flow Calculations	127
Method 3 - Molecular Weight and Excess Air Calculations	127
Method 4 - Stack Gas Moisture Calculations	128
Nomenclature for Method 1-5 Calculations	129-130
Dry Gas Meter Calibration Information	131
Type S Pitot Tube Inspection Data Form	132
Stack Temperature Sensor Calibration Data Forms	133
Calibration Gas Certificates	134-136
Infrared Industries Model IR-2200 Oxygen Analyzer Specifications	137-138
Automated Customs Systems Analyzer Specifications	139-140
Western Research SO_2 Analyzer Specifications	141-144
TECO Model 10S NO_x Analyzer Specifications	145-147
TECO Model 48 Carbon Monoxide Analyzer Specifications	148-150
Professional Resumes of Project Personnel	151-155
Am Test, Inc. Capabilities	156-157
Data Sheets and Laboratory Results from Rejected Inlet/Outlet testing (11/7-8/91)	158-189

1.0
INTRODUCTION

The purpose of this source emission evaluation was to quantify emission levels during typical operation of a gas combustor installed at the City of Seattle's Midway Sanitary Landfill located in Seattle, Washington. The City of Seattle contracted the services of Parametrix, Inc. to coordinate this testing effort, and Parametrix hired Am Test-Air Quality, Inc. based in Preston, Washington to conduct the emissions testing and prepare this final report of results. The gases produced from the landfill are extracted and are piped to the combustor area where they are incinerated by four (4) flares prior to emitting the exhaust gases to the atmosphere. Testing of the emissions at the inlet and the outlet of 1 of the 4 landfill gas combustors (also called a flare) was conducted on November 7-8, 1991 and on February 7, 1992. The testing was performed to demonstrate compliance with the requirements of the Puget Sound Air Pollution Control Agency (PSAPCA).

Testing was performed to determine the inlet and outlet emission concentration, emission rate, and the destruction efficiency of the combustor system which controls emissions of landfill gas. The inlet and outlet gas streams at Flare #3 were measured to quantify the gas velocity, gas temperature, percent carbon dioxide (CO_2), percent oxygen (O_2), parts per million (ppm) carbon monoxide (CO), percent moisture, hydrochloric acid (HCl), ppm sulfur dioxide (SO_2), ppm nitrogen oxides (NO_X as NO_2), and volatile organic compounds (VOCs). VOCs were collected at the inlet and outlet of Flare #3 using Compendium Method TO-14. This technique allows an integrated sample of gas to be collected in an electropolished SUMMA^R six-liter stainless steel canister. The integrated samples were analyzed using a gas chromatograph equipped with a mass spectrophotometer

detector (GC-MS). In addition to the volatile organic compounds identified by GC-MS procedures, the fixed gases (CO_2, O_2, CO, nitrogen (N_2) and methane (CH_4), were analyzed for the inlet samples using a GC equipped with a thermal conductivity detector (GC-TCD). The inlet and outlet VOC analysis was repeated on February 7, 1992 after the data from testing performed on November 7-8, 1991 indicated that there had been a leak in the inlet sampling system. The inlet and outlet gas streams at Flare #3 were remeasured to quantify the gas velocity and gas temperature for determining the airflow of the stack gas on February 7, 1992.

Environmental Protection Agency (EPA) sampling and analysis methods specified in the July 1, 1991 Title 40 Code of Federal Regulations, Part 60 (40 CFR 60), Appendix A, Methods 1, 2, 3A, 4, 6C, 7E and 10 were utilized. Methods 1 and 2 were performed to measure the stack gas temperature and velocity and for calculating the volumetric flow rate. Method 3A was performed to determine the molecular weight of the stack gas based on measurements of fixed gases. Method 4 was performed to measure the moisture content of the stack gas at the outlet. Gaseous chloride emissions (as hydrochloric acid (HCl)) were collected in the moisture sample train for analysis. Method 6C was performed to determine the SO_2 emission concentration at the flare outlet. Method 7E was performed to determine the NO_x emission concentration at the flare outlet. Method 10 was performed to determine the CO emission concentration at the flare outlet. Three (3) replicate samples of each type were collected.

The samples were collected by Mr. K. Steven Mackey, Mr. Andy Winkler and Mr. Larry D. Zuck of Am Test-Air Quality, Inc. Analysis of the samples collected in SUMMA canisters was performed by Coast-to-Coast Analytical Services, Inc. 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, Ms. Judy A. Aasland and Ms. Jan M. Widmeyer of Am Test-Air Quality, Inc. Mr. Bill Sullivan coordinated this project for Parametrix, Inc.

2.0
SUMMARY OF RESULTS

The following sections of this report summarize the findings of this emission evaluation. The order of presentation is by EPA method number, Method 1, 2, 3A, 4, 6C, 7E, 10 and VOCs by TO-14, respectively. There are summary tables which include many of the measurements taken at the inlet and outlet of Flare #3 on pages 8-10. These summary tables contain information obtained from computer printouts of results for each individual run 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. 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 and schematics of the sample trains utilized, and the original VOC field data sheets and laboratory analysis results from the November 7-8, 1991 sampling. 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 - Velocity, Temperature and Airflow

The velocity and temperature of the gas passing through the inlet duct to Flare #3 was measured on the test days. The velocity of the inlet gas averaged 18.2 ft/second at the inlet to Flare #3 on February 7, 1992. The average temperature at the inlet was 73.6° F. The average airflow of landfill gas into Flare #3 was 839.7 dry standard cubic feet per minute (dscf/min). The results of the airflow measurements made at the inlet to Flare #3 on February 7, 1992 are presented in the summary table on page 8. A range of velocity heads and temperatures were also measured at

the outlet of Flare #3. The average velocity at the outlet on February 7, 1992 was 8.07 ft/second. The average temperature at the outlet was 1584.2° F. The average airflow through the stack was 4800.1 dscf/min. These averages are based on measurements taken during the three (3) 30-minute velocity traverses conducted on February 7, 1992. The airflow results from the February 7, 1992 tests were used to calculate the emission rate of VOCs. The results of the airflow measurements made at the outlet are presented in the summary table on page 9. The average velocity at the outlet on November 7-8, 1991 was 8.95 ft/second. The average temperature at the outlet was 1634.4° F. The average stack gas airflow was 5236.5 dscf/min. The airflow results from the November 7-8, 1991 tests were used to calculate the emission rate of SO_2, NO_x and HCl. The results of the airflow measurements made at the outlet to Flare #3 on November 7-8, 1991 are presented in the summary table on page 10. These averages are based on measurements taken during the three (3) 60-minute moisture/chloride runs. The residence time based on combustion from the burner to the sample port was calculated to be 1.9 seconds using an average of 20,450.3 actual cubic feet per minute (acfm) and an average temperature of 1584.2° F as measured on February 7, 1992.

2.2 EPA Method 3A, 10 and Fixed Gases Analysis

EPA Method 3A procedures which specify the use of instrumental analyzers were used by Am Test in the field on November 7-8, 1991 to obtain measurements of oxygen, carbon dioxide and carbon monoxide at the flare outlet. This data was averaged, and the average values were bias-corrected for calibration drift during each test. Copies of the bias-corrected results for each Method 3A and 10 test at the outlet of Flare #3 are included in Appendix A of this report. Printouts of individual 1-minute O_2, CO_2 and CO readings are included in Appendix D of this report along with field data sheets for the bias corrections. The average bias-

corrected results from the November 7-8, 1991 testing at the outlet were used to calculate the airflow during the February 7, 1992 testing. Fixed gases at the inlet to the flare were quantified by Coast-to-Coast Analytical using the gas collected in TO-14 canisters on February 7, 1992. Average combustion gas values obtained at the inlet and outlet of Flare #3 are presented in Table 2.2 below.

Table 2.2. Concentration of gaseous constituents found in the inlet landfill gas on February 7, 1992 and outlet landfill gas on November 7-8, 1991 at the Midway Landfill.

Compound	Average Inlet Gas Concentrations 2/7/92	Average Outlet Gas Concentrations 11/7-8/91
Methane (%)	20.0	NA
Carbon Dioxide (%)	35.0	7.9
Oxygen (%)	3.7	11.6
Carbon Monoxide	< 0.1 %	0 ppm
Nitrogen (%)	41.0	80.5

2.3 EPA Method 4 - Moisture and Hydrochloric Acid

The moisture concentration at the inlet to the flare was estimated using psychrometry. The average moisture was estimated to be 1.2%. The results of the three (3) Method 4 moisture tests for quantifying moisture and hydrochloric acid emissions at the outlet of the flare are presented in the summary table on page 10. The average moisture at the outlet of Flare #3 was 8.07%. The average chloride emission concentration was 0.666 parts per million (ppm), or 0.979 ppm corrected to 7% oxygen.

2.4 EPA Method 6C and 7E - Sulfur Dioxide and Nitrogen Oxides

Method 6C and 7E data was recorded at 1-minute intervals during three (3) 60-minute periods on November 7-8, 1991. This data was averaged, and the average

values were bias-corrected for calibration drift during each test. The Method 6C and 7E results for sulfur dioxide and nitrogen oxides from the outlet are presented in the summary table on page 10. Copies of the bias-corrected results for each Method 6C and 7E test at the outlet of Flare #3 are included in Appendix A of this report in printouts titled "Calibration Summary - Gaseous Emission Monitors". The individual 1-minute SO_2 and NO_x readings are included in Appendix D of this report along with the bias-corrected results. Example calculations of the emission rate equations are included in Appendix C of this report.

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SUMMARY OF RESULTS - AIRFLOW AND MOISTURE INFORMATION
AM TEST - AIR QUALITY, INC.

FILE NAME: 135\MIDINSUM
CLIENT: PARAMETRIX, INC.
LOCATION: MIDWAY LANDFILL
SAMPLE SITE: #3 FLARE INLET DUCT

	RUN #1	RUN #2	RUN #3	AVERAGE
LAB #:	I-0577-1	I-0577-2	I-0577-3	
DATE:	2/7/92	2/7/92	2/7/92	
START TIME:	10:50	11:25	12:00	
STOP TIME:	11:20	11:55	12:30	
STACK GAS MOISTURE (percent):	1.2	1.2	1.2	1.2
BAROMETRIC PRESSURE (inches of Hg):	29.58	29.58	29.58	29.58
STATIC PRESSURE (inches of H2O):	6.0	6.1	6.0	6.0
STACK PRESSURE (inches of Hg):	30.02	30.03	30.02	30.02
STACK TEMPERATURE (degrees F.):	73.0	73.8	74.0	73.6
STACK TEMPERATURE (degrees R.):	533.0	533.8	534.0	533.6
METHANE (percent):	20.0	20.0	20.0	20.0
CARBON DIOXIDE (percent):	35.0	35.0	35.0	35.0
OXYGEN (percent):	3.7	3.7	3.7	3.7
CARBON MONOXIDE (percent):	< 0.1	< 0.1	< 0.1	< 0.1
MOLECULAR WEIGHT (dry, lb/lb-mole):	31.35	31.35	31.35	31.35
MOLECULAR WEIGHT (wet, lb/lb-mole):	31.19	31.19	31.19	31.19
AVERAGE VELOCITY HEAD (inches of H2O):	0.082	0.080	0.080	0.081
STACK GAS VELOCITY (feet per second):	18.3	18.1	18.1	18.2
STACK DIAMETER (inches):	12.0	12.0	12.0	
STACK AREA (square feet):	0.785	0.785	0.785	
AIRFLOW (dry std. cubic feet per min.):	848.5	835.4	835.1	839.7
AIRFLOW (actual cubic feet per min.):	864.0	851.6	851.9	855.8

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SUMMARY OF RESULTS - AIRFLOW AND MOISTURE INFORMATION
AM TEST - AIR QUALITY, INC.

FILE NAME: 135\MIDOSUM
CLIENT: PARAMETRIX, INC.
LOCATION: MIDWAY LANDFILL
SAMPLE SITE: #3 FLARE OUTLET STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
LAB #:	1482	1483	1484	
DATE:	2/7/92	2/7/92	2/7/92	
START TIME:	10:50	11:25	12:00	
STOP TIME:	11:20	11:55	12:30	
STACK GAS MOISTURE (percent):	8.1	8.1	8.1	8.1
BAROMETRIC PRESSURE (inches of Hg):	29.58	29.58	29.58	29.58
STATIC PRESSURE (inches of H2O):	-0.075	-0.082	-0.079	-0.079
STACK PRESSURE (inches of Hg):	29.57	29.57	29.57	29.57
STACK TEMPERATURE (degrees F.):	1574.2	1596.8	1581.5	1584.2
STACK TEMPERATURE (degrees R.):	2034.2	2056.8	2041.5	2044.2
CARBON DIOXIDE (percent):	7.9	7.9	7.9	7.9
OXYGEN (percent):	11.6	11.6	11.6	11.6
CARBON MONOXIDE (ppm):	0	0	0	0
MOLECULAR WEIGHT (dry, lb/lb-mole):	29.73	29.73	29.73	29.73
MOLECULAR WEIGHT (wet, lb/lb-mole):	28.78	28.78	28.78	28.78
AVERAGE VELOCITY HEAD (inches of H2O):	0.007	0.005	0.004	0.005
STACK GAS VELOCITY (feet per second):	9.59	7.65	6.97	8.07
STACK DIAMETER (inches):	88.0	88.0	88.0	
STACK AREA (square feet):	42.24	42.24	42.24	
AIRFLOW (dry std. cubic feet per min.):	5728.7	4521.2	4150.3	4800.1
AIRFLOW (actual cubic feet per min.):	24296.7	19389.0	17665.3	20450.3

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

FILE NAME: 126\MIDSUM
CLIENT: PARAMETRIX, INC.
LOCATION: SEATTLE, WASHINGTON - MIDWAY LANDFILL
SAMPLE SITE: FLARE #3 OUTLET STACK

	RUN #1	RUN #2	RUN #3	AVERAGE
LAB #:	13329	13330	13331	
DATE:	11/7/91	11/7/91	11/8/91	
START TIME:	11:10	13:10	09:05	
STOP TIME:	12:10	14:10	10:05	
VOLUME SAMPLED (cubic feet):	32.760	34.140	33.568	33.489
VOLUME SAMPLED (dry std. cubic feet):	33.303	34.022	34.394	33.906
VOLUME SAMPLED (dry std. cubic meters):	0.943	0.964	0.974	0.960
STACK GAS MOISTURE (percent):	7.61	8.47	8.12	8.07
BAROMETRIC PRESSURE (inches of Hg):	29.87	29.80	29.75	29.81
STATIC PRESSURE (inches of H2O):	-0.080	-0.085	-0.095	-0.09
STACK PRESSURE (inches of Hg):	29.86	29.79	29.74	29.80
STACK TEMPERATURE (degrees F.):	1630.6	1626.4	1646.2	1634.4
STACK TEMPERATURE (degrees R.):	2090.6	2086.4	2106.2	2094.4
CARBON DIOXIDE (percent):	6.8	7.7	9.2	7.9
OXYGEN (percent):	12.5	11.7	10.6	11.6
CARBON MONOXIDE (ppm):	1	0	0	0
MOLECULAR WEIGHT (dry, lb/lb-mole):	29.59	29.70	29.90	29.73
MOLECULAR WEIGHT (wet, lb/lb-mole):	28.71	28.71	28.93	28.78
STACK GAS VELOCITY (feet per second):	8.57	8.57	9.72	8.95
STACK DIAMETER (inches):	88.0	88.0	88.0	
STACK AREA (square feet):	42.24	42.24	42.24	
AIRFLOW (dry std. cubic feet per min.):	5057.5	5012.2	5639.9	5236.5
AIRFLOW (actual cubic feet per min.):	21715.5	21730.9	24632.9	22693.1
SULFUR DIOXIDE CONCENTRATION (ppm):	1.9	2.7	2.8	2.5
SULFUR DIOXIDE EMISSION RATE (lb/hr):	0.096	0.135	0.157	0.129
SULFUR DIOXIDE EMISSION RATE (tons/yr):	0.419	0.590	0.689	0.566
NITROGEN OXIDES EMISSION CONC. (ppm):	7.7	8.7	10.2	8.9
NOx EMISSION RATE (lb/hr as NO2):	0.279	0.312	0.412	0.335
NITROGEN OXIDES EMISSION RATE (tons/yr):	1.22	1.37	1.805	1.47
CHLORIDE EMISSION CONCENTRATION (mg/dscm):	0.744	0.817	1.47	1.01
CHLORIDE EMISSION CONCENTRATION (ppm):	0.491	0.539	0.968	0.666
CHLORIDE EMISSION CONC. (ppm @ 7% oxygen):	0.812	0.814	1.31	0.979
CHLORIDE EMISSION RATE (mg/min):	103.6	112.7	227.9	148.1
CHLORIDE EMISSION RATE (lb/hr):	0.014	0.015	0.031	0.020

2.5 Volatile Organic Compounds

Integrated samples of the gas at the inlet and outlet of the flare were collected for volatile organic compound (VOC) analysis using Compendium Method TO-14. The integrated samples were analyzed using 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 Services are included in Appendix B of this report in concentration units of micrograms per cubic meter (ug/m^3). The concentration units were converted to 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 printouts for the individual runs include the instrument blank and detection limit values. The emission rate results for each of the three (3) runs at the inlet and outlet of Flare #3 were averaged and are presented on the summary tables on pages 12 (inlet) and 13 (outlet). It should be noted that when the results for three (3) runs are averaged together, if a value is less than (<) the detection limit (DL), it is counted as zero (0) in the average. If 1 or 2 values are < the DL and the average is a value larger than the detection limit, then it is presented as an approximation (~) in the average column. In cases where a compound is found in levels above the detection limit for only 1 or 2 of 3 runs, the data should be considered to be less significant than cases where a compound was found for all 3 runs. The data becomes increasingly significant as the concentration value increases in orders of magnitude. The converse of this would be true as the concentration value approaches the detection limit.

AMTEST
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SUMMARY OF EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
AM TEST-AIR QUALITY, INC.

FILE NAME: 135\P@MINSUM
CLIENT: Parametrix, Inc.
LOCATION: Midway Landfill
SAMPLE SITE: #3 Flare Inlet Duct

	RUN #1 (mg/min)	RUN #2 (mg/min)	RUN #3 (mg/min)	AVERAGE
LAB NUMBER:	I-0577-1	I-0577-2	I-0577-3	
DATE:	2/7/92	2/7/92	2/7/92	
START TIME:	10:50	11:25	12:00	
STOP TIME:	11:20	11:55	12:30	
SAMPLE LENGTH (minutes):	30	30	30	
ANALYTE				
Acetone	< DL	< DL	< DL	< DL
Benzene	38.4	35.5	40.2	38.0
Bromodichloromethane	< DL	< DL	< DL	< DL
Bromomethane (Methyl Bromide)	< DL	< DL	< DL	< DL
Bromoform	< DL	< DL	< DL	< DL
1,3-Butadiene	< DL	< DL	< DL	< DL
2-Butanone (MEK)	< DL	< DL	< DL	< DL
Carbon Disulfide	< DL	< DL	< DL	< DL
Carbon Tetrachloride	< DL	< DL	< DL	< DL
Chlorobenzene	67.3	61.5	66.2	65.0
Chloroethane (Ethyl Chloride)	6.73	5.91	6.62	6.42
2-Chloroethyl Vinyl Ether	< DL	< DL	< DL	< DL
Chloroform	< DL	< DL	< DL	< DL
Chloromethane (Methyl Chloride)	22.6	23.7	23.2	23.2
Dibromochloromethane	< DL	< DL	< DL	< DL
1,2-Dibromoethane (EDB)	< DL	< DL	< DL	< DL
1,2-Dichlorobenzene	11.5	6.15	8.51	8.72
1,3-Dichlorobenzene	< DL	< DL	< DL	< DL
1,4-Dichlorobenzene	38.4	23.7	28.4	30.2
1,1-Dichloroethane	9.61	8.99	9.70	9.43
1,2-Dichloroethane (EDC)	< DL	< DL	< DL	< DL
1,1-Dichloroethene	< DL	< DL	< DL	< DL
cis-1,2-Dichloroethene	26.4	23.7	26.0	25.4
trans-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	1081.4	1017.3	1087.9	1062.2
2-Hexanone	< DL	< DL	< DL	< DL
4-Methyl-2-Pentanone (MIBK)	6.49	6.39	6.39	6.42
Styrene	11.8	10.4	12.3	11.5
1,1,2,2-Tetrachloroethane	< DL	< DL	< DL	< DL
Tetrachloroethene (PCE)	< DL	< DL	< DL	< DL
Toluene	156.2	151.4	163.2	156.9
1,1,1-Trichloroethane (TCA)	< DL	< DL	< DL	< DL
1,1,2-Trichloroethane	< DL	< DL	< DL	< DL
Trichloroethene (TCE)	< DL	< DL	< DL	< DL
Trichlorofluoromethane (F-11)	3.60	4.02	3.78	3.80
Trichlorotrifluoroethane (F-113)	< DL	< DL	< DL	< DL
Vinyl Acetate	< DL	< DL	< DL	< DL
Vinyl Chloride	69.7	71.0	71.0	70.6
Xylenes, Total	1129.4	1041.0	1111.6	1094.0

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

mg/min = milligrams of analyte emitted per minute

AMTEST AIR QUALITY, INC.

SUMMARY OF EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
AM TEST-AIR QUALITY, INC.

FILE NAME: 135\PaMOTSUM
CLIENT: Parametrix, Inc.
LOCATION: Midway Landfill
SAMPLE SITE: #3 Flare Outlet Stack

	RUN #1 (mg/min)	RUN #2 (mg/min)	RUN #3 (mg/min)	AVERAGE
LAB NUMBER:	I-0577-4	I-0577-5	I-0577-6	
DATE:	2/7/92	2/7/92	2/7/92	
START TIME:	10:50	11:25	12:00	
STOP TIME:	11:20	11:55	12:30	
SAMPLE LENGTH (minutes):	30	30	30	
ANALYTE				
Acetone	4.38	3.84	2.94	3.72
Benzene	0.422	< DL	< DL	~0.141
Bromodichloromethane	< DL	< DL	< DL	< DL
Bromomethane (Methyl Bromide)	< DL	< DL	< DL	< DL
Bromoform	< DL	< DL	< DL	< DL
1,3-Butadiene	< 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 (Ethyl Chloride)	< DL	< DL	< DL	< DL
2-Chloroethyl Vinyl Ether	< DL	< DL	< DL	< DL
Chloroform	< DL	< DL	< DL	< DL
Chloromethane (Methyl Chloride)	< DL	< DL	< DL	< DL
Dibromochloromethane	< DL	< DL	< DL	< DL
1,2-Dibromoethane (EDB)	< DL	< DL	< DL	< DL
1,2-Dichlorobenzene	< DL	< DL	< DL	< DL
1,3-Dichlorobenzene	< DL	< DL	< DL	< DL
1,4-Dichlorobenzene	< DL	< DL	< DL	< DL
1,1-Dichloroethane	< DL	< DL	< DL	< DL
1,2-Dichloroethane (EDC)	< DL	< DL	< DL	< DL
1,1-Dichloroethene	< DL	< DL	< DL	< DL
cis-1,2-Dichloroethene	< DL	< DL	< DL	< DL
trans-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
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	< DL	< DL	< DL	< DL
1,1,1-Trichloroethane (TCA)	< DL	< DL	< DL	< DL
1,1,2-Trichloroethane	< DL	< DL	< DL	< DL
Trichloroethene (TCE)	< DL	< DL	< DL	< DL
Trichlorofluoromethane (F-11)	< DL	< DL	< DL	< DL
Trichlorotrifluoroethane (F-113)	< DL	< DL	< DL	< DL
Vinyl Acetate	< DL	< DL	< DL	< DL
Vinyl Chloride	< DL	< DL	< DL	< DL
Xylenes, Total	< DL	< DL	< DL	< DL

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

mg/min = milligrams of analyte emitted per minute

2.6 Destruction Efficiency of Volatile Organic Compounds

The destruction efficiency is the amount of vapors destroyed through incineration, expressed on a percentage basis. The percent destruction efficiency for each volatile organic compound which was analyzed in the gas at Flare #3 at the Midway Landfill is reported on page 15. Destruction efficiencies were calculated based on the average emission rate of each compound detected in milligrams per minute (mg/min). The compound which was not completely destroyed was benzene (detected during run 1 at the outlet only). The laboratory analysis detection limits are lower for the outlet samples because the inlet samples required dilution in the laboratory, therefore, certain compounds may be detected at the outlet and not at the inlet.

AMTEST
AIR QUALITY, INC.

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

FILE NAME: 135\MIDWDEST
CLIENT: Parametrix, Inc.
LOCATION: Midway Landfill
SAMPLE SITE: #3 Flare
SAMPLE DATES: February 7, 1992

COMPOUNDS	Average Inlet Emission Rate mg/min	Average Outlet Emission Rate mg/min	Destruction Efficiency Percent
Acetone	< DL	3.72	-----
Benzene	38.0	~0.141	~99.63
Bromodichloromethane	< DL	< DL	-----
Bromomethane (Methyl Bromide)	< DL	< DL	-----
Bromoform	< DL	< DL	-----
1,3-Butadiene	< DL	< DL	-----
2-Butanone (MEK)	< DL	< DL	-----
Carbon Disulfide	< DL	< DL	-----
Carbon Tetrachloride	< DL	< DL	-----
Chlorobenzene	65.0	< DL	99.99
Chloroethane (Ethyl Chloride)	6.42	< DL	99.99
2-Chloroethyl Vinyl Ether	< DL	< DL	-----
Chloroform	< DL	< DL	-----
Chloromethane (Methyl Chloride)	23.2	< DL	99.99
Dibromochloromethane	< DL	< DL	-----
1,2-Dibromoethane (EDB)	< DL	< DL	-----
1,2-Dichlorobenzene	8.72	< DL	99.99
1,3-Dichlorobenzene	< DL	< DL	-----
1,4-Dichlorobenzene	30.2	< DL	99.99
1,1-Dichloroethane	9.43	< DL	99.99
1,2-Dichloroethane (EDC)	< DL	< DL	-----
1,1-Dichloroethene	< DL	< DL	-----
cis-1,2-Dichloroethene	25.4	< DL	99.99
trans-1,2-Dichloroethene	< DL	< DL	-----
Dichloromethane	< DL	< DL	-----
1,2-Dichloropropane	< DL	< DL	-----
cis-1,3-Dichloropropene	< DL	< DL	-----
trans-1,3-Dichloropropene	< DL	< DL	-----
Ethylbenzene	1062.2	< DL	99.99
2-Hexanone	< DL	< DL	-----
4-Methyl-2-Pentanone (MIBK)	6.42	< DL	99.99
Styrene	11.5	< DL	99.99
1,1,2,2-Tetrachloroethane	< DL	< DL	-----
Tetrachloroethene (PCE)	< DL	< DL	-----
Toluene	156.9	< DL	99.99
1,1,1-Trichloroethane (TCA)	< DL	< DL	-----
1,1,2-Trichloroethane	< DL	< DL	-----
Trichloroethene (TCE)	< DL	< DL	-----
Trichlorofluoromethane (F-11)	3.80	< DL	99.99
Trichlorotrifluoroethane (F-113)	< DL	< DL	-----
Vinyl Acetate	< DL	< DL	-----
Vinyl Chloride	70.6	< DL	99.99
Xylenes, Total	1094.0	< DL	99.99

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

mg/min = milligrams of analyte emitted per minute

3.0
SOURCE OPERATION

The landfill gas combustor stack consists of a refractory-lined steel shell with a landfill gas burner at the base. The facility includes three 1500 scfm motor blowers (one spare), two gas scrubbers (condensate knockout), and four (4) 750 scfm landfill gas flares. These flares were designed to provide a minimum residence time of 0.5 seconds at 1500° F. With these requirements, the combustor configuration that resulted is 7.5 feet in diameter (I.D.) and reaches an elevation of approximately 25 feet. An extractive collection system supplies the landfill gas to the combustor. Centrifugal blowers create the necessary vacuum in the gas collection wells and trenches to extract the gas and vent it through the combustor burners. The operation of the flares is designed to provide balanced flow to the 4 flares during normal operating conditions, therefore, only 1 of the 4 flares (Flare #3) had a full battery of tests conducted simultaneously at the inlet and outlet.

4.0
METHODOLOGY REFERENCES

Sampling procedures specified in the July 1, 1991 Title 40 Code of Federal Regulations, Part 60 (40 CFR 60), Appendix A, Methods 1, 2, 3A, 4, 6C, 7E and 10 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".

5.0
SAMPLING AND ANALYSIS PROCEDURES

5.1 EPA Methods 1 and 2 - Velocity, Temperature and Airflow

Velocity and temperature measurements were performed at the inlet and outlet of Flare #3. EPA Method 1 procedures were used to assure that representative measurements of volumetric flow rate were obtained by dividing the cross-section of the exhaust stack into a number of equal areas, and then locating a traverse point within each of the equal areas. Method 2 was performed to measure the stack gas velocity using a pitot tube, and the gas temperature using a thermocouple. The pitot tubes were connected with tubing to an incline manometer to obtain velocity measurements. The pitot tube lines were leak-checked and the incline manometers were leveled and magnehelic gauges were zeroed prior to use. Temperatures were measured using calibrated thermocouple probes connected to a Fluke^{R} digital thermocouple indicator.

The inlet gas enters Flare #3 through a 12-inch (I.D.) circular duct which has a tap available to draw gas samples. A standard (P-Type) pitot tube was used to monitor the velocity of the inlet gas at a point near the center of the duct. The Flare #3 exhaust stack has an 88 inch inside diameter. The stack is fitted with four (4) sampling ports located at the same elevation, and circumferentially 90 degrees apart. These sampling ports are located 15 feet from the nearest upstream flow disturbance, and 10 feet from the nearest downstream flow disturbance. There is a second set of ports located 4 feet above the ports just mentioned. Two (2) velocity and temperature traverses of twelve (12) points each were performed in two (2) of the lower test ports during each test run on November 7-8, 1991. Gaseous emission samples (SO_2, NO_x, CO, VOCs, etc.) were collected from the upper test ports. A

schematic of the stack and the traverse points selected is included as Figure 1 in Appendix E of this report. The sample probes were marked with felt pen and heat resistant tape to indicate the proper point location at the edge of the port nipple.

5.2 EPA Method 3A and Fixed Gas Analysis

The concentration of fixed gases at the flare inlet (carbon dioxide (CO_2), carbon monoxide (CO), oxygen (O_2), nitrogen, and methane (CH_4)) were quantified by Coast-to-Coast Analytical using the gas collected in the TO-14 canisters. A gas chromatograph equipped with a thermal conductivity detector (GC-TCD) was used for this analysis.

The outlet gas was measured on-site on November 7-8, 1991 to quantify the O_2 and CO_2 concentration. An Infrared Industries Model 2200 oxygen (O_2) analyzer was utilized to measure the percent O_2 in the gas stream. An Automated Custom Systems (ACS) Model 3300 non-dispersive infrared (NDIR) analyzer was utilized to measure the percent CO_2. Copies of the specifications for these instruments are included in Appendix E of this report. An Odessa Engineering data acquisitions system was used to log outputs of the analyzers. Measurements from the instruments were recorded at 1-minute intervals during each one-hour run. The average of the measurements obtained November 7-8, 1991 were used to calculate the molecular weight of the stack gas during the velocity and temperature runs on February 7, 1992.

5.3 EPA Method 4 - Moisture and Hydrochloric Acid

The moisture content of the inlet gas stream was estimated using a psychrometric chart. Wet bulb and dry bulb temperatures recorded during each run were used for this determination. The moisture content of the outlet gas stream 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 chloride using a mercuric nitrate titration method. The sample probe was positioned in the stack at a point of average velocity in the upper test ports and moisture samples were collected over three (3) 60-minute periods. The average percent moisture measured November 7-8, 1991 was used to calculate airflow of the stack gas on February 7, 1992 which was used for VOC emission calculations.

The sample train used for moisture sampling was an EPA Method 4 design as illustrated in Figure 2 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. The magnehelic gauges used for pressure measurements have been calibrated against an oil-filled manometer. Pressure sensor calibration data is included in Appendix D of this report.

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.

5.4 Method 6C - Sulfur Dioxide

Sulfur dioxide measurements were collected using Method 6C, which is an instrumental method. A gas sample was continuously extracted from the stack and passed through an ultraviolet analyzer which measures the parts per million (ppm) sulfur dioxide (SO_2). The Method 6C sample train is illustrated in Figure 3 in Appendix E of this report. Also included in Appendix E are specifications for the analyzer, along with copies of calibration gas certificates. An effluent gas sample was drawn through a stainless steel sampling probe and through a refrigerator type moisture removal system to continuously remove condensate from the sample gas. A Teflon sample line was used to transport the gas sample to the continuous monitor system. 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. The SO_2 measurement system consisted of a Western Research Model 721AT ultraviolet analyzer. An Odessa Engineering data acquisition system was used to log outputs of the sulfur dioxide analyzer. Readings were recorded at 1-minute intervals over three (3) 60-minute test periods.

The SO_2 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 appropriate 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 were made to the system, except as necessary to maintain a constant flow rate of calibration gas through the instrument. Following the initial calibrations, testing commenced following a period of at least twice the system response time.

Immediately preceding and following every one-hour test period, or whenever adjustments to the measurement system were made, a sampling system bias check was performed. In this test, calibration gases were introduced at the calibration valve at the outlet of the sampling probe. A zero gas and either the mid-range or high-range gas, whichever most closely approximated the effluent concentration, was used for this check. Calibration gas was introduced and the concentration displayed by the analyzer was recorded. Then zero gas was introduced and the reading was recorded. The calibration gas flow rates were adjusted to maintain 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, then the average of the initial and final bias check values were used to calculate the gas concentration for the run.

5.5 Method 7E - Nitrogen Oxides

Nitrogen oxides (NO_x) concentration measurements were collected using Method 7E, which is an instrumental method. The Method 7E analyzer measures NO_x as nitrogen dioxide (NO_2). A gas sample was continuously extracted from the stack, and passed through a chemiluminescent analyzer for measuring the NO_x concentration in parts per million (ppm). The Method 7E sampling system is illustrated in Figure 3 in Appendix E of this report. Also included in Appendix E are specifications for the analyzer, along with copies of calibration gas certificates.

An effluent gas sample was drawn through an in-stack filter and through a stainless steel sampling probe and through a moisture removal system to continuously remove condensate from the sample gas. A Teflon^R sample line was used to transport the gas sample to the continuous monitor system. 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. The NO_x measurement system consisted of a Thermo Environmental Instruments (TECO) Model 10S chemiluminescent nitrogen dioxide (NO_2) analyzer which measures NO_x as NO_2. The gas passes through an NO_2 to NO converter which converts the nitrogen dioxide in the sample to nitrogen oxide. 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. An Odessa Engineering data acquisition

system was used to log outputs of the NO_x analyzer. Measurements from the instruments were recorded at 1-minute intervals over three (3) 60-minute test periods.

The NO_x measurement system was assembled on-site and calibration gases were introduced and calibration adjustments were made to calibrate the instruments. The sampling system components were adjusted to achieve appropriate sampling rates. Prior to sampling, a calibration error check was performed by introducing calibration gases to the system upstream of the analyzers. 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. Following the initial calibrations, testing commenced following a period of at least twice the system response time. Immediately preceding and following each test period a sampling system bias check was performed, as described in Section 5.4 of this report. The average of the initial and final bias check values were used to calculate the gas concentration for the run.

5.6 Method 10 - Carbon Monoxide

An Thermo Environmental Instruments Model 48 gas filter correlation non-dispersive infrared (NDIR) analyzer was used to measure the parts per million (ppm) carbon monoxide (CO) at the outlet stack using procedures described in Method 10. Copies of the specifications for this instrument are included in Appendix E of this report along with copies of the calibration gas certificate for the gas used for calibrations. Following the initial calibrations, testing commenced following a period of at least twice the system response time. An Odessa Engineering data acquisition system was used to log outputs of the carbon monoxide analyzer. Measurements from the instrument were recorded at 1-minute intervals

during three (3) 60-minute periods. Immediately preceding and following each test period a sampling system bias check was performed, as described in Section 5.4 of this report. The average of the initial and final bias check values were used to calculate the gas concentration for the run.

5.7 Method TO-14 - Volatile Organic Compounds

Integrated samples of the gas at the inlet and outlet of Flare #3 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 inlet and outlet sites. The TO-14 sampling system is illustrated in Figure 4 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 stainless steel probe was inserted into the port to pull a gas sample through the flow controller and into the canister. All 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.

6.0
CALCULATION OF RESULTS

The Method 1, 2, 3A, 4, 6C, 7E and 10 results were calculated in accordance with the 40 CFR 60, Appendix A criteria. Copies of the pertinent equations used are included in Appendix E of this report. Standard conditions are 68° F and 29.92 inches of mercury. The laboratory results were converted to emission concentration and emission rate units. The results from each run are presented along with an average for the series of three (3) runs. It should be noted that when the results for three (3) runs are averaged together, if a value is less than (<) the detection limit (DL), it is counted as zero (0) in the average. If 1 or 2 values are < the DL and the average is a value larger than the detection limit, then it is presented as an approximation (~) in the average column. In cases where a compound is found in levels above the detection limit for only 1 or 2 of 3 runs, the data should be considered to be less significant than cases where a compound was found for all 3 runs. The data becomes increasingly significant as the concentration value increases in orders of magnitude. The converse of this would be true as the concentration value approaches the detection limit. Final result calculations were performed using custom-written spreadsheets run on Hewlett-Packard Vectra computer systems. By-hand sample calculations of computerized results were performed to verify computer program integrity, and are included in Appendix C of this report.

7.0
QUALITY ASSURANCE PLAN

The purpose of the quality assurance plan is to provide guidelines for achieving quality control in air pollution measurements. The detailed procedures Am Test-Air Quality, Inc. utilized are included in the Environmental Protection Agency's (EPA's) reference manual titled Quality Assurance Handbook for Air Pollution Measurements Systems, Volume 3, EPA-600/4-77-027b. Procedures were followed throughout equipment preparation, field sampling, sample recovery, analysis, and data reduction. Am Test-Air Quality, Inc.'s quality assurance procedures are discussed below.

7.1 Calibration Procedures and Frequency

Field equipment utilized for on-site measurements is calibrated at a frequency as recommended by the equipment manufacturer or industry practice. Prior to field use, each instrument is calibrated and the calibration value reported in a calibration log. If any measuring or test device requiring calibration cannot immediately be removed from service, the Project Manager may extend the calibration cycle providing a review of the equipment's history warrants the issuance of an extension. No equipment will be extended more than twice a calibration cycle, nor will the extension exceed one-half the prescribed calibration cycle. Test equipment consistently found to be out of calibration will be repaired or replaced.

The dry gas meter used to accurately measure sample volumes has been calibrated using a wet test meter. A standard P-type pitot tube or a calibrated S-type pitot tube was used for velocity measurements. The coefficients for S-type pitot tubes was determined using Method 2, Section 4.1 procedures. The Fluke^{R} digital

thermocouple indicator used for temperature measurement has a readability of 1 degree 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. Calibration data for these measurement devices is included in Appendix E of this report.

The sulfur dioxide, nitrogen oxides and carbon monoxide measurement system is capable of meeting the system performance specifications detailed in 40 CFR 60, Appendix A, Method 6C, Section 4. For meeting these specifications, the analyzer's calibration error must be less than ± 2 percent of the span for the zero, mid-range, and high-range calibration gases. The sampling system bias must be less than $\pm 5\%$ of the span for the zero, and mid- or high-range calibration gases. The zero drift must be less than $\pm 3\%$ of the span over the period of each run. The calibration drift must be less than $\pm 3\%$ of the span over the period of each run. The calibration gases used for all instrumental techniques were purchased from Airco Special Gases and were analyzed following the EPA Traceability Protocol Number 1, or next best available. Purified nitrogen was utilized as zero gas. Specifications for the instruments used for this project are included in Appendix E of this report, along with copies of the calibration certificates for each tank of gas utilized.

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 Leader. 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
- 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.

7.2 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 Leader 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 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.

7.3 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. A copy of the chain of custody form for VOC samples is 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.

7.4 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 UPS blue for second day delivery.

7.5 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

AIRFLOW AND MOISTURE INFORMATION
AM TEST-AIR QUALITY, INC.

FILE NAME:	135\2MID3-I1	LAB #:	I-0577-1
CLIENT:	PARAMETRIX, INC.	START TIME:	10:50 o'clock
LOCATION:	MIDWAY LANDFILL	STOP TIME:	11:20 o'clock
SAMPLE SITE:	#3 FLARE INLET DUCT		
SAMPLE DATE:	FEBRUARY 7, 1992		
RUN #:	1 - VELOCITY		
OPERATORS:	S. MACKEY		
CONTACT:	B. SULLIVAN		

PSCHROMETRIC MOISTURE:	1.2
Bws:	0.012
PITOT TUBE Cp:	0.99
DUCT DIAMETER:	12.0 inches
DUCT AREA:	0.785 sq. feet
BAROMETRIC PRES.:	29.58 inches Hg
STATIC PRESSURE:	6.0 inches H2O
DUCT PRESSURE:	30.02 inches Hg

AVERAGE CO2 CONC:	35.0 percent
AVERAGE O2 CONC:	3.7 percent
AVERAGE CO CONC:	< 0.1 percent
AVERAGE CH4 CONC.:	20.0 percent
MOLECULAR WEIGHT:	31.35 g/g-mole-dry
MOLECULAR WEIGHT:	31.19 g/g-mole-wet

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
Point of	0.09	72	Point of	0.08	73
Avg. Vel.	0.08	73	Avg. Vel.	0.08	74

INLET GAS TEMPERATURE:	73.0 degrees F	533.0 degrees R
AVERAGE VELOCITY HEAD:	0.082 " of H2O	
INLET GAS VELOCITY:		18.3 ft/sec
INLET GAS AIR FLOW:	864.0 acf/min	848.5 dscf/min

AIRFLOW AND MOISTURE INFORMATION
AM TEST-AIR QUALITY, INC.

FILE NAME:	135\2MID3-12	LAB #:	I-0577-2
CLIENT:	PARAMETRIX, INC.	START TIME:	11:25 o'clock
LOCATION:	MIDWAY LANDFILL	STOP TIME:	11:55 o'clock
SAMPLE SITE:	#3 FLARE INLET DUCT		
SAMPLE DATE:	FEBRUARY 7, 1992		
RUN #:	2 - VELOCITY		
OPERATORS:	S. MACKEY		
CONTACT:	B. SULLIVAN		

PSCHROMETRIC MOISTURE:	1.2
Bws:	0.012
PITOT TUBE Cp:	0.99
DUCT DIAMETER:	12.0 inches
DUCT AREA:	0.785 sq. feet
BAROMETRIC PRES.:	29.58 inches Hg
STATIC PRESSURE:	6.1 inches H2O
DUCT PRESSURE:	30.03 inches Hg

AVERAGE CO2 CONC:	35.0 percent
AVERAGE O2 CONC:	3.7 percent
AVERAGE CO CONC:	< 0.1 percent
AVERAGE CH4 CONC.:	20.0 percent
MOLECULAR WEIGHT:	31.35 g/g-mole-dry
MOLECULAR WEIGHT:	31.19 g/g-mole-wet

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
Point of	0.08	73	Point of	0.08	74
Avg. Vel.	0.08	74	Avg. Vel.	0.08	74

INLET GAS TEMPERATURE:	73.8 degrees F	533.8 degrees R
AVERAGE VELOCITY HEAD:	0.080 " of H2O	
INLET GAS VELOCITY:		18.1 ft/sec
INLET GAS AIR FLOW:	851.6 acf/min	835.4 dscf/min

AIRFLOW AND MOISTURE INFORMATION
AM TEST-AIR QUALITY, INC.

FILE NAME:	135\2MID3-I3	LAB #:	I-0577-3
CLIENT:	PARAMETRIX, INC.	START TIME:	12:00 o'clock
LOCATION:	MIDWAY LANDFILL	STOP TIME:	12:30 o'clock
SAMPLE SITE:	#3 FLARE INLET DUCT		
SAMPLE DATE:	FEBRUARY 7, 1992		
RUN #:	3 - VELOCITY		
OPERATORS:	S. MACKEY		
CONTACT:	B. SULLIVAN		

PSCHROMETRIC MOISTURE:	1.2
Bws:	0.012
PITOT TUBE Cp:	0.99
DUCT DIAMETER:	12.0 inches
DUCT AREA:	0.785 sq. feet
BAROMETRIC PRES.:	29.58 inches Hg
STATIC PRESSURE:	6.0 inches H2O
DUCT PRESSURE:	30.02 inches Hg

AVERAGE CO2 CONC:	35.0 percent
AVERAGE O2 CONC:	3.7 percent
AVERAGE CO CONC:	< 0.1 percent
AVERAGE CH4 CONC.:	20.0 percent
MOLECULAR WEIGHT:	31.35 g/g-mole-dry
MOLECULAR WEIGHT:	31.19 g/g-mole-wet

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
Point of Avg. Vel.	0.08	74	Point of Avg. Vel.	0.08	74
	0.08	74		0.08	74

INLET GAS TEMPERATURE:	74.0 degrees F	534.0 degrees R
AVERAGE VELOCITY HEAD:	0.080 " of H2O	
INLET GAS VELOCITY:		18.1 ft/sec
INLET GAS AIR FLOW:	851.9 acf/min	835.1 dscf/min

METHODS 1 AND 2 - VELOCITY, TEMPERATURE AND AIRFLOW
AM TEST - AIR QUALITY, INC.

FILE NAME:	135\P@MOM4-1	LAB #:	1482
CLIENT:	PARAMETRIX, INC.	START TIME:	10:50 o'clock
LOCATION:	MIDWAY LANDFILL	STOP TIME:	11:20 o'clock
SAMPLE SITE:	#3 FLARE OUTLET STACK		
SAMPLE DAT:	FEBRUARY 7, 1992		
RUN #:	1 - METHOD 2		
OPERATORS:	S. MACKEY		

PERCENT MOISTURE:	8.1
Bws:	0.0810
PITOT TUBE Cp:	0.84
STACK DIAMETER:	88.0 inches
STACK AREA:	42.24 sq. feet
BAROMETRIC PRES.:	29.58 inches Hg
STATIC PRESSURE:	-0.075 inches H2O
STACK PRESSURE:	29.57 inches Hg
AVERAGE CO2 CONC:	7.9 percent
AVERAGE O2 CONC:	11.6 percent
AVERAGE CO CONC:	0 ppm
MOLECULAR WEIGHT:	29.73 g/g-mole-dry
MOLECULAR WEIGHT:	28.78 g/g-mole-wet

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
SE 1	0.011	1496	NE 1	0.007	1500
2	0.011	1575	2	0.006	1500
3	0.010	1616	3	0.006	1571
4	0.010	1591	4	0.005	1542
5	0.010	1595	5	0.005	1586
6	0.010	1614	6	0.005	1562
7	0.009	1535	7	0.005	1589
8	0.010	1514	8	0.006	1621
9	0.009	1579	9	0.005	1639
10	0.009	1560	10	0.005	1628
11	0.009	1566	11	0.006	1633
12	0.009	1525	12	0.005	1644

STACK GAS TEMPERATURE:	1574.2 degrees F
STACK GAS TEMPERATURE:	2034.2 degrees R
AVERAGE VELOCITY HEAD:	0.007 " of H2O
STACK GAS VELOCITY:	9.59 ft/sec
STACK GAS AIR FLOW:	24296.7 acf/min
STACK GAS AIR FLOW:	5728.7 dscf/min

METHODS 1 AND 2 - VELOCITY, TEMPERATURE AND AIRFLOW
AM TEST - AIR QUALITY, INC.

FILE NAME:	135\PAMOM4-2	LAB #:	1483
CLIENT:	PARAMETRIX, INC.	START TIME:	11:25 o'clock
LOCATION:	MIDWAY LANDFILL	STOP TIME:	11:55 o'clock
SAMPLE SITE:	#3 FLARE OUTLET STACK		
SAMPLE DAT:	FEBRUARY 7, 1992		
RUN #:	2 - METHOD 2		
OPERATORS:	S. MACKEY		

PERCENT MOISTURE:	8.1	
Bws:	0.0810	
PITOT TUBE Cp:	0.84	
STACK DIAMETER:	88.0	inches
STACK AREA:	42.24	sq. feet
BAROMETRIC PRES.:	29.58	inches Hg
STATIC PRESSURE:	-0.082	inches H2O
STACK PRESSURE:	29.57	inches Hg
AVERAGE CO2 CONC:	7.9	percent
AVERAGE O2 CONC:	11.6	percent
AVERAGE CO CONC:	0	ppm
MOLECULAR WEIGHT:	29.73	g/g-mole-dry
MOLECULAR WEIGHT:	28.78	g/g-mole-wet

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
NE 1	0.004	1491	SE 1	0.005	1533
2	0.004	1505	2	0.005	1584
3	0.005	1575	3	0.005	1640
4	0.004	1599	4	0.005	1649
5	0.004	1604	5	0.005	1634
6	0.004	1642	6	0.005	1631
7	0.005	1589	7	0.005	1570
8	0.004	1613	8	0.005	1577
9	0.005	1614	9	0.005	1588
10	0.005	1630	10	0.005	1574
11	0.005	1633	11	0.005	1599
12	0.004	1643	12	0.005	1607

STACK GAS TEMPERATURE:	1596.8 degrees F
STACK GAS TEMPERATURE:	2056.8 degrees R
AVERAGE VELOCITY HEAD:	0.005 " of H2O
STACK GAS VELOCITY:	7.65 ft/sec
STACK GAS AIR FLOW:	19389.0 acf/min
STACK GAS AIR FLOW:	4521.2 dscf/min

METHODS 1 AND 2 - VELOCITY, TEMPERATURE AND AIRFLOW
AM TEST - AIR QUALITY, INC.

FILE NAME:	135\P@MOM4-3	LAB #:	1484
CLIENT:	PARAMETRIX, INC.	STOP TIME:	12:00 o'clock
LOCATION:	MIDWAY LANDFILL	START TIME:	12:30 o'clock
SAMPLE SITE:	#3 FLARE OUTLET STACK		
SAMPLE DAT:	FEBRUARY 7, 1992		
RUN #:	3 - METHOD 2		
OPERATORS:	S. MACKEY		

PERCENT MOISTURE:	8.1
Bws:	0.0810
PITOT TUBE Cp:	0.84
STACK DIAMETER:	88.0 inches
STACK AREA:	42.24 sq. feet
BAROMETRIC PRES.:	29.58 inches Hg
STATIC PRESSURE:	-0.079 inches H2O
STACK PRESSURE:	29.57 inches Hg
AVERAGE CO2 CONC:	7.9 percent
AVERAGE O2 CONC:	11.6 percent
AVERAGE CO CONC:	0 ppm
MOLECULAR WEIGHT:	29.73 g/g-mole-dry
MOLECULAR WEIGHT:	28.78 g/g-mole-wet

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
SE 1	0.005	1505	NE 1	0.003	1489
2	0.005	1573	2	0.003	1509
3	0.005	1624	3	0.003	1533
4	0.005	1626	4	0.002	1572
5	0.005	1619	5	0.003	1577
6	0.005	1619	6	0.003	1571
7	0.005	1548	7	0.003	1589
8	0.005	1570	8	0.003	1609
9	0.005	1601	9	0.003	1620
10	0.005	1571	10	0.003	1630
11	0.005	1570	11	0.003	1624
12	0.005	1594	12	0.004	1612

STACK GAS TEMPERATURE:	1581.5 degrees F
STACK GAS TEMPERATURE:	2041.5 degrees R
AVERAGE VELOCITY HEAD:	0.004 " of H2O
STACK GAS VELOCITY:	6.97 ft/sec
STACK GAS AIR FLOW:	17665.3 acf/min
STACK GAS AIR FLOW:	4150.3 dscf/min

METHODS 1, 2, 3A, 4 AND HYDROCHLORIC ACID
AM TEST - AIR QUALITY, INC.

FILE NAME:	126\MIDM4-R1	LAB #:	13329	
CLIENT:	PARAMETRIX, INC.	START TIME:	11:10	o'clock
LOCATION:	MIDWAY LANDFILL	STOP TIME:	12:10	o'clock
SAMPLE SITE:	FLARE #3 OUTLET STACK	SAMPLE TIME:	60.0	minutes
SAMPLE DATE:	NOVEMBER 7, 1991			
RUN #:	1 - OUTLET			
OPERATORS:	MACKEY/WINKLER			
CONTACT:	B. SULLIVAN			

IMPIR FINAL GRAMS	INITIAL GRAMS	NET GRAMS
664.1	642.7	21.4
664.1	640.9	23.2
546.3	542.0	4.3
871.9	862.6	9.3
TOTAL H2O GAIN:		58.2
TOTAL VOLUME (SCF):		2.74
PERCENT MOISTURE:		7.61
Bws:		0.0761

PITOT TUBE Cp:	0.84	
NOZZLE DIAMETER:	NA	inches
NOZZLE AREA:	NA	sq. feet
STACK DIAMETER:	88.0	inches
STACK AREA:	42.24	sq. feet
METER TEMPERATURE:	65.0	degrees F
BAROMETRIC PRES.:	29.87	inches Hg
STATIC PRESSURE:	-0.080	inches H2O
STACK PRESSURE:	29.86	inches Hg
ORIFICE PRESSURE:	1.00	inches H2O
METER PRESSURE:	29.94	inches Hg

INIT. METER VOLUME:	556.907	
FINAL METER VOLUME:	589.667	
VOLUME SAMPLED:	32.760	
STD VOLUME (DSCF):	33.303	
STD VOLUME (DSCM):	0.943	
Y FACTOR:	1.010	

AVERAGE CONC. CO2:	6.8	percent
AVERAGE CONC. O2:	12.5	percent
AVERAGE CONC. CO:	1	ppm
MOLECULAR WEIGHT:	29.59	g/g-mole-dry
MOLECULAR WEIGHT:	28.71	g/g-mole-wet

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
E 1	0.006	1620	S 1	0.007	1675
2	0.005	1620	2	0.006	1672
3	0.005	1610	3	0.005	1675
4	0.007	1618	4	0.005	1666
5	0.007	1627	5	0.006	1665
6	0.008	1644	6	0.005	1632
7	0.009	1650	7	0.005	1580
8	0.009	1652	8	0.004	1595
9	0.010	1656	9	0.004	1576
10	0.008	1660	10	0.003	1566
11	0.010	1655	11	0.002	1585
12	0.010	1655	12	0.001	1580

STACK TEMPERATURE:	1630.6	degrees F	2090.6 degrees R
AVERAGE VELOCITY HEAD:	0.006	inches H2O	
STACK GAS VELOCITY:			8.57 ft/sec
STACK GAS AIR FLOW:	21715.5	acf/min	5057.5 dscf/min

GASEOUS CHLORIDE EMISSIONS (as HYDROCHLORIC ACID)

CHLORIDE DETECTION LIMIT (ug/ml):	1.0
CHLORIDE DETECTION LIMIT (micrograms):	348
TOTAL VOLUME OF SAMPLE (milliliters):	348
CHLORIDE CONCENTRATION IN SAMPLE (micrograms):	682
CHLORIDE CONCENTRATION IN AIR (mg/dscm):	0.744
CHLORIDE AS HCL (ppm):	0.491
CHLORIDE AS HCL (ppm @ 7% O2):	0.812
CHLORIDE EMISSION RATE (mg/min):	103.6
CHLORIDE EMISSION RATE (lb/hr):	0.014

METHODS 1, 2, 3A, 4 AND HYDROCHLORIC ACID
AM TEST - AIR QUALITY, INC.

FILE NAME:	126\MIDM4-R2	LAB #:	13330
CLIENT:	PARAMETRIX, INC.	START TIME:	13:10 o'clock
LOCATION:	MIDWAY LANDFILL	STOP TIME:	14:10 o'clock
SAMPLE SITE:	FLARE #3 OUTLET STACK	SAMPLE TIME:	60.0 minutes
SAMPLE DATE:	NOVEMBER 7, 1991		
RUN #:	2 - OUTLET		
OPERATORS:	MACKEY/WINKLER		
CONTACT:	B. SULLIVAN		

IMPIR FINAL GRAMS	INITIAL GRAMS	NET GRAMS
679.1	640.1	39.0
649.5	632.2	17.3
540.6	538.6	2.0
880.3	871.8	8.5
TOTAL H2O GAIN:		66.8
TOTAL VOLUME (SCF):		3.15
PERCENT MOISTURE:		8.47
Bws:		0.0847

PITOT TUBE Cp:	0.84	
NOZZLE DIAMETER:	NA	inches
NOZZLE AREA:	NA	sq. feet
STACK DIAMETER:	88.0	inches
STACK AREA:	42.24	sq. feet
METER TEMPERATURE:	74.3	degrees F
BAROMETRIC PRES.:	29.80	inches Hg
STATIC PRESSURE:	-0.085	inches H2O
STACK PRESSURE:	29.79	inches Hg
ORIFICE PRESSURE:	1.00	inches H2O
METER PRESSURE:	29.87	inches Hg

INIT. METER VOLUME:	589.760	
FINAL METER VOLUME:	623.900	
VOLUME SAMPLED:	34.140	
STD VOLUME (DSCF):	34.022	
STD VOLUME (DSCM):	0.964	
Y FACTOR:	1.010	
AVERAGE CONC. CO2:	7.7	percent
AVERAGE CONC. O2:	11.7	percent
AVERAGE CONC. CO:	0	ppm
MOLECULAR WEIGHT:	29.70	g/g-mole-dry
MOLECULAR WEIGHT:	28.71	g/g-mole-wet

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
E 1	0.004	1610	S 1	0.007	1640
2	0.005	1606	2	0.008	1640
3	0.004	1601	3	0.008	1635
4	0.003	1610	4	0.007	1635
5	0.005	1624	5	0.006	1635
6	0.005	1650	6	0.005	1617
7	0.006	1660	7	0.006	1607
8	0.006	1658	8	0.006	1606
9	0.005	1630	9	0.007	1616
10	0.006	1645	10	0.006	1612
11	0.006	1635	11	0.007	1610
12	0.006	1640	12	0.008	1611

STACK TEMPERATURE:	1626.4 degrees F	2086.4 degrees R
AVERAGE VELOCITY HEAD:	0.006 inches H2O	
STACK GAS VELOCITY:		8.57 ft/sec
STACK GAS AIR FLOW:	21730.9 acf/min	5012.2 dscf/min

GASEOUS CHLORIDE EMISSIONS (as HYDROCHLORIC ACID)

CHLORIDE DETECTION LIMIT (ug/ml):	1.0
CHLORIDE DETECTION LIMIT (micrograms):	373
TOTAL VOLUME OF SAMPLE (milliliters):	373
CHLORIDE CONCENTRATION IN SAMPLE (micrograms):	765
CHLORIDE CONCENTRATION IN AIR (mg/dscm):	0.817
CHLORIDE AS HCL (ppm):	0.539
CHLORIDE AS HCL (ppm @ 7% O2):	0.814
CHLORIDE EMISSION RATE (mg/min):	112.7
CHLORIDE EMISSION RATE (lb/hr):	0.015

METHODS 1, 2, 3A, 4 AND HYDROCHLORIC ACID
AM TEST - AIR QUALITY, INC.

FILE NAME:	126\MIDM4-R3	LAB #:	13331
CLIENT:	PARAMETRIX, INC.	START TIME:	9:05 o'clock
LOCATION:	MIDWAY LANDFILL	STOP TIME:	10:05 o'clock
SAMPLE SITE:	FLARE #3 OUTLET STACK	SAMPLE TIME:	60.0 minutes
SAMPLE DATE:	NOVEMBER 8, 1991		
RUN #:	3 - OUTLET		
OPERATORS:	MACKEY/WINKLER		
CONTACT:	B. SULLIVAN		

IMPIR FINAL GRAMS	INITIAL GRAMS	NET GRAMS
682.9	638.0	44.9
661.3	644.0	17.3
541.5	539.3	2.2
836.2	836.1	0.1
TOTAL H2O GAIN:		64.5
TOTAL VOLUME (SCF):		3.04
PERCENT MOISTURE:		8.12
Bws:		0.0812

PITOT TUBE Cp:	0.84	
NOZZLE DIAMETER:	NA	inches
NOZZLE AREA:	NA	sq. feet
STACK DIAMETER:	88.0	inches
STACK AREA:	42.24	sq. feet
METER TEMPERATURE:	58.8	degrees F
BAROMETRIC PRES.:	29.75	inches Hg
STATIC PRESSURE:	-0.095	inches H2O
STACK PRESSURE:	29.74	inches Hg
ORIFICE PRESSURE:	1.00	inches H2O
METER PRESSURE:	29.82	inches Hg

INIT. METER VOLUME:	624.238	AVERAGE CONC. CO2:	9.2 percent
FINAL METER VOLUME:	657.806	AVERAGE CONC. O2:	10.6 percent
VOLUME SAMPLED:	33.568	AVERAGE CONC. CO:	0 ppm
STD VOLUME (DSCF):	34.394	MOLECULAR WEIGHT:	29.90 g/g-mole-dry
STD VOLUME (DSCM):	0.974	MOLECULAR WEIGHT:	28.93 g/g-mole-wet
Y FACTOR:	1.010		

SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.	SAMPLE POINT	VELOCITY " OF H2O	TEMPERATURE DEGREES F.
E 1	0.008	1616	S 1	0.006	1660
2	0.008	1619	2	0.007	1653
3	0.006	1620	3	0.007	1660
4	0.007	1643	4	0.008	1674
5	0.009	1644	5	0.006	1667
6	0.008	1650	6	0.006	1629
7	0.009	1672	7	0.005	1638
8	0.010	1685	8	0.007	1638
9	0.010	1676	9	0.007	1628
10	0.011	1660	10	0.007	1622
11	0.010	1662	11	0.005	1620
12	0.010	1651	12	0.005	1622

STACK TEMPERATURE:	1646.2 degrees F	2106.2 degrees R
AVERAGE VELOCITY HEAD:	0.007 inches H2O	
STACK GAS VELOCITY:		9.72 ft/sec
STACK GAS AIR FLOW:	24632.9 acf/min	5639.9 dscf/min

GASEOUS CHLORIDE EMISSIONS (as HYDROCHLORIC ACID)

CHLORIDE DETECTION LIMIT (ug/ml):	1.0
CHLORIDE DETECTION LIMIT (micrograms):	377
TOTAL VOLUME OF SAMPLE (milliliters):	377
CHLORIDE CONCENTRATION IN SAMPLE (micrograms):	1390
CHLORIDE CONCENTRATION IN AIR (mg/dscm):	1.47
CHLORIDE AS HCL (ppm):	0.968
CHLORIDE AS HCL (ppm @ 7% O2):	1.31
CHLORIDE EMISSION RATE (mg/min):	227.9
CHLORIDE EMISSION RATE (lb/hr):	0.031

CALIBRATION SUMMARY - GASEOUS EMISSION MONITORS

FILE NAME: 124\MID-1
CLIENT: Parametrix, Inc.
LOCATION: Seattle, Washington - Midway Landfill
SAMPLE SITE: Flare #3 Outlet
DATE: November 7, 1991
RUN #: 1 - METHODS 3A, 6C, 7E AND 10
SAMPLE TIMES: 11:10-12:10

PARAMETER	MEASUREMENT UNIT	INITIAL ZERO CHECK	FINAL ZERO CHECK	INITIAL SPAN CHECK	FINAL SPAN CHECK	UPSCALE CAL. GAS VALUE Cma	AVERAGE ZERO BIAS Co	AVERAGE SPAN BIAS Cm	AVERAGE MEASURED CONC. C
Carbon Dioxide (CO2)	%	0.0	0.0	12.0	11.9	12.0	0.0	12.0	6.8
Oxygen (O2)	%	0.0	0.0	9.8	9.8	9.8	0.0	9.8	12.5
Carbon Monoxide (CO)	ppm	0.0	0.0	501.0	504.0	500.0	0.0	502.5	1
Sulfur Dioxide (SO2)	ppm	0.0	0.0	93.9	92.3	93.9	0.0	93.1	1.9
Nitrogen Oxides (NOx)	ppm	0.0	0.0	94.8	96.1	94.8	0.0	95.5	7.8

PARAMETER	EFFLUENT GAS CONCENTRATION Cgas
Carbon Dioxide (CO2)	6.8 %
Oxygen (O2)	12.5 %
Carbon Monoxide (CO)	1 ppm
Sulfur Dioxide (SO2)	1.9 ppm
Nitrogen Oxides (NOx)	7.7 ppm

CALIBRATION SUMMARY - GASEOUS EMISSION MONITORS

FILE NAME:	124\MID-2
CLIENT:	Parametrix, Inc.
LOCATION:	Seattle, Washington - Midway Landfill
SAMPLE SITE:	Flare #3 Outlet
DATE:	November 7, 1991
RUN #:	2 - METHODS 3A, 6C, 7E AND 10
SAMPLE TIMES:	13:10-14:10

PARAMETER	MEASUREMENT UNIT	INITIAL ZERO CHECK	FINAL ZERO CHECK	INITIAL SPAN CHECK	FINAL SPAN CHECK	UPSCALE CAL. GAS VALUE Cma	AVERAGE ZERO BIAS Co	AVERAGE SPAN BIAS Cm	AVERAGE MEASURED CONC. C
Carbon Dioxide (CO2)	%	0.0	0.0	12.0	11.9	12.0	0.0	12.0	7.7
Oxygen (O2)	%	0.0	0.0	9.8	9.8	9.8	0.0	9.8	11.7
Carbon Monoxide (CO)	ppm	0.0	0.0	499.0	501.0	500.0	0.0	500.0	0
Sulfur Dioxide (SO2)	ppm	0.0	0.7	93.6	93.3	93.9	0.4	93.5	3.0
Nitrogen Oxides (NOx)	ppm	0.0	0.0	94.7	95.2	94.8	0.0	95.0	8.7

PARAMETER	EFFLUENT GAS CONCENTRATION Cgas
Carbon Dioxide (CO2)	7.7 %
Oxygen (O2)	11.7 %
Carbon Monoxide (CO)	0 ppm
Sulfur Dioxide (SO2)	2.7 ppm
Nitrogen Oxides (NOx)	8.7 ppm

CALIBRATION SUMMARY - GASEOUS EMISSION MONITORS

FILE NAME: 124\MID-3
CLIENT: Parametrix, Inc.
LOCATION: Seattle, Washington - Midway Landfill
SAMPLE SITE: Flare #3 Outlet
DATE: November 8, 1991
RUN #: 3 - METHODS 3A, 6C, 7E AND 10
SAMPLE TIMES: 9:05-10:05

PARAMETER	MEASUREMENT UNIT	INITIAL ZERO CHECK	FINAL ZERO CHECK	INITIAL SPAN CHECK	FINAL SPAN CHECK	UPSCALE CAL. GAS VALUE Cma	AVERAGE ZERO BIAS Co	AVERAGE SPAN BIAS Cm	AVERAGE MEASURED CONC. C
Carbon Dioxide (CO2)	%	0.0	0.0	12.9	12.0	12.9	0.0	12.5	8.9
Oxygen (O2)	%	0.0	0.0	9.8	9.8	9.8	0.0	9.8	10.6
Carbon Monoxide (CO)	ppm	0.0	0.0	500.0	500.0	500.0	0.0	500.0	0
Sulfur Dioxide (SO2)	ppm	0.0	0.9	93.7	94.3	93.9	0.5	94.0	3.2
Nitrogen Oxides (NOx)	ppm	0.0	0.0	94.9	95.1	94.8	0.0	95.0	10.2

PARAMETER	EFFLUENT GAS CONCENTRATION Cgas
Carbon Dioxide (CO2)	9.2 %
Oxygen (O2)	10.6 %
Carbon Monoxide (CO)	0 ppm
Sulfur Dioxide (SO2)	2.8 ppm
Nitrogen Oxides (NOx)	10.2 ppm

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
AM TEST-AIR QUALITY, INC.

FILE NAME:	135\TO14PM1I
CLIENT:	Parametrix, Inc.
LOCATION:	Midway Landfill
SAMPLE LOCATION:	#3 Flare Inlet Duct
SAMPLE DATE:	February 7, 1992
SAMPLE TIME:	10:50-11:20
LAB NUMBER(S):	I-0577-1
AIRFLOW:	848.5 dscf/min

ANALYTE	Run 1 mg/min	Blank mg/min	DL Run 1 mg/min
Acetone	< DL	< DL	7.21
Benzene	38.4	< DL	1.20
Bromodichloromethane	< DL	< DL	2.40
Bromomethane (Methyl Bromide)	< DL	< DL	2.40
Bromoform	< DL	< DL	2.40
1,3-Butadiene	< DL	< DL	0.48
2-Butanone (MEK)	< DL	< DL	1.20
Carbon Disulfide	< DL	< DL	2.40
Carbon Tetrachloride	67.3	< DL	2.40
Chlorobenzene	6.73	< DL	1.20
Chloroethane (Ethyl Chloride)	< DL	< DL	1.20
2-Chloroethyl Vinyl Ether	< DL	< DL	12.0
Chloroform	22.6	< DL	1.20
Chloromethane (Methyl Chloride)	< DL	< DL	0.48
Dibromochloromethane	< DL	< DL	2.40
1,2-Dibromoethane (EDB)	11.5	< DL	2.40
1,2-Dichlorobenzene	< DL	< DL	2.40
1,3-Dichlorobenzene	38.4	< DL	2.40
1,4-Dichlorobenzene	9.61	< DL	2.40
1,1-Dichloroethane	< DL	< DL	1.20
1,2-Dichloroethane (EDC)	< DL	< DL	1.20
1,1-Dichloroethene	26.4	< DL	1.20
cis-1,2-Dichloroethene	< DL	< DL	1.20
trans-1,2-Dichloroethene	< DL	< DL	1.20
Dichloromethane	< DL	< DL	12.0
1,2-Dichloropropane	< DL	< DL	1.20
cis-1,3-Dichloropropene	< DL	< DL	1.20
trans-1,3-Dichloropropene	1081.4	< DL	1.20
Ethylbenzene	< DL	< DL	2.40
2-Hexanone	6.49	< DL	1.20
4-Methyl-2-Pentanone (MIBK)	11.8	< DL	1.20
Styrene	< DL	< DL	2.40
1,1,2,2-Tetrachloroethane	< DL	< DL	2.40
Tetrachloroethene (PCE)	156.2	< DL	2.40
Toluene	< DL	< DL	2.40
1,1,1-Trichloroethane (TCA)	< DL	< DL	2.40
1,1,2-Trichloroethane	< DL	< DL	2.40
Trichloroethene (TCE)	< DL	< DL	2.40
Trichlorofluoromethane (F-11)	3.60	< DL	1.20
Trichlorotrifluoroethane (F-113)	< DL	< DL	2.40
Vinyl Acetate	< DL	< DL	4.81
Vinyl Chloride	69.7	< DL	12.0
Xylenes, Total	1129.4	< DL	1.20
			2.40

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

mg/min = milligrams of analyte emitted per minute

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
AM TEST-AIR QUALITY, INC.

FILE NAME:	135\TO14PM2I
CLIENT:	Parametrix, Inc.
LOCATION:	Midway Landfill
SAMPLE LOCATION:	#3 Flare Inlet Duct
SAMPLE DATE:	February 7, 1992
SAMPLE TIME:	11:25-11:55
LAB NUMBER(S):	I-0577-2
AIRFLOW:	835.4 dscf/min

ANALYTE	Run 2 mg/min	Blank mg/min	DL Run 2 mg/min
Acetone	< DL	< DL	7.10
Benzene	35.5	< DL	1.18
Bromodichloromethane	< DL	< DL	2.37
Bromomethane (Methyl Bromide)	< DL	< DL	2.37
Bromoform	< DL	< DL	2.37
1,3-Butadiene	< DL	< DL	0.47
2-Butanone (MEK)	< DL	< DL	1.18
Carbon Disulfide	< DL	< DL	2.37
Carbon Tetrachloride	< DL	< DL	2.37
Chlorobenzene	61.5	< DL	1.18
Chloroethane (Ethyl Chloride)	5.91	< DL	1.18
2-Chloroethyl Vinyl Ether	< DL	< DL	11.8
Chloroform	< DL	< DL	1.18
Chloromethane (Methyl Chloride)	23.7	< DL	0.47
Dibromochloromethane	< DL	< DL	2.37
1,2-Dibromoethane (EDB)	< DL	< DL	2.37
1,2-Dichlorobenzene	6.15	< DL	2.37
1,3-Dichlorobenzene	< DL	< DL	2.37
1,4-Dichlorobenzene	23.7	< DL	2.37
1,1-Dichloroethane	8.99	< DL	1.18
1,2-Dichloroethane (EDC)	< DL	< DL	1.18
1,1-Dichloroethene	< DL	< DL	1.18
cis-1,2-Dichloroethene	23.7	< DL	1.18
trans-1,2-Dichloroethene	< DL	< DL	1.18
Dichloromethane	< DL	< DL	11.8
1,2-Dichloropropane	< DL	< DL	1.18
cis-1,3-Dichloropropene	< DL	< DL	1.18
trans-1,3-Dichloropropene	< DL	< DL	1.18
Ethylbenzene	1017.3	< DL	2.37
2-Hexanone	< DL	< DL	1.18
4-Methyl-2-Pentanone (MIBK)	6.39	< DL	1.18
Styrene	10.4	< DL	2.37
1,1,2,2-Tetrachloroethane	< DL	< DL	2.37
Tetrachloroethene (PCE)	< DL	< DL	2.37
Toluene	151.4	< DL	2.37
1,1,1-Trichloroethane (TCA)	< DL	< DL	2.37
1,1,2-Trichloroethane	< DL	< DL	2.37
Trichloroethene (TCE)	< DL	< DL	1.18
Trichlorofluoromethane (F-11)	4.02	< DL	2.37
Trichlorotrifluoroethane (F-113)	< DL	< DL	4.73
Vinyl Acetate	< DL	< DL	11.8
Vinyl Chloride	71.0	< DL	1.18
Xylenes, Total	1041.0	< DL	2.37

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

mg/min = milligrams of analyte emitted per minute

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
AM TEST-AIR QUALITY, INC.

FILE NAME: 135\TO14PMI3
CLIENT: Parametrix, Inc.
LOCATION: Midway Landfill
SAMPLE LOCATION: #3 Flare Inlet Duct
SAMPLE DATE: February 7, 1992
SAMPLE TIME: 12:00-12:30
LAB NUMBER(S): I-0577-3
AIRFLOW: 835.1 dscf/min

ANALYTE	Run 3 mg/min	Blank mg/min	DL Run 3 mg/min
Acetone	< DL	< DL	7.10
Benzene	40.2	< DL	1.18
Bromodichloromethane	< DL	< DL	2.37
Bromomethane (Methyl Bromide)	< DL	< DL	2.37
Bromoform	< DL	< DL	2.37
1,3-Butadiene	< DL	< DL	0.47
2-Butanone (MEK)	< DL	< DL	1.18
Carbon Disulfide	< DL	< DL	2.37
Carbon Tetrachloride	< DL	< DL	2.37
Chlorobenzene	66.2	< DL	1.18
Chloroethane (Ethyl Chloride)	6.62	< DL	1.18
2-Chloroethyl Vinyl Ether	< DL	< DL	11.8
Chloroform	< DL	< DL	1.18
Chloromethane (Methyl Chloride)	23.2	< DL	0.47
Dibromochloromethane	< DL	< DL	2.37
1,2-Dibromoethane (EDB)	< DL	< DL	2.37
1,2-Dichlorobenzene	8.51	< DL	2.37
1,3-Dichlorobenzene	< DL	< DL	2.37
1,4-Dichlorobenzene	28.4	< DL	2.37
1,1-Dichloroethane	9.70	< DL	1.18
1,2-Dichloroethane (EDC)	< DL	< DL	1.18
1,1-Dichloroethene	< DL	< DL	1.18
cis-1,2-Dichloroethene	26.0	< DL	1.18
trans-1,2-Dichloroethene	< DL	< DL	1.18
Dichloromethane	< DL	< DL	11.8
1,2-Dichloropropane	< DL	< DL	1.18
cis-1,3-Dichloropropene	< DL	< DL	1.18
trans-1,3-Dichloropropene	< DL	< DL	1.18
Ethylbenzene	1087.9	< DL	2.37
2-Hexanone	< DL	< DL	1.18
4-Methyl-2-Pentanone (MIBK)	6.39	< DL	1.18
Styrene	12.3	< DL	2.37
1,1,2,2-Tetrachloroethane	< DL	< DL	2.37
Tetrachloroethene (PCE)	< DL	< DL	2.37
Toluene	163.2	< DL	2.37
1,1,1-Trichloroethane (TCA)	< DL	< DL	2.37
1,1,2-Trichloroethane	< DL	< DL	2.37
Trichloroethene (TCE)	< DL	< DL	1.18
Trichlorofluoromethane (F-11)	3.78	< DL	2.37
Trichlorotrifluoroethane (F-113)	< DL	< DL	4.73
Vinyl Acetate	< DL	< DL	11.8
Vinyl Chloride	71.0	< DL	1.18
Xylenes, Total	1111.6	< DL	2.37

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

mg/min = milligrams of analyte emitted per minute

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
AM TEST-AIR QUALITY, INC.

FILE NAME: 135\TO14PM10
CLIENT: Parametrix, Inc.
LOCATION: Midway Landfill
SAMPLE LOCATION: #3 Flare Outlet Stack
SAMPLE DATE: February 7, 1992
SAMPLE TIME: 10:50-11:20
LAB NUMBER(S): I-0577-4
AIRFLOW: 5728.7 dscf/min

ANALYTE	Run 1 mg/min	Blank mg/min	DL Run 1 mg/min
Acetone	4.38	< DL	0.487
Benzene	0.422	< DL	0.081
Bromodichloromethane	< DL	< DL	0.162
Bromomethane (Methyl Bromide)	< DL	< DL	0.162
Bromoform	< DL	< DL	0.162
1,3-Butadiene	< DL	< DL	0.032
2-Butanone (MEK)	< DL	< DL	0.081
Carbon Disulfide	< DL	< DL	0.162
Carbon Tetrachloride	< DL	< DL	0.162
Chlorobenzene	< DL	< DL	0.081
Chloroethane (Ethyl Chloride)	< DL	< DL	0.081
2-Chloroethyl Vinyl Ether	< DL	< DL	0.811
Chloroform	< DL	< DL	0.081
Chloromethane (Methyl Chloride)	< DL	< DL	0.032
Dibromochloromethane	< DL	< DL	0.162
1,2-Dibromoethane (EDB)	< DL	< DL	0.162
1,2-Dichlorobenzene	< DL	< DL	0.162
1,3-Dichlorobenzene	< DL	< DL	0.162
1,4-Dichlorobenzene	< DL	< DL	0.162
1,1-Dichloroethane	< DL	< DL	0.081
1,2-Dichloroethane (EDC)	< DL	< DL	0.081
1,1-Dichloroethene	< DL	< DL	0.081
cis-1,2-Dichloroethene	< DL	< DL	0.081
trans-1,2-Dichloroethene	< DL	< DL	0.081
Dichloromethane	< DL	< DL	0.811
1,2-Dichloropropane	< DL	< DL	0.081
cis-1,3-Dichloropropene	< DL	< DL	0.081
trans-1,3-Dichloropropene	< DL	< DL	0.081
Ethylbenzene	< DL	< DL	0.162
2-Hexanone	< DL	< DL	0.081
4-Methyl-2-Pentanone (MIBK)	< DL	< DL	0.081
Styrene	< DL	< DL	0.162
1,1,2,2-Tetrachloroethane	< DL	< DL	0.162
Tetrachloroethene (PCE)	< DL	< DL	0.162
Toluene	< DL	< DL	0.162
1,1,1-Trichloroethane (TCA)	< DL	< DL	0.162
1,1,2-Trichloroethane	< DL	< DL	0.162
Trichloroethene (TCE)	< DL	< DL	0.081
Trichlorofluoromethane (F-11)	< DL	< DL	0.162
Trichlorotrifluoroethane (F-113)	< DL	< DL	0.324
Vinyl Acetate	< DL	< DL	0.811
Vinyl Chloride	< DL	< DL	0.081
Xylenes, Total	< DL	< DL	0.162

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

mg/min = milligrams of analyte emitted per minute

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
AM TEST-AIR QUALITY, INC.

FILE NAME: 135\TO14PM2O
CLIENT: Parametrix, Inc.
LOCATION: Midway Landfill
SAMPLE LOCATION: #3 Flare Outlet Stack
SAMPLE DATE: February 7, 1992
SAMPLE TIME: 11:25-11:55
LAB NUMBER(S): I-0577-5
AIRFLOW: 4521.2 dscf/min

ANALYTE	Run 2 mg/min	Blank mg/min	DL Run 2 mg/min
Acetone	3.84	< DL	0.384
Benzene	< DL	< DL	0.064
Bromodichloromethane	< DL	< DL	0.128
Bromomethane (Methyl Bromide)	< DL	< DL	0.128
Bromoform	< DL	< DL	0.128
1,3-Butadiene	< DL	< DL	0.026
2-Butanone (MEK)	< DL	< DL	0.064
Carbon Disulfide	< DL	< DL	0.128
Carbon Tetrachloride	< DL	< DL	0.128
Chlorobenzene	< DL	< DL	0.064
Chloroethane (Ethyl Chloride)	< DL	< DL	0.064
2-Chloroethyl Vinyl Ether	< DL	< DL	0.640
Chloroform	< DL	< DL	0.064
Chloromethane (Methyl Chloride)	< DL	< DL	0.026
Dibromochloromethane	< DL	< DL	0.128
1,2-Dibromoethane (EDB)	< DL	< DL	0.128
1,2-Dichlorobenzene	< DL	< DL	0.128
1,3-Dichlorobenzene	< DL	< DL	0.128
1,4-Dichlorobenzene	< DL	< DL	0.128
1,1-Dichloroethane	< DL	< DL	0.064
1,2-Dichloroethane (EDC)	< DL	< DL	0.064
1,1-Dichloroethene	< DL	< DL	0.064
cis-1,2-Dichloroethene	< DL	< DL	0.064
trans-1,2-Dichloroethene	< DL	< DL	0.064
Dichloromethane	< DL	< DL	0.640
1,2-Dichloropropane	< DL	< DL	0.064
cis-1,3-Dichloropropene	< DL	< DL	0.064
trans-1,3-Dichloropropene	< DL	< DL	0.064
Ethylbenzene	< DL	< DL	0.128
2-Hexanone	< DL	< DL	0.064
4-Methyl-2-Pentanone (MIBK)	< DL	< DL	0.064
Styrene	< DL	< DL	0.128
1,1,2,2-Tetrachloroethane	< DL	< DL	0.128
Tetrachloroethene (PCE)	< DL	< DL	0.128
Toluene	< DL	< DL	0.128
1,1,1-Trichloroethane (TCA)	< DL	< DL	0.128
1,1,2-Trichloroethane	< DL	< DL	0.128
Trichloroethene (TCE)	< DL	< DL	0.064
Trichlorofluoromethane (F-11)	< DL	< DL	0.128
Trichlorotrifluoroethane (F-113)	< DL	< DL	0.256
Vinyl Acetate	< DL	< DL	0.640
Vinyl Chloride	< DL	< DL	0.064
Xylenes, Total	< DL	< DL	0.128

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

mg/min = milligrams of analyte emitted per minute

EMISSION RATE RESULTS
TO-14 VOLATILE ORGANIC COMPOUNDS
AM TEST-AIR QUALITY, INC.

FILE NAME: 135\TO14PM3O
CLIENT: Parametrix, Inc.
LOCATION: Midway Landfill
SAMPLE LOCATION: #3 Flare Outlet Stack
SAMPLE DATE: February 7, 1992
SAMPLE TIME: 12:00-12:30
LAB NUMBER(S): I-0577-6
AIRFLOW: 4150.3 dscf/min

ANALYTE	Run 3 mg/min	Blank mg/min	DL Run 3 mg/min
Acetone	2.94	< DL	0.353
Benzene	< DL	< DL	0.059
Bromodichloromethane	< DL	< DL	0.118
Bromomethane (Methyl Bromide)	< DL	< DL	0.118
Bromoform	< DL	< DL	0.118
1,3-Butadiene	< DL	< DL	0.024
2-Butanone (MEK)	< DL	< DL	0.059
Carbon Disulfide	< DL	< DL	0.118
Carbon Tetrachloride	< DL	< DL	0.118
Chlorobenzene	< DL	< DL	0.059
Chloroethane (Ethyl Chloride)	< DL	< DL	0.059
2-Chloroethyl Vinyl Ether	< DL	< DL	0.588
Chloroform	< DL	< DL	0.059
Chloromethane (Methyl Chloride)	< DL	< DL	0.024
Dibromochloromethane	< DL	< DL	0.118
1,2-Dibromoethane (EDB)	< DL	< DL	0.118
1,2-Dichlorobenzene	< DL	< DL	0.118
1,3-Dichlorobenzene	< DL	< DL	0.118
1,4-Dichlorobenzene	< DL	< DL	0.118
1,1-Dichloroethane	< DL	< DL	0.059
1,2-Dichloroethane (EDC)	< DL	< DL	0.059
1,1-Dichloroethene	< DL	< DL	0.059
cis-1,2-Dichloroethene	< DL	< DL	0.059
trans-1,2-Dichloroethene	< DL	< DL	0.059
Dichloromethane	< DL	< DL	0.588
1,2-Dichloropropane	< DL	< DL	0.059
cis-1,3-Dichloropropene	< DL	< DL	0.059
trans-1,3-Dichloropropene	< DL	< DL	0.059
Ethylbenzene	< DL	< DL	0.118
2-Hexanone	< DL	< DL	0.059
4-Methyl-2-Pentanone (MIBK)	< DL	< DL	0.059
Styrene	< DL	< DL	0.118
1,1,2,2-Tetrachloroethane	< DL	< DL	0.118
Tetrachloroethene (PCE)	< DL	< DL	0.118
Toluene	< DL	< DL	0.118
1,1,1-Trichloroethane (TCA)	< DL	< DL	0.118
1,1,2-Trichloroethane	< DL	< DL	0.118
Trichloroethene (TCE)	< DL	< DL	0.059
Trichlorofluoromethane (F-11)	< DL	< DL	0.118
Trichlorotrifluoroethane (F-113)	< DL	< DL	0.235
Vinyl Acetate	< DL	< DL	0.588
Vinyl Chloride	< DL	< DL	0.059
Xylenes, Total	< DL	< DL	0.118

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

mg/min = milligrams of analyte emitted per minute

APPENDIX B

Laboratory Analysis Results

COAST · TO · COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

San Luis Obispo, CA • Goleta, CA • Benicia, CA • Camarillo, CA • Newport Beach, CA • Valparaiso, IN

San Luis Obispo Division (805) 543-2553
141 Suburban Road, San Luis Obispo, California 93401 FAX (805) 543-2685

CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-1
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : GC/TCD

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Inlet Run 1 C#453	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	(CAS RN)	*PQL PERCENT	RESULT PERCENT	NOTE
FIXED GASES AND METHANE				
Carbon Dioxide	(124389)	0.1	35.	
Oxygen	(7782447)	0.01	3.7	
Nitrogen	(7727379)	0.02	41.	
Methane	(74828)	0.005	20.	
Carbon Monoxide	(630080)	0.1	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/13/92
TCD/02129203
LRH/ge/drc
IB12M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

COAST - TO - COAST ANALYTICAL SERVICES

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CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-2
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : GC/TCD

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Inlet Run 2 C#476	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	(CAS RN)	*PQL PERCENT	RESULT PERCENT	NOTE
FIXED GASES AND METHANE				
Carbon Dioxide	(124389)	0.1	35.	
Oxygen	(7782447)	0.01	3.7	
Nitrogen	(7727379)	0.02	41.	
Methane	(74828)	0.005	20.	
Carbon Monoxide	(630080)	0.1	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/13/92
TCD/02129204
LRH/ge/drc
IB12TA

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

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CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-3
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : GC/TCD

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Inlet Run 3 C#481	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	(CAS RN)	*PQL PERCENT	RESULT PERCENT	NOTE
FIXED GASES AND METHANE				
Carbon Dioxide	(124389)	0.1	35.	
Oxygen	(7782447)	0.01	3.7	
Nitrogen	(7727379)	0.02	41.	
Methane	(74828)	0.005	20.	
Carbon Monoxide	(630080)	0.1	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/13/92
TCD/02129205
LRH/ge/drc
IB12TA

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

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56

CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

QC Batch ID: IB12TA I-0577-3
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : GC/TCD

QC DUPLICATE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Inlet Run 3 C#481	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	(CAS RN)	*PQL PERCENT	RESULT PERCENT	%DIFF	NOTE
FIXED GASES AND METHANE					
Carbon Dioxide	(124389)	0.1	35.	0.	
Oxygen	(7782447)	0.01	3.5	5.6	
Nitrogen	(7727379)	0.02	41.	0.	
Methane	(74828)	0.005	21.	4.9	
Carbon Monoxide	(630080)	0.1	ND		

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/13/92
TCD/02129206
LRH/ge/drc
I0577-3

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

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Laurence R. Hilpert, Ph.D.
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COAST · TO · COAST ANALYTICAL SERVICES

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QC Batch ID: IB12M1

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 02/12/92
Analyzed by: EA
Method : GC/TCD

QC SPIKE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED
QC SPIKE	Air		

CONSTITUENT	*PQL PERCENT	SPIKE AMOUNT	RESULT PERCENT	%REC	NOTE
FIXED GASES AND METHANE					
Carbon Dioxide	0.1	15.	15.	100.	
Oxygen	0.01	7.1	7.1	100.	
Nitrogen	0.02	66.	66.	100.	
Methane	0.005	4.6	4.6	100.	
Carbon Monoxide	0.1	7.1	7.1	100.	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/13/92
TCD/02129207
LRH/ge/drc
I0577-1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

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CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-1
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Inlet Run 1 C#453	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
VOLATILE ORGANICS BY EPA TO-14				1
Acetone	100.	ND	ND	
Benzene	10.	460.	1600.	
Bromodichloromethane	10.	ND	ND	
Bromomethane (Methyl Bromide)	20.	ND	ND	
Bromoform	10.	ND	ND	
1,3-Butadiene	10.	ND	ND	
2-Butanone (MEK)	20.	ND	ND	
Carbon Disulfide	20.	ND	ND	
Carbon Tetrachloride	10.	ND	ND	
Chlorobenzene	10.	560.	2800.	
Chloroethane (Ethyl Chloride)	20.	100.	280.	
2-Chloroethyl Vinyl Ether	100.	ND	ND	
Chloroform	10.	ND	ND	
Chloromethane (Methyl Chloride)	10.	420.	940.	
Dibromochloromethane	10.	ND	ND	
1,2-Dibromoethane (EDB)	10.	ND	ND	
1,2-Dichlorobenzene	20.	70.	480.	
1,3-Dichlorobenzene	20.	ND	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) Canister was received at 1 psig.

02/13/92
MSD1/1C25E
LRH/ge/drc
IB12M1

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59

CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-1
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Inlet Run 1 C#453	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
1,4-Dichlorobenzene	20.	240.	1600.	
1,1-Dichloroethane	10.	90.	400.	
1,2-Dichloroethane (EDC)	10.	ND	ND	
1,1-Dichloroethene	10.	ND	ND	
cis-1,2-Dichloroethene	10.	250.	1100.	
trans-1,2-Dichloroethene	10.	ND	ND	
Dichloromethane	100.	ND	ND	
1,2-Dichloropropane	10.	ND	ND	
cis-1,3-Dichloropropene	10.	ND	ND	
trans-1,3-Dichloropropene	10.	ND	ND	
Ethylbenzene	20.	9500.	45000.	
2-Hexanone	10.	ND	ND	
4-Methyl-2-Pentanone (MIBK)	10.	60.	270.	
Styrene	20.	110.	490.	
1,1,2,2-Tetrachloroethane	10.	ND	ND	
Tetrachloroethene (PCE)	10.	ND	ND	
Toluene	20.	1600.	6500.	
1,1,1-Trichloroethane (TCA)	20.	ND	ND	
1,1,2-Trichloroethane	20.	ND	ND	
Trichloroethene (TCE)	10.	ND	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/13/92
MSD1/1C25E
LRH/ge/drc
IB12M1

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CLIENT: Angela Blaisdell
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30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-1
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Inlet Run 1 C#453	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
Trichlorofluoromethane (F-11)	20.	20.	150.	
Trichlorotrifluoroethane (F-113)	20.	ND	ND	
Vinyl Acetate	100.	ND	ND	
Vinyl Chloride	20.	1000.	2900.	
Xylenes, Total	20.	9900.	47000.	
Percent Surrogate Recovery			102.	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/13/92
MSD1/1C25E
LRH/ge/drc
IB12M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

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CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

QC Batch ID: IB12M1 I-0577-1
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

QC DUPLICATE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Inlet Run 1 C#453	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	%DIFF	NOTE
VOLATILE ORGANICS BY EPA TO-14					1
Acetone	100.	ND	ND		
Benzene	10.	490.	1700.	6.1	
Bromodichloromethane	10.	ND	ND		
Bromomethane (Methyl Bromide)	20.	ND	ND		
Bromoform	10.	ND	ND		
1,3-Butadiene	10.	ND	ND		
2-Butanone (MEK)	20.	ND	ND		
Carbon Disulfide	20.	ND	ND		
Carbon Tetrachloride	10.	ND	ND		
Chlorobenzene	10.	600.	3000.	6.9	
Chloroethane (Ethyl Chloride)	20.	87.	250.	11.	
2-Chloroethyl Vinyl Ether	100.	ND	ND		
Chloroform	10.	ND	ND		
Chloromethane (Methyl Chloride)	10.	410.	930.	1.1	
Dibromochloromethane	10.	ND	ND		
1,2-Dibromoethane (EDB)	10.	ND	ND		
1,2-Dichlorobenzene	20.	64.	420.	13.	
1,3-Dichlorobenzene	20.	ND	ND		
1,4-Dichlorobenzene	20.	230.	1500.	6.5	
1,1-Dichloroethane	10.	93.	410.	2.5	
1,2-Dichloroethane (EDC)	10.	ND	ND		

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) Canister was received at 1 psig.

02/13/92
MSD1/1C26E
LRH/ge/drc
I0577-1

COAST - TO - COAST ANALYTICAL SERVICES

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CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

QC Batch ID: IB12M1 I-0577-1
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

QC DUPLICATE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Inlet Run 1 C#453	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	%DIFF	NOTE
1,1-Dichloroethene	10.	ND	ND		
cis-1,2-Dichloroethene	10.	280.	1200.	8.7	
trans-1,2-Dichloroethene	10.	ND	ND		
Dichloromethane	100.	ND	ND		
1,2-Dichloropropane	10.	ND	ND		
cis-1,3-Dichloropropene	10.	ND	ND		
trans-1,3-Dichloropropene	10.	ND	ND		
Ethylbenzene	20.	10000.	48000.	6.5	
2-Hexanone	10.	ND	ND		
4-Methyl-2-Pentanone (MIBK)	10.	67.	300.	11.	
Styrene	20.	110.	530.	7.8	
1,1,2,2-Tetrachloroethane	10.	ND	ND		
Tetrachloroethene (PCE)	10.	ND	ND		
Toluene	20.	1700.	7000.	7.4	
1,1,1-Trichloroethane (TCA)	20.	ND	ND		
1,1,2-Trichloroethane	20.	ND	ND		
Trichloroethene (TCE)	10.	ND	ND		
Trichlorofluoromethane (F-11)	20.	26.	160.	6.5	
Trichlorotrifluoroethane (F-113)	20.	ND	ND		
Vinyl Acetate	100.	ND	ND		
Vinyl Chloride	20.	970.	2700.	7.1	
Xylenes, Total	20.	11000.	51000.	8.2	
Percent Surrogate Recovery			103.		

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/13/92
MSD1/1C26E
LRH/ge/drc
I0577-1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Geshena Dai

Geshena Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

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CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-2
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Inlet Run 2 C#476	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
VOLATILE ORGANICS BY EPA TO-14				
Acetone	100.	ND	ND	1
Benzene	10.	430.	1500.	
Bromodichloromethane	10.	ND	ND	
Bromomethane (Methyl Bromide)	20.	ND	ND	
Bromoform	10.	ND	ND	
1,3-Butadiene	10.	ND	ND	
2-Butanone (MEK)	20.	ND	ND	
Carbon Disulfide	20.	ND	ND	
Carbon Tetrachloride	10.	ND	ND	
Chlorobenzene	10.	520.	2600.	
Chloroethane (Ethyl Chloride)	20.	90.	250.	
2-Chloroethyl Vinyl Ether	100.	ND	ND	
Chloroform	10.	ND	ND	
Chloromethane (Methyl Chloride)	10.	440.	1000.	
Dibromochloromethane	10.	ND	ND	
1,2-Dibromoethane (EDB)	10.	ND	ND	
1,2-Dichlorobenzene	20.	40.	260.	
1,3-Dichlorobenzene	20.	ND	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) Canister was received at 1 psig.

02/13/92
MSD1/1C24E
LRH/ge/drc
IB12M1

COAST - TO - COAST ANALYTICAL SERVICES

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CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-2
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Inlet Run 2 C#476	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
1,4-Dichlorobenzene	20.	150.	1000.	
1,1-Dichloroethane	10.	90.	380.	
1,2-Dichloroethane (EDC)	10.	ND	ND	
1,1-Dichloroethene	10.	ND	ND	
cis-1,2-Dichloroethene	10.	230.	1000.	
trans-1,2-Dichloroethene	10.	ND	ND	
Dichloromethane	100.	ND	ND	
1,2-Dichloropropane	10.	ND	ND	
cis-1,3-Dichloropropene	10.	ND	ND	
trans-1,3-Dichloropropene	10.	ND	ND	
Ethylbenzene	20.	9100.	43000.	
2-Hexanone	10.	ND	ND	
4-Methyl-2-Pentanone (MIBK)	10.	60.	270.	
Styrene	20.	90.	440.	
1,1,2,2-Tetrachloroethane	10.	ND	ND	
Tetrachloroethene (PCE)	10.	ND	ND	
Toluene	20.	1600.	6400.	
1,1,1-Trichloroethane (TCA)	20.	ND	ND	
1,1,2-Trichloroethane	20.	ND	ND	
Trichloroethene (TCE)	10.	ND	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/13/92
MSD1/1C24E
LRH/ge/drc
IB12M1

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Air, Water & Hazardous Waste Sampling, Analysis & Consultation
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CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-2
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Inlet Run 2 C#476	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
Trichlorofluoromethane (F-11)	20.	30.	170.	
Trichlorotrifluoroethane (F-113)	20.	ND	ND	
Vinyl Acetate	100.	ND	ND	
Vinyl Chloride	20.	1100.	3000.	
Xylenes, Total	20.	9300.	44000.	
Percent Surrogate Recovery			109.	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/13/92
MSD1/1C24E
LRH/ge/drc
IB12M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

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66

CLIENT: Angela Blaisdell
Am Test - Air Quality Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-3
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Inlet Run 3 C#481	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
VOLATILE ORGANICS BY EPA TO-14				1
Acetone	100.	ND	ND	
Benzene	10.	490.	1700.	
Bromodichloromethane	10.	ND	ND	
Bromomethane (Methyl Bromide)	20.	ND	ND	
Bromoform	10.	ND	ND	
1,3-Butadiene	10.	ND	ND	
2-Butanone (MEK)	20.	ND	ND	
Carbon Disulfide	20.	ND	ND	
Carbon Tetrachloride	10.	ND	ND	
Chlorobenzene	10.	560.	2800.	
Chloroethane (Ethyl Chloride)	20.	100.	280.	
2-Chloroethyl Vinyl Ether	100.	ND	ND	
Chloroform	10.	ND	ND	
Chloromethane (Methyl Chloride)	10.	430.	980.	
Dibromochloromethane	10.	ND	ND	
1,2-Dibromoethane (EDB)	10.	ND	ND	
1,2-Dichlorobenzene	20.	50.	360.	
1,3-Dichlorobenzene	20.	ND	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01, L.A.Co.CSD#10187.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) Canister received at 0 psig and pressurized to 14.5 psig with He.

04/13/92
MSD1/1C23E
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CLIENT: Angela Blaisdell
Am Test - Air Quality Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-3
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

REVISED
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Inlet Run 3 C#481	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
1,4-Dichlorobenzene	20.	180.	1200.	
1,1-Dichloroethane	10.	90.	410.	
1,2-Dichloroethane (EDC)	10.	ND	ND	
1,1-Dichloroethene	10.	ND	ND	
cis-1,2-Dichloroethene	10.	250.	1100.	
trans-1,2-Dichloroethene	10.	ND	ND	
Dichloromethane	100.	ND	ND	
1,2-Dichloropropane	10.	ND	ND	
cis-1,3-Dichloropropene	10.	ND	ND	
trans-1,3-Dichloropropene	10.	ND	ND	
Ethylbenzene	20.	9700.	46000.	
2-Hexanone	10.	ND	ND	
4-Methyl-2-Pentanone (MIBK)	10.	60.	270.	
Styrene	20.	110.	520.	
1,1,2,2-Tetrachloroethane	10.	ND	ND	
Tetrachloroethene (PCE)	10.	ND	ND	
Toluene	20.	1700.	6900.	
1,1,1-Trichloroethane (TCA)	20.	ND	ND	
1,1,2-Trichloroethane	20.	ND	ND	
Trichloroethene (TCE)	10.	ND	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01, L.A.Co.CSD#10187.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

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68

CLIENT: Angela Blaisdell
Am Test - Air Quality Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-3
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

R E V I S E D
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Inlet Run 3 C#481	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
Trichlorofluoromethane (F-11)	20.	30.	160.	
Trichlorotrifluoroethane (F-113)	20.	ND	ND	
Vinyl Acetate	100.	ND	ND	
Vinyl Chloride	20.	1100.	3000.	
Xylenes, Total	20.	9900.	47000.	
Percent Surrogate Recovery			110.	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01, L.A.Co.CSD#10187.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

04/13/92
MSD1/1C23E
LRH/ge/drc
IB12M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai
Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

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CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-4
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Outlet Run 1 C#497	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
VOLATILE ORGANICS BY EPA TO-14				1
Acetone	1.	10.	27.	
Benzene	0.1	0.7	2.6	
Bromodichloromethane	0.1	ND	ND	
Bromomethane (Methyl Bromide)	0.2	ND	ND	
Bromoform	0.1	ND	ND	
1,3-Butadiene	0.1	ND	ND	
2-Butanone (MEK)	0.2	ND	ND	
Carbon Disulfide	0.2	ND	ND	
Carbon Tetrachloride	0.1	ND	ND	
Chlorobenzene	0.1	ND	ND	
Chloroethane (Ethyl Chloride)	0.2	ND	ND	
2-Chloroethyl Vinyl Ether	1.	ND	ND	
Chloroform	0.1	ND	ND	
Chloromethane (Methyl Chloride)	0.1	ND	ND	
Dibromochloromethane	0.1	ND	ND	
1,2-Dibromoethane (EDB)	0.1	ND	ND	
1,2-Dichlorobenzene	0.2	ND	ND	
1,3-Dichlorobenzene	0.2	ND	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) Canister was received at 1 psig.

02/14/92
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CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-4
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Outlet Run 1 C#497	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
1,4-Dichlorobenzene	0.2	ND	ND	
1,1-Dichloroethane	0.1	ND	ND	
1,2-Dichloroethane (EDC)	0.1	ND	ND	
1,1-Dichloroethene	0.1	ND	ND	
cis-1,2-Dichloroethene	0.1	ND	ND	
trans-1,2-Dichloroethene	0.1	ND	ND	
Dichloromethane	1.	ND	ND	
1,2-Dichloropropane	0.1	ND	ND	
cis-1,3-Dichloropropene	0.1	ND	ND	
trans-1,3-Dichloropropene	0.1	ND	ND	
Ethylbenzene	0.2	ND	ND	
2-Hexanone	0.1	ND	ND	
4-Methyl-2-Pentanone (MIBK)	0.1	ND	ND	
Styrene	0.2	ND	ND	
1,1,2,2-Tetrachloroethane	0.1	ND	ND	
Tetrachloroethene (PCE)	0.1	ND	ND	
Toluene	0.2	ND	ND	
1,1,1-Trichloroethane (TCA)	0.2	ND	ND	
1,1,2-Trichloroethane	0.2	ND	ND	
Trichloroethene (TCE)	0.1	ND	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/14/92
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CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-4
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Outlet Run 1 C#497	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
Trichlorofluoromethane (F-11)	0.2	ND	ND	
Trichlorotrifluoroethane (F-113)	0.2	ND	ND	
Vinyl Acetate	1.	ND	ND	
Vinyl Chloride	0.2	ND	ND	
Xylenes, Total	0.2	ND	ND	
Percent Surrogate Recovery			108.	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/14/92
MSD1/1C22E
LRH/ge/drc
IB12M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

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72

CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-5
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Outlet Run 2 C#540	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
VOLATILE ORGANICS BY EPA TO-14				1
Acetone	1.	12.	30.	
Benzene	0.1	ND	ND	
Bromodichloromethane	0.1	ND	ND	
Bromomethane (Methyl Bromide)	0.2	ND	ND	
Bromoform	0.1	ND	ND	
1,3-Butadiene	0.1	ND	ND	
2-Butanone (MEK)	0.2	ND	ND	
Carbon Disulfide	0.2	ND	ND	
Carbon Tetrachloride	0.1	ND	ND	
Chlorobenzene	0.1	ND	ND	
Chloroethane (Ethyl Chloride)	0.2	ND	ND	
2-Chloroethyl Vinyl Ether	1.	ND	ND	
Chloroform	0.1	ND	ND	
Chloromethane (Methyl Chloride)	0.1	ND	ND	
Dibromochloromethane	0.1	ND	ND	
1,2-Dibromoethane (EDB)	0.1	ND	ND	
1,2-Dichlorobenzene	0.2	ND	ND	
1,3-Dichlorobenzene	0.2	ND	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) Canister received at 0 psig and pressurized to 15 psig with He.

02/13/92
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COAST - TO - COAST ANALYTICAL SERVICES

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CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-5
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Outlet Run 2 C#540	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
1,4-Dichlorobenzene	0.2	ND	ND	
1,1-Dichloroethane	0.1	ND	ND	
1,2-Dichloroethane (EDC)	0.1	ND	ND	
1,1-Dichloroethene	0.1	ND	ND	
cis-1,2-Dichloroethene	0.1	ND	ND	
trans-1,2-Dichloroethene	0.1	ND	ND	
Dichloromethane	1.	ND	ND	
1,2-Dichloropropane	0.1	ND	ND	
cis-1,3-Dichloropropene	0.1	ND	ND	
trans-1,3-Dichloropropene	0.1	ND	ND	
Ethylbenzene	0.2	ND	ND	
2-Hexanone	0.1	ND	ND	
4-Methyl-2-Pentanone (MIBK)	0.1	ND	ND	
Styrene	0.2	ND	ND	
1,1,2,2-Tetrachloroethane	0.1	ND	ND	
Tetrachloroethene (PCE)	0.1	ND	ND	
Toluene	0.2	ND	ND	
1,1,1-Trichloroethane (TCA)	0.2	ND	ND	
1,1,2-Trichloroethane	0.2	ND	ND	
Trichloroethene (TCE)	0.1	ND	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/13/92
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CLIENT: Angela Blaisdell
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30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-5
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Outlet Run 2 C#540	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
Trichlorofluoromethane (F-11)	0.2	ND	ND	
Trichlorotrifluoroethane (F-113)	0.2	ND	ND	
Vinyl Acetate	1.	ND	ND	
Vinyl Chloride	0.2	ND	ND	
Xylenes, Total	0.2	ND	ND	
Percent Surrogate Recovery			88.	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/13/92
MSD1/1C20E
LRH/ge/drc
IB12M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

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CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-6
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Outlet Run 3 C#543	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
VOLATILE ORGANICS BY EPA TO-14				1
Acetone	1.	10.	25.	
Benzene	0.1	ND	ND	
Bromodichloromethane	0.1	ND	ND	
Bromomethane (Methyl Bromide)	0.2	ND	ND	
Bromoform	0.1	ND	ND	
1,3-Butadiene	0.1	ND	ND	
2-Butanone (MEK)	0.2	ND	ND	
Carbon Disulfide	0.2	ND	ND	
Carbon Tetrachloride	0.1	ND	ND	
Chlorobenzene	0.1	ND	ND	
Chloroethane (Ethyl Chloride)	0.2	ND	ND	
2-Chloroethyl Vinyl Ether	1.	ND	ND	
Chloroform	0.1	ND	ND	
Chloromethane (Methyl Chloride)	0.1	ND	ND	
Dibromochloromethane	0.1	ND	ND	
1,2-Dibromoethane (EDB)	0.1	ND	ND	
1,2-Dichlorobenzene	0.2	ND	ND	
1,3-Dichlorobenzene	0.2	ND	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) Canister was received at 1 psig.

02/13/92
MSD1/1C21E
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CLIENT: Angela Blaisdell
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Lab Number : I-0577-6
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Outlet Run 3 C#543	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
1,4-Dichlorobenzene	0.2	ND	ND	
1,1-Dichloroethane	0.1	ND	ND	
1,2-Dichloroethane (EDC)	0.1	ND	ND	
1,1-Dichloroethene	0.1	ND	ND	
cis-1,2-Dichloroethene	0.1	ND	ND	
trans-1,2-Dichloroethene	0.1	ND	ND	
Dichloromethane	1.	ND	ND	
1,2-Dichloropropane	0.1	ND	ND	
cis-1,3-Dichloropropene	0.1	ND	ND	
trans-1,3-Dichloropropene	0.1	ND	ND	
Ethylbenzene	0.2	ND	ND	
2-Hexanone	0.1	ND	ND	
4-Methyl-2-Pentanone (MIBK)	0.1	ND	ND	
Styrene	0.2	ND	ND	
1,1,2,2-Tetrachloroethane	0.1	ND	ND	
Tetrachloroethene (PCE)	0.1	ND	ND	
Toluene	0.2	ND	ND	
1,1,1-Trichloroethane (TCA)	0.2	ND	ND	
1,1,2-Trichloroethane	0.2	ND	ND	
Trichloroethene (TCE)	0.1	ND	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/13/92
MSD1/1C21E
LRH/ge/drc
IB12M1

COAST · TO · COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

San Luis Obispo, CA • Goleta, CA • Benicia, CA • Camarillo, CA • Newport Beach, CA • Valparaiso, IN

San Luis Obispo Division (805) 543-2553
141 Suburban Road, San Luis Obispo, California 93401 FAX (805) 543-2685

CLIENT: Angela Blaisdell
AMTEST, Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : I-0577-6
Project : Parametrix @ Midway Landfill
Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Outlet Run 3 C#543	Air	Larry Zuck	02/07/92	02/12/92

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT µg/cu M	NOTE
Trichlorofluoromethane (F-11)	0.2	ND	ND	
Trichlorotrifluoroethane (F-113)	0.2	ND	ND	
Vinyl Acetate	1.	ND	ND	
Vinyl Chloride	0.2	ND	ND	
Xylenes, Total	0.2	ND	ND	
Percent Surrogate Recovery			105.	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/13/92
MSD1/1C21E
LRH/ge/drc
IB12M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

COAST - TO - COAST ANALYTICAL SERVICES

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QC Batch ID: IB12M1

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 02/12/92
Analyzed by: CR
Method : EPA TO-14

INSTRUMENT BLANK
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED
INSTRUMENT BLANK	Air		

CONSTITUENT	(CAS RN)	*PQL µg/cu M	RESULT µg/cu M	NOTE
VOLATILE ORGANICS BY EPA TO-14				
Acetone	(67641)	3.	ND	
Benzene	(71432)	0.5	ND	
Bromodichloromethane	(75274)	1.	ND	
Bromomethane (Methyl Bromide)	(74839)	1.	ND	
Bromoform	(75252)	1.	ND	
1,3-Butadiene	(106990)	0.2	ND	
2-Butanone (MEK)	(78933)	.5	ND	
Carbon Disulfide	(75150)	1.	ND	
Carbon Tetrachloride	(56235)	1.	ND	
Chlorobenzene	(108907)	0.5	ND	
Chloroethane (Ethyl Chloride)	(75003)	0.5	ND	
2-Chloroethyl Vinyl Ether	(110758)	5.	ND	
Chloroform	(67663)	0.5	ND	
Chloromethane (Methyl Chloride)	(74873)	0.2	ND	
Dibromochloromethane	(124381)	1.	ND	
1,2-Dibromoethane (EDB)	(106934)	1.	ND	
1,2-Dichlorobenzene	(95501)	1.	ND	
1,3-Dichlorobenzene	(541731)	1.	ND	
1,4-Dichlorobenzene	(106467)	1.	ND	
1,1-Dichloroethane	(75343)	0.5	ND	
1,2-Dichloroethane (EDC)	(107062)	0.5	ND	
1,1-Dichloroethene	(75354)	0.5	ND	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/13/92
MSD1/1C11E
LRH/ge/drc
I0572-1

COAST · TO · COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories
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San Luis Obispo Division
141 Suburban Road, San Luis Obispo, California 93401
(805) 543-2553
FAX (805) 543-2685

CLIENT: Coast-to-Coast Analytical Services, Inc.

QC Batch ID: IB12M1

Analyzed : 02/12/92
Analyzed by: CR
Method : EPA TO-14

INSTRUMENT BLANK
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
INSTRUMENT BLANK	Air			

CONSTITUENT	(CAS RN)	*PQL µg/cu M	RESULT µg/cu M	NOTE
cis-1,2-Dichloroethene	(156694)	0.5	ND	
trans-1,2-Dichloroethene	(156605)	0.5	ND	
Dichloromethane	(75092)	5.	ND	
1,2-Dichloropropane	(78875)	0.5	ND	
cis-1,3-Dichloropropene	(10061015)	0.5	ND	
trans-1,3-Dichloropropene	(10061026)	0.5	ND	
Ethylbenzene	(100411)	1.	ND	
2-Hexanone	(591786)	0.5	ND	
4-Methyl-2-Pentanone (MIBK)	(108101)	0.5	ND	
Styrene	(100425)	1.	ND	
1,1,2,2-Tetrachloroethane	(79345)	1.	ND	
Tetrachloroethene (PCE)	(127184)	1.	ND	
Toluene	(108883)	1.	ND	
1,1,1-Trichloroethane (TCA)	(71556)	1.	ND	
1,1,2-Trichloroethane	(79005)	1.	ND	
Trichloroethene (TCE)	(79016)	0.5	ND	
Trichlorofluoromethane (F-11)	(75694)	1.	ND	
Trichlorotrifluoroethane (F-113)	(76131)	2.	ND	
Vinyl Acetate	(108054)	5.	ND	
Vinyl Chloride	(75014)	0.5	ND	
Xylenes, Total		1.	ND	
Percent Surrogate Recovery			98.	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

02/13/92
MSD1/1C11E
LRH/ge/drc
I0572-1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

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80

QC Batch ID: IB12M1

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

QC SPIKE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED
QC SPIKE	Air		

CONSTITUENT	*PQL µg/cu M	SPIKE AMOUNT	RESULT µg/cu M	%REC	NOTE
VOLATILE ORGANICS BY EPA TO-14					1
Acetone	3.		NS		
Benzene	0.5	17.	15.	88.	
Bromodichloromethane	1.		NS		
Bromomethane (Methyl Bromide)	1.		NS		
Bromoform	1.		NS		
1,3-Butadiene	0.2		NS		
2-Butanone (MEK)	.5		NS		
Carbon Disulfide	1.		NS		
Carbon Tetrachloride	1.	34.	38.	112.	
Chlorobenzene	0.5	25.	24.	96.	
Chloroethane (Ethyl Chloride)	0.5		NS		
2-Chloroethyl Vinyl Ether	5.		NS		
Chloroform	0.5	27.	20.	74.	
Chloromethane (Methyl Chloride)	0.2		NS		
Dibromochloromethane	1.		NS		
1,2-Dibromoethane (EDB)	1.	40.	39.	98.	
1,2-Dichlorobenzene	1.		NS		
1,3-Dichlorobenzene	1.		NS		
1,4-Dichlorobenzene	1.		NS		
1,1-Dichloroethane	0.5		NS		
1,2-Dichloroethane (EDC)	0.5	22.	27.	123.	

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
* RESULTS listed as 'NS' were not spiked. PQL = Practical Quantitation Limit
(1) Zero Air spiked with NIST SRM 1804, Cylinder # ALM-000881.

02/13/92
MSD1/1C32E
LRH/ge/drc
I0572-1

COAST - TO - COAST ANALYTICAL SERVICES

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81

QC Batch ID: IB12M1

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 02/12/92
Analyzed by: EA
Method : EPA TO-14

QC SPIKE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
QC SPIKE	Air			

CONSTITUENT	*PQL µg/cu M	SPIKE AMOUNT	RESULT µg/cu M	%REC	NOTE
1,1-Dichloroethene	0.5		NS		
cis-1,2-Dichloroethene	0.5		NS		
trans-1,2-Dichloroethene	0.5		NS		
Dichloromethane	5.	19.	16.	84.	
1,2-Dichloropropane	0.5	25.	27.	108.	
cis-1,3-Dichloropropene	0.5		NS		
trans-1,3-Dichloropropene	0.5		NS		
Ethylbenzene	1.	22.	25.	114.	
2-Hexanone	0.5		NS		
4-Methyl-2-Pentanone (MIBK)	0.5		NS		
Styrene	1.		NS		
1,1,2,2-Tetrachloroethane	1.		NS		
Tetrachloroethene (PCE)	1.	37.	40.	108.	
Toluene	1.	20.	15.	75.	
1,1,1-Trichloroethane (TCA)	1.	30.	26.	87.	
1,1,2-Trichloroethane	1.		NS		
Trichloroethene (TCE)	0.5	29.	24.	83.	
Trichlorofluoromethane (F-11)	1.		NS		
Trichlorotrifluoroethane (F-113)	2.		NS		
Vinyl Acetate	5.		NS		
Vinyl Chloride	0.5	15.	13.	87.	
Xylenes, Total	1.	24.	28.	117.	
Percent Surrogate Recovery			96.		

Lab Certifications: CAELAP#1598, NYELAP#11177, UTELAP#E-142, A2LA#0136-01.
* RESULTS listed as 'NS' were not spiked. PQL = Practical Quantitation Limit

02/13/92
MSD1/1C32E
LRH/ge/drc
I0572-1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

AMTest Inc. Regional Analytical Services
14603 N.E. 87th St. Fax: 206 [illegible]95
Redmond, WA 98052 Tel: 206 885 1664

CHAIN OF CUSTODY RECORD

PROJ. NO.

PROJECT NAME: Parametrix @ Midway Landfill

SAMPLERS: (Signature)

NO. OF CONTAINERS: 1

Client Name: Am Test Air Quality

Client Address: 30545 S.E. 80th St. #5 Preston, WA 980

Client Phone: 206-222-7746

Contact Person: Angela

P.O. No.

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION			
	2/7/92	1050 1120	✓		Inlet	Run 1	1/453	I0571-1
	2/7/92	1125 1155	✓			Run 2	1/476	-2
	2/7/92	1200 1230	✓			Run 3	1/481	-3
	2/7/92	1050 1120	✓		Outlet (stack)	Run 1	1/497	-4
	2/7/92	1125 1155	✓			2	1/540	-5
	2/7/92	1200 1230	✓			3	1/543	-6

Analysis Required: VOC's as per TO-14; Fixed Gases

Analysis Required: VOCs per TO14

Do VOC's & fixed gases for Inlet Only.

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	2/10/92 3:00pm				
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) Kelley Wilson	Date/Time 2/12/92 1225	Remarks S.I.	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

28

AMTEST

ANALYSIS REPORT

83

Am Test Air Quality, Inc.
30545 SE 84th Street
Suite 5
Preston, WA 98050

Date Received: 11/22/91
Date Reported: 12/12/91

Project Name: Parametrix Midway
Date Sampled: 11/ 7/91

PARAMETER	UNITS	RESULT
91-A013329		
Client ID: Run1-M4		
Volume	(mls)	348.
Chloride	(ug)	682.
91-A013330		
Client ID: Run2-M4		
Volume	(mls)	373.
Chloride	(ug)	765.
91-A013331		
Client ID: Run3-M4		
Volume	(mls)	377.
Chloride	(ug)	1390
91-A013332		
Client ID: Blank H2O		
Volume	(mls)	100.
Chloride	(ug)	< 100

Detection Limit: 1.0 ug/ml
EPA Method 325.3

Reported by: _____
Kathy Fugiel

APPENDIX C

Example Calculations

Lab# I-0577-2
Parametrix @ Midway
Inlet Airflow
Run 2
2-7-92

SAMPLE CALCULATION SHEET ~~(continued)~~
METHODS 1, 2, 3A, 4 and ~~5~~

B_{ws} = (_____scf)/(_____scf + _____dscf)

= NA

%Moisture = 0.012 * 100

= 1.2 % (from wet bulb/dry bulb measurement - see Psychrometric chart next page)

Molecular weight - Equation 3-2

M_d = 0.440 * (35.0 $\%CO_2$) + 0.320 * (3.7 $\%O_2$) + 0.280 * (41.3 % CO + $\%N_2$)

0.16 * 20.0% CH_4 +

%CO = 100 - 35 - 3.7 - 20

M_d = 31.35 g/g-mole (dry)

M_s = 31.35 g/g-mole * (1 - 0.012) + 18.0g/g-mole * 0.012

M_s = 31.19 g/g-mole (wet)

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

V_s = 85.49 * .99 * $\sqrt{0.080 * 533.8}$ ° R / 31.19 g/g-mole / 30.03"Hg

V_s = 18.1 ft/sec

Q_{sd} = 3600 * (1 - 0.012) * 18.1 ft/sec * 0.785 ft^2 * (528 ° R/533.8° R) * (30.03"Hg/29.92"Hg)

= 50,121.3 dscf/hr / 60 min/hr

= 835.4 dscf/min (dry standard cubic feet per minute)

acfm = 18.1 ft/sec * 0.785 ft^2 * 60 sec/min

= 851.6 acfm (actual cubic feet per minute)

Isokinetic variation - Equation 5-8

I = 0.09450 * _____dscf * _____° R/(_____"Hg * _____ft/sec * _____min * _____ft^2 *(1 - _____))

I = NA %

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

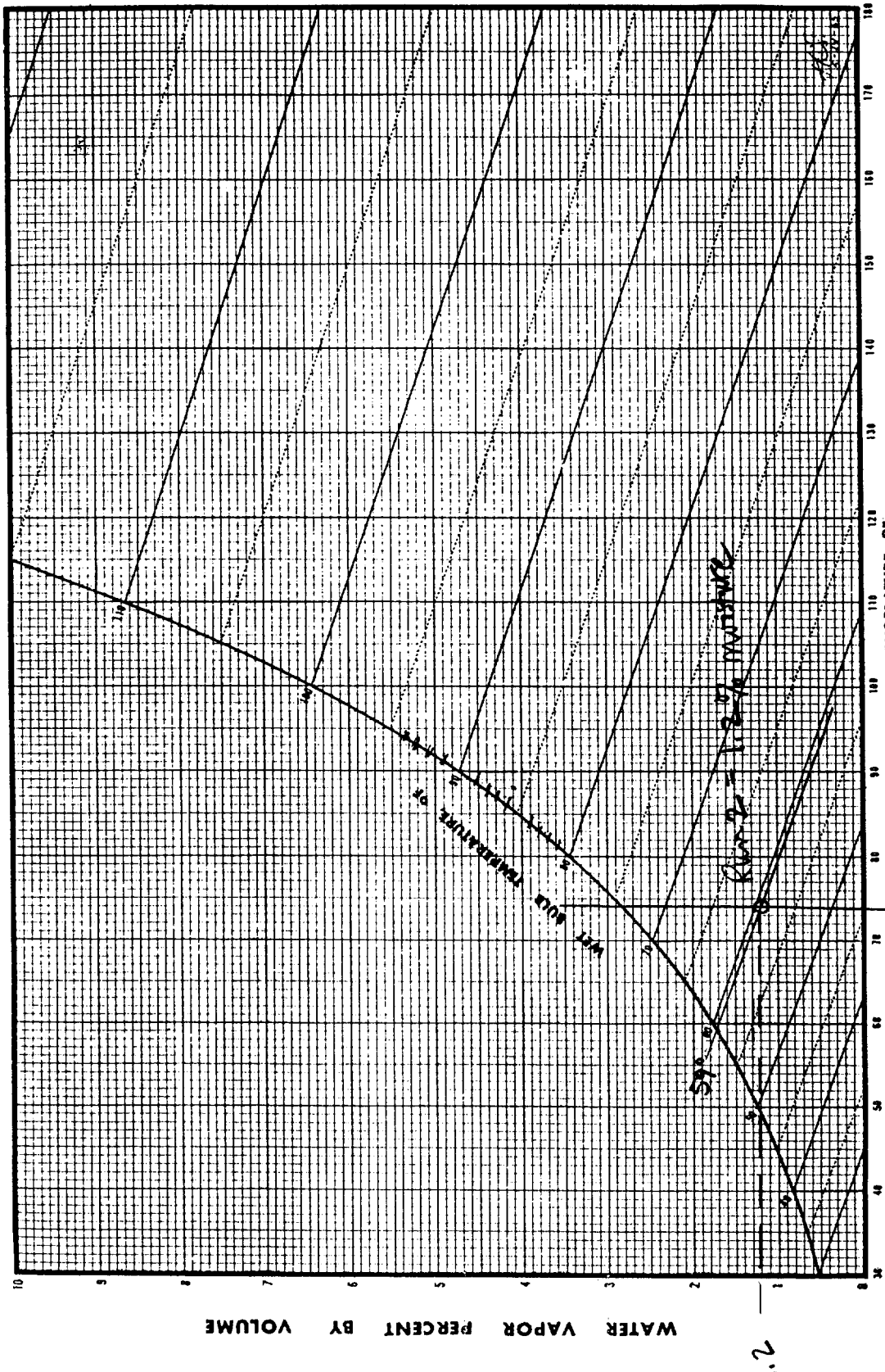

Figure D8. Psychrometric chart expressing volume of water vapor by %.

SAMPLE CALCULATION SHEET
METHODS 1, 2, 3A, 4 AND 5

CLIENT: Parametrix DATE OF TEST: 11-7-91

LOCATION: Midway Landfill RUN #: 2

Particulate Matter Emission Concentration - Equation 5-1

Vm_{std} =
17.647°R/"Hg * 34.140 ft^3 * 1.010 * (29.80 "Hg + (1.00 "H_2O/13.6))/(460 + 74.3° F)

= 34.022 dscf

dscm = 34.022 dscf/35.31 ft^3/m^3

= 0.964 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 * 66.8 grams of H_2O collected in impingers

= 3.15 scf

SAMPLE CALCULATION SHEET (continued)
METHODS 1, 2, 3A, 4 and 5

B_{ws} = (3.15 scf)/(3.15 scf + 34.022 dscf)

= 0.0847

%Moisture = 0.0847 * 100

= 8.47 %

Molecular weight - Equation 3-2

M_d = 0.440 * (7.7 $\%CO_2$) + 0.320 * (11.7 $\%O_2$) + 0.280 * (80.6 % CO + $\%N_2$)

M_d = 29.70 g/g-mole (dry)

M_s = 29.70 g/g-mole * (1 - 0.0847) + 18.0g/g-mole * 0.0847

M_s = 28.71 g/g-mole (wet)

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

V_s = 85.49 * .84 * $\sqrt{0.006}$ * 2086.4° R / 28.71 g/g-mole / 29.79 "Hg

V_s = 8.57 ft/sec

$29.79_{P_s} = 29.80_{B_p} + (-0.085/13.6")_{\text{Static}}$

Q_{sd} = 3600 * (1 - 0.0847) * 8.57 ft/sec * 42.24 ft² * (528 ° R/2086.4° R) * (29.79 "Hg/29.92"Hg)

=300,734 dscf/hr / 60 min/hr

=5012.2 dscf/min (dry standard cubic feet per minute)

acfm = 8.57 ft/sec * 42.24 ft²* 60 sec/min

= 21730.9acfm (actual cubic feet per minute)

Isokinetic variation - Equation 5-8

I = 0.09450 * _____dscf * _____° R/(_____"Hg * _____ft/sec *_____min * _____ft² *(1 -_____))

I = NA %

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

AMTEST AIR QUALITY, INC.
AmTest-Air Quality, Inc.
30545 S.E. 84th St., #5
Preston, WA 98050
Office: (206) 222-7746
FAX: (206) 222-7849

Example Calculation - Hydrochloric Acid

Client - Parametrix @ Midway Land fill
Date - 11/7/91
Run - 2

$$mg/dscm = \frac{\mu g\ Cl^-}{dscm} * \frac{1\ mg}{1000\ \mu g} * \frac{36.46\ mg/m\text{-}mole\ HCl}{35.45\ mg/m\text{-}mole\ Cl^-}$$

$$= \frac{765\ \mu g}{0.964\ dscm} * \frac{1\ mg}{1000\ \mu g} * \frac{36.46\ mg/m\text{-}mole\ HCl}{35.45\ mg/m\text{-}mole\ Cl^-}$$

$$= 0.817 \quad mg/dscm\ as\ HCl$$

$$mg/min = \frac{765\ \mu g}{34.022\ dscf} * \frac{1\ mg}{1000\ \mu g} * 5012.2\ \frac{dscf}{min} = 112.7\ \frac{mg}{min}$$

$$ppm = \frac{mg}{dscm} * \frac{293.15°K}{273.15°K} * \frac{22.414\ L/g\text{-}mole}{36.46\ g/g\text{-}mole} * \frac{1\ g}{10^3\ mg} * \frac{1\ m^3}{10^3\ L} * 10^6\ ppm$$

$$= 0.817\ \frac{mg}{dscm} * \frac{293.15°K}{273.15°K} * \frac{22.414\ L/g\text{-}mole}{36.46\ g/g\text{-}mole} * \frac{1\ g}{10^3\ mg} * \frac{1\ m^3}{10^3\ L} * 10^6\ ppm$$

$$= 0.539 \quad ppm\ HCl$$

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

$$= 0.539\ ppm * \frac{13.9}{(20.9 - 11.7\%\ O_2)}$$

$$= 0.814 \quad ppm\ HCl\ @\ 7\%\ O_2$$

$$lb/hr = \frac{mg}{dscm} * \frac{1\ m^3}{35.31\ ft^3} * \frac{dscf}{min} * \frac{60\ min}{hr} * \frac{1\ lb}{453600\ mg}$$

$$= 0.817\ \frac{mg}{dscm} * \frac{1\ m^3}{35.31\ ft^3} * 5012.2\ dscfm * 60\ \frac{min}{hr} * \frac{1\ lb}{453600\ mg}$$

$$= 0.015 \quad lb/hr$$

AMTEST

EXAMPLE CALCULATION OF GASEOUS EMISSION RATES

RUN 2

CLIENT Parametrix LOCATION Midway Landfill

SAMPLE SITE Flare #3 DATE 11/7/91

SULFUR DIOXIDE (SO_2)

instrument averaged 2.7 ppm during the run

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

conversion factor

2.7 ppm x 1.660×10^{-7} = 4.482×10^{-7} lb/dscf

4.482×10^{-7} lb/dscf x 5012.2 dscf/min x 60 min/hr = 0.135 lb/hr

NITROGEN OXIDES (NO_x as NO_2)

$\frac{\text{tons}}{\text{year}} = 0.1351\frac{\text{lb}}{\text{hr}} * 24\frac{\text{hr}}{\text{day}} * 365\frac{\text{day}}{\text{yr}} * \frac{1\text{ton}}{2000\text{lbs}}$

$= 0.590 \frac{\text{tons}}{\text{year}}$

instrument averaged 8.7 ppm during the run

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

conversion factor

8.7 ppm x 1.194×10^{-7} = 1.039×10^{-6} lb/dscf

1.039×10^{-6} lb/dscf x 5012.2 dscf/min x 60 min/hr = 0.312 lb/hr

$\frac{\text{tons}}{\text{year}} = 0.312\frac{\text{lb}}{\text{hr}} * 24\frac{\text{hr}}{\text{day}} * 365\frac{\text{day}}{\text{yr}} * \frac{1\text{ton}}{2000\text{lbs}}$

$= 1.37 \frac{\text{tons}}{\text{yr}}$

AMTEST AIR QUALITY, INC.
AmTest-Air Quality, Inc.
30545 S.E. 84th St., #5
Preston, WA 98050
Office: (206) 222-7746
FAX: (206) 222-7849

Example Calculation
VOC Emission Rate
Midway Landfill
#3 Flare
2-7-92

Run #1 - Inlet

Example Compound = Benzene

$$1600 \frac{ug}{m^3} * \frac{1 m^3}{35.31 ft^3} * 848.5 \frac{dscf}{min} * \frac{1 mg}{1000 ug}$$

$$= 38.4 \frac{mg}{min}$$

Run #1 Outlet

Example Compound = Benzene

$$2.6 \frac{ug}{m^3} * \frac{1 m^3}{35.31} * 5728.7 \frac{dscf}{min} * \frac{1 mg}{1000 ug}$$

$$= 0.422 \frac{mg}{min}$$

Destruction Efficiency - Benzene

$$\frac{\left(\text{Average Inlet Emission Rate} - \text{Average Outlet Emission}\right) * 100\%}{\text{Average Inlet Emission Rate}}$$

$$\frac{\left(38.0 \frac{mg}{min} - \sim 0.141 \frac{mg}{min}\right)}{38.0 \frac{mg}{min}} * 100\% = \sim 99.63\%$$

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30545 S.E. 84th St., #5
Preston, WA 98050
Office: (206) 222-7746
FAX: (206) 222-7849

Example Calculation of Retention Time
Parametrix, Inc. @ Midway Landfill
#3 Flare

Length of Combustion Zone = 15 ft

Area of Combustion Zone = 42.24 ft2

Average Airflow at the test Port = 20450.3 acfm

$$\frac{\text{Area} \times \text{Length} \times 60 \frac{\text{sec}}{\text{min}}}{\text{actual cubic feet per min (acfm)}} = \text{retention time}$$

$$\frac{42.24 \text{ ft}^2 \times 15 \text{ ft} \times 60 \frac{\text{sec}}{\text{min}}}{20450.3 \text{ acfm}} = \underline{\underline{1.9}} \text{ seconds @ } 1584.2^\circ\text{F}$$

(based on combustion to the height of the test port)

APPENDIX D

Field Data Sheets

TRAVERSE SAMPLING DATA SHEET

Page 1 of 1

I-0577-1

Client Parametrix @ Midway Landfill
Location
Sample Site Flare/No 3 Inlet
Stack Diameter 12" ϕ
Date 2/7/92
Operators KSM
Run I.D. 1 - Inlet

EQUIPMENT CHECKS

	Initial/Final
Leak Rate cfm	/_____
Leak Test Vacuum	/_____
✓ Pitots, Pre Leak Ck	
✓ Pitots, Post Leak Ck	
Gas Sampling System	
Integrated Bag	
Thermocouples @ °F	

QA FORMS COMPLETED

Stack Schematic	___
Sample Train	___
Pitot Tube Insp.	___
Magnehelic Cal.	___
Temp. Probe Cal.	___
Gas Meter Calib.	___

Filter # _____ Box # _____

	Final Wt. gram	Initial Wt. gram	Net Wt. gram
#1 Imp.	Wet Bulb = 58°F		
#2 Imp.			
#3 Imp.	Dry Bulb = 73°F		
#4 Imp.			
#5 Imp.			
#6 S.G.			
Total H_2O Volume			g

Start Time 10:50
Stop Time 11:20
Barometric Pressure "Hg 29.58
Static Pres "H_2O -6.0
Production Rate
TO-14 Canister 453 (453)

SAMPLING PARAMETERS

% Moisture
Meter Temp.
Stack Temp.
ΔH@ _____ Y _____
Pitot # Std Side # —
Cp .99
Nozzle Diameter _____ inch
D_1 _____ D_2 _____ D_3 _____
K Factor

Moisture = 1.2%

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu.Ft.	Pitot Reading Δ P " H_2O	Orifice Setting (Δ H) " H_2O Ideal	Orifice Setting (Δ H) " H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vac. Gauge " Hg	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	O_2 %	
Duct Center	0		.09								72		
	10		.08								73		
	20		.08								73		
	30		.08								74		

$\sqrt{(\Delta P)^2}$ $\overline{\Delta H}$ $\overline{T_m}$ $\frac{73.0}{T_s}$

I-0577-2

TRAVERSE SAMPLING DATA SHEET

95

Client Parametrix e
Location Milling Landfill
Sample Site Flare No. 3 Inlet

Stack Diameter 12" d
Date 2/7/92
Operators KSM
Run I.D. 2-Inlet

EQUIPMENT CHECKS

Initial/Final

Leak Rate cfm ____/____
Leak Test Vacuum ____/____
✓ Pitots, Pre Leak Ck
✓ Pitots, Post Leak Ck
____ Gas Sampling System
____ Integrated Bag
____ Thermocouples @ ___ °F

QA FORMS COMPLETED

Stack Schematic ___
Sample Train ___
Pitot Tube Insp. ___
Magnehelic Cal. ___
Temp. Probe Cal. ___
Gas Meter Calib. ___

Filter # ______ Box # ______

	Final Wt. gram	Initial Wt. gram		Net Wt. gram
#1 Imp.	Wet Bulb		=	59°F
#2 Imp.		-	=	
#3 Imp.	Dry Bulb		=	74°F
#4 Imp.		-	=	
#5 Imp.		-	=	
#6 S.G.		-	=	

Total H_2O Volume ______ g

Start Time 11:25
Stop Time 11:55
Barometric Pressure "Hg 29.58
Static Pres "H_2O +6.1
Production Rate
T014 Canister #476

SAMPLING PARAMETERS

% Moisture ______
Meter Temp. ______
Stack Temp. ______
ΔH@ ______ Y ______
Pitot # Std Side # —
Cp .99
Nozzle Diameter ______ inch
D_1 ______ D_2 ______ D_3 ______

K Factor ______

moisture = 1.2%

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu.Ft.	Pitot Reading Δ P " H_2O	Orifice Setting (Δ H) " H_2O Ideal	Orifice Setting (Δ H) " H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vac. Gauge " Hg	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	O_2 %	
Center	0		.08								73		
	10		.08								74		
	20		.08								74		
	30		.08								74		
			$\sqrt{(\Delta P)}^2$	$\overline{\Delta H}$		$\overline{T_m}$					73.8 T_s		

TRAVERSE SAMPLING DATA SHEET

I-0577-3

Page 1 of 1

96

Client Parametrix @ Midway Landfill
Location
Sample Site Flare No. 3 Inlet
Stack Diameter 12" ø
Date 2/7/92
Operators KSM
Run I.D. 3 – Inlet

EQUIPMENT CHECKS

	Initial/Final
Leak Rate cfm	/_____
Leak Test Vacuum	/_____
✓ Pitots, Pre Leak Ck	
✓ Pitots, Post Leak Ck	
Gas Sampling System	
Integrated Bag	
Thermocouples @ °F	

QA FORMS COMPLETED

Stack Schematic ___
Sample Train ___
Pitot Tube Insp. ___
Magnehelic Cal. ___
Temp. Probe Cal. ___
Gas Meter Calib. ___

Filter # _____ Box # _____

	Final Wt. gram	Initial Wt. gram	Net Wt. gram
#1 Imp.	Wet Bulb =		59°F
#2 Imp.			=
#3 Imp.	Dry Bulb =		74°F
#4 Imp.	–		=
#5 Imp.	–		=
#6 S.G.	–		=

Total H_2O Volume _____ g

Start Time 12:00
Stop Time 12:30
Barometric Pressure "Hg 29.58
Static Pres "H_2O +6.0
Production Rate
TO-14 Canister #481

SAMPLING PARAMETERS

% Moisture _____
Meter Temp. _____
Stack Temp. _____
ΔH@ _____ Y _____
Pitot # Std Side # –
Cp .99
Nozzle Diameter _____ inch
D_1 _____ D_2 _____ D_3 _____

K Factor _____

moisture = 1.2 %

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu.Ft.	Pitot Reading Δ P " H_2O	Orifice Setting (Δ H) " H_2O Ideal	Orifice Setting (Δ H) " H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vac. Gauge " Hg	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	O_2 %	
Duct Center	0		.08								74		
	10		.08								74		
	20		.08								74		
	30		.08								74		

$\sqrt{(\Delta P)^2}$ | $\overline{\Delta H}$ | T_m | 74.0 T_s

STACK SCHEMATIC AND LOCATION OF SAMPLE POINTS

Client Parametrix @ Midway Landfill

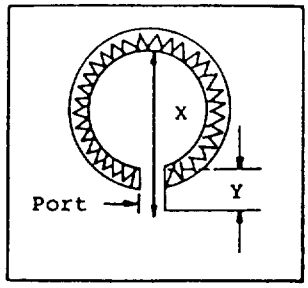
Location Midway, WA

Sampling Location Flare No. 3 Outlet Stack

Inside of far wall to outside of port (distance, X) 96.0"

Inside of near wall to outside of port (distance, Y) 8.0"

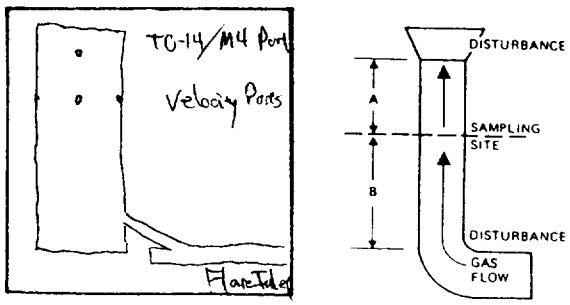
Stack I.D. (distance X - distance Y) 88.0"



Schematic of Sampling Location

1 Traverse Point #	2 Fractional Percent of Stack I.D.	3 Stack I.D. inches	4 Column 2 x 3	5 Distance Y	6 Traverse Point Location from Outside of Port columns 4 + 5
1	2.1%	88.0"	1.85"	8.0"	9.85"
2	6.7%	↓	5.90	↓	13.90"
3	11.8%		10.38		18.38"
4	17.7%		15.58		23.58"
5	25.0%		22.0		30.0"
6	35.6%		31.33		39.33"
7	64.4%		56.67		64.67"
8	75.0%		66.0		74.0"
9	82.3%		72.42		80.42"
10	88.2%		77.62		85.62"
11	93.3%		82.10		90.10"
12	97.9%	↓	86.15	↓	94.15"

CROSS SECTION

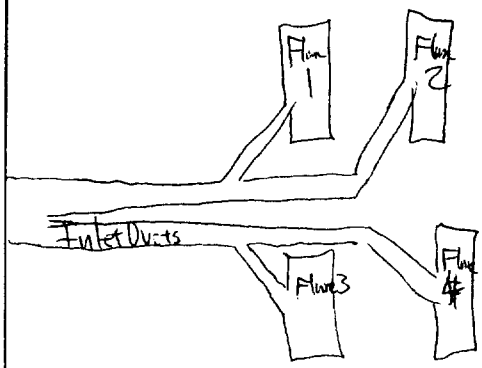


Velocity Ports:

Distance A = 10 ft *downstream*

Distance B = 15 ft *upstream*

STACK, CONTROL DEVICE AND PROCESS FLOW DIAGRAM



TRAVERSE SAMPLING DATA SHEET

Page 1 of 1

1482 98

Client Parametrix @ Military Landfill
Location Military, VA
Sample Site Flare No. 3 Outlet Stack
Stack Diameter 88.0
Date 2/7/92
Operators KSM
Run I.D. 1 - Outlet Stack

EQUIPMENT CHECKS

	Initial/Final
Leak Rate cfm	/_____
Leak Test Vacuum	/_____
√ Pitots, Pre Leak Ck	
√ Pitots, Post Leak Ck	
_____ Gas Sampling System	
_____ Integrated Bag	
_____ Thermocouples @ ___ °F	

QA FORMS COMPLETED

Stack Schematic ___
Sample Train ___
Pitot Tube Insp. ___
Magnehelic Cal. ___
Temp. Probe Cal. ___
Gas Meter Calib. ___

Filter # _____ Box # _____

	Final Wt. gram	Initial Wt. gram	Net Wt. gram
#1 Imp.	Use Previous		
#2 Imp.		M4 Data	
#3 Imp.		=	
#4 Imp.		=	
#5 Imp.		=	
#6 S.G.		=	

Total H_2O Volume _____ g

Start Time 10:50
Stop Time 11:20
Barometric Pressure "Hg 29.58
Static Pres "H_2O -.075
Production Rate
TO-14 Canister #497

SAMPLING PARAMETERS

% Moisture _____
Meter Temp. _____
Stack Temp. _____
ΔH@ _____ Y _____
Pitot # P8A Side # A
Cp .84
Nozzle Diameter _____ inch
D_1 _____ D_2 _____ D_3 _____

K Factor _____

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu.Ft.	Pitot Reading Δ P " H_2O	Orifice Setting (Δ H) " H_2O Ideal	Orifice Setting (Δ H) " H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vac. Gauge " Hg	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	O_2 %	
SE1			.011								1496		
2			.011								1575		
3			.010								1616		
4			.010								1591		
5			.010								1595		
6			.010								1614		
7			.009								1535		
8			.010								1514		
9			.009								1579		
10			.009								1560		
11			.009								1566		
12			.009								1525		
NE1			.007								1500		
2			.006								1500		
3			.006								1571		
4			.005								1542		
5			.005								1586		
6			.005								1562		
7			.005								1589		
8			.006								1621		
9			.005								1639		
10			.005								1628		
11			.006								1633		
12			.005								1644		
			$\sqrt{(\Delta P)^2}$		$\overline{\Delta H}$		T_m				1574.2 T_s		

TRAVERSE SAMPLING DATA SHEET

Page 1 of 99

1483

Client Parametrix @ Midway Landfill
Location Midway Landfill
Sample Site Flare No. 3 Outlet Stack
Stack Diameter 88"
Date 2/7/92
Operators KSM
Run I.D. 2-Outlet Stack

EQUIPMENT CHECKS

	Initial/Final
Leak Rate cfm	____/____
Leak Test Vacuum	____/____
✓ Pitots, Pre Leak Ck	
✓ Pitots, Post Leak Ck	
____ Gas Sampling System	
____ Integrated Bag	
____ Thermocouples @ ___ °F	

QA FORMS COMPLETED

Stack Schematic ___
Sample Train ___
Pitot Tube Insp. ___
Magnehelic Cal. ___
Temp. Probe Cal. ___
Gas Meter Calib. ___

Filter # _____ Box # _____

	Final Wt. gram	Initial Wt. gram	Net Wt. gram
#1 Imp.	Use Previous M14 Data		
#2 Imp.			
#3 Imp.			
#4 Imp.			
#5 Imp.			
#6 S.G.			

Total H_2O Volume _____ g

Start Time 11:25
Stop Time 11:55
Barometric Pressure "Hg 29.58
Static Pres "H_2O -.082
Production Rate
TO-14 Canister #540

SAMPLING PARAMETERS

% Moisture _____
Meter Temp. _____
Stack Temp. _____
ΔH@ _____ Y _____
Pitot # P8A Side # A
Cp .84
Nozzle Diameter _____ inch
D_1 _____ D_2 _____ D_3 _____

K Factor _____

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu.Ft.	Pitot Reading Δ P " H_2O	Orifice Setting (Δ H) " H_2O Ideal	Orifice Setting (Δ H) " H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vac. Gauge " Hg	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	O_2 %	
NE 1			.004								1491		
2			.004								1505		
3			.005								1575		
4			.004								1599		
5			.004								1604		
6			.004								1642		
7			.005								1589		
8			.004								1613		
9			.005								1614		
10			.005								1630		
11			.005								1633		
12			.004								1643		
SE 1			.005								1533		
2			.005								1584		
3			.005								1640		
4			.005								1649		
5			.005								1634		
6			.005								1631		
7			.005								1570		
8			.005								1577		
9			.005								1588		
10			.005								1574		
11			.005								1599		
12			.005								1607		
			$\sqrt{(\Delta P)^2}$		$\overline{\Delta H}$		T_m				1596.8 T_s		

TRAVERSE SAMPLING DATA SHEET

Page 1 of 1

1484

Client Parametrix @ Midway Landfill
Location
Sample Site Flare No 3 Outlet Stack
Stack Diameter 88"ø
Date 2/7/92
Operators
Run I.D. 3 - Outlet Stack

EQUIPMENT CHECKS

	Initial/Final
Leak Rate cfm	/_____
Leak Test Vacuum	/_____
✓ Pitots, Pre Leak Ck	
✓ Pitots, Post Leak Ck	
Gas Sampling System	
Integrated Bag	
Thermocouples @ °F	

QA FORMS COMPLETED

Stack Schematic ___
Sample Train ___
Pitot Tube Insp. ___
Magnehelic Cal. ___
Temp. Probe Cal. ___
Gas Meter Calib. ___

Filter # _____ Box # _____

	Final Wt. gram	Initial Wt. gram	Net Wt. gram
#1 Imp.	Use Previous MY Data		
#2 Imp.			
#3 Imp.			
#4 Imp.			
#5 Imp.			
#6 S.G.			

Total H_2O Volume _____ g

Start Time 12:00
Stop Time 12:30
Barometric Pressure "Hg 29.58
Static Pres "H_2O -.079
Production Rate
TO-14 Canister #543

SAMPLING PARAMETERS

% Moisture
Meter Temp.
Stack Temp.
ΔH@ Y
Pitot # P8A Side # A
Cp .84
Nozzle Diameter inch
D_1 D_2 D_3

K Factor

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu.Ft.	Pitot Reading Δ P " H_2O	Orifice Setting (Δ H) " H_2O Ideal	Orifice Setting (Δ H) " H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vac. Gauge " Hg	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	O_2 %	
SE1			.005								1505		
2			.005								1573		
3			.005								1624		
4			.005								1626		
5			.005								1619		
6			.005								1619		
7			.005								1548		
8			.005								1570		
9			.005								1601		
10			.005								1571		
11			.005								1570		
12			.005								1594		
NE1			.003								1489		
2			.003								1509		
3			.003								1533		
4			.002								1572		
5			.003								1577		
6			.003								1571		
7			.003								1589		
8			.003								1609		
9			.003								1620		
10			.003								1630		
11			.003								1624		
12			.004								1612		
			$\sqrt{(\Delta P)^2}$		$\overline{\Delta H}$		T_m				1581.5 T_s		

#13329

TRAVERSE SAMPLING DATA SHEET

Page 1 of 1

Client Paramount @ Midway Landfill
Location Midway, WA
Sample Site #3 Flare Outlet Stack
Stack Diameter 88.0" Ø
Date 11/7/91
Operators KSM / RAW
Run I.D. 1 - Outlet M4/AC1

EQUIPMENT CHECKS

	Initial/Final
Leak Rate cfm	.009 / .005
Leak Test Vacuum	15" / 12"
✓ Pitots, Pre Leak Ck	
✓ Pitots, Post Leak Ck	
✓ Gas Sampling System	
— Integrated Bag	
✓ Thermocouples @ ___ °F	

QA FORMS COMPLETED

Stack Schematic	✓
Sample Train	✓
Pitot Tube Insp.	✓
Magnehelic Cal.	N/A
Temp. Probe Cal.	✓
Gas Meter Calib.	✓

Filter # N/A Box # B2-1

	Final Wt. gram	Initial Wt. gram	Net Wt. gram
#1 Imp.	664.1	- 642.7	=
#2 Imp.	664.1	- 640.9	=
#3 Imp.	546.3	- 542.0	=
#4 Imp.		-	=
#5 Imp.		-	=
#6 S.G.	871.9	- 862.6	=
Total H_2O Volume	58.2		g

Start Time 11:10
Stop Time 12:10
Barometric Pressure "Hg 29.87
Static Pres "H_2O [redacted] -0.080
Production Rate

SAMPLING PARAMETERS

% Moisture —
Meter Temp. —
Stack Temp. —
ΔH@ 1.782 Y 1.010 (Rd/Rwn)
Pitot # [redacted]B Side # A
Cp .84
Nozzle Diameter N/A inch
D_1 — D_2 — D_3 —
K Factor —

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu.Ft.	Pitot Reading Δ P " H_2O	Orifice Setting (Δ H) " H_2O Ideal	Orifice Setting (Δ H) " H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vac. Gauge " Hg	Filter Box Temp °F (N/A)	Imp. Exit Temp °F	Stack Temp °F	O_2 %	
~~Single~~ S1	0	556.907	0.006	1.0	1.0	62	62	1	N/A	59	1620	Dup. Lost	
2	10		0.005			63	63	1		52	1620		
3	20		0.005			65	64	1		54	1610		
4	30		0.007			67	64	1		54	1618		
5	40		0.007			69	65	1		56	1627		
6	50		0.008	↓	↓	70	66	1	↓	58	1644		
7	60	589.067	0.009								1650		
8			0.009								1652		
9			0.010								1656		
10			0.008								1660		
11			0.010								1655		
12			0.010								1655		
S1			0.007								1675		
2			0.006								1672		
3			0.005								1675		
4			0.005								1660		
5			0.006								1665		
6			0.005								1632		
7			0.005								1580		
8			0.004								1595		
9			0.004								1570		
10			0.003								1566		
11			0.002								1585		
12			0.001								1580		
		32.760	$\sqrt{(\Delta P)^2}$		1.0 / ΔH		65.0 / T_m				1630.6 / T_s		

Use Times EAST 1145 - 1205 SOUTH 1205 - 1210

TRAVERSE SAMPLING DATA SHEET

Page 1 of 1 / 102

13330

Client Parametrix @ Midway Landfill
Location Midway WA
Sample Site #3 Flare Outlet Stack

Stack Diameter 88" Ø
Date 11/7/91
Operators KSM/GAW
Run I.D. 2-Outlet M4/HCl

EQUIPMENT CHECKS

	Initial/Final
Leak Rate cfm	.009 / 0.008
Leak Test Vacuum	15" / 15"
✓ Pitots, Pre Leak Ck	
✓ Pitots, Post Leak Ck	
✓ Gas Sampling System	
— Integrated Bag	
✓ Thermocouples @ ___ °F	

QA FORMS COMPLETED

Stack Schematic ___
Sample Train ___
Pitot Tube Insp. ___
Magnehelic Cal. ___
Temp. Probe Cal. ___
Gas Meter Calib. ___

Filter # N/A Box # B2-2

	Final Wt. gram	Initial Wt. gram	Net Wt. gram
#1 Imp.	679.1	640.1	=
#2 Imp.	649.5	632.2	=
#3 Imp.	540.6	538.6	=
#4 Imp.			=
#5 Imp.			=
#6 S.G.	880.3	871.8	=

Total H_2O Volume 66.80 g

Start Time 13:10
Stop Time 14:10
Barometric Pressure "Hg 29.80
Static Pres "H_2O -0.085
Production Rate ___

SAMPLING PARAMETERS

% Moisture —
Meter Temp. —
Stack Temp. —
ΔH@ 1.782 Y 1.010 (Red Run)
Pitot # P8A Side # A
Cp .84
Nozzle Diameter — inch
D_1 — D_2 — D_3 —
K Factor —

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu.Ft.	Pitot Reading Δ P " H_2O	Orifice Setting (Δ H) " H_2O Ideal	Orifice Setting (Δ H) " H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vac. Gauge " Hg	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	O_2 %	
EAST 1	0	589.760	0.004	1.0	1.0	74	74	1	N/A	54	1610	Data Logger	
2	10		0.005	↓	↓	74	75	1	↓	54	1606		
3	20		0.004			74	75	1		54	1601		
4	30		0.003			74	74	1		54	1610		
5	40		0.005			74	73	1		54	1624		
6	50		0.005			77	73	1		57	1650		
7	60	623.900	0.006								1660		
8			0.006								1658		
9			0.005								1630		
10			0.006								1645		
11			0.006								1635		
12			0.006								1640		
WEST 1			0.007								1640		
2			0.008								1640		
3			0.008								1635		
4			0.007								1635		
5			0.006								1635		
6			0.005								1617		
7			0.006								1607		
8			0.006								1606		
9			0.007								1616		
10			0.006								1612		
11			0.007								1610		
12			0.008								1611		
		34.140	$\sqrt{(\Delta P)^2}$		1.00 / Δ H	74.3 / T_m					1626.4 / T_s		

Vol Tran Times South 1400 - 1407

13331

TRAVERSE SAMPLING DATA SHEET

Page 1 of 103

Client Paramount @ Midway Landfill
Location Midway, WA
Sample Site #3 Flare Outlet Stack
Stack Diameter 88.0" ϕ
Date 11/8/91
Operators KSN/DAW
Run I.D. 3 - Outlet M4/HCl

EQUIPMENT CHECKS

	Initial/Final
Leak Rate cfm	.009 / 0.005
Leak Test Vacuum	15" / 15"
✓ Pitots, Pre Leak Ck	
✓ Pitots, Post Leak Ck	
✓ Gas Sampling System	
— Integrated Bag	
✓ Thermocouples @ °F	

QA FORMS COMPLETED

Stack Schematic ✓
Sample Train ✓
Pitot Tube Insp. ✓
Magnehelic Cal. N/A
Temp. Probe Cal. ✓
Gas Meter Calib. ✓

Filter # N/A Box # B2-3

	Final Wt. gram	Initial Wt. gram	Net Wt. gram
#1 Imp.	682.9	638.0	
#2 Imp.	661.3	646.0	
#3 Imp.	541.5	539.3	
#4 Imp.			
#5 Imp.			
#6 S.G.	836.2	836.1	
Total H_2O Volume	64.5 g		

Start Time 9:05
Stop Time 10:05
Barometric Pressure "Hg 29.75"
Static Pres "H_2O -0.095
Production Rate

SAMPLING PARAMETERS

% Moisture —
Meter Temp. —
Stack Temp. —
ΔH@ 1.782 Y 1.010
Pitot # P8A Side # A
Cp .84
Nozzle Diameter — inch
D_1 — D_2 — D_3 —
K Factor —

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu.Ft.	Pitot Reading Δ P " H_2O	Orifice Setting (Δ H) " H_2O Ideal	Orifice Setting (Δ H) " H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vac. Gauge " Hg	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	O_2 %	
E1	0	624.28	0.008	1.0	1.0	57	57	1	N/A	63	1616	Data Lost	
2	10		0.008			57	58	1		57	1619		
3	20		0.006			57	60	1		58	1620		
4	30		0.007			57	61	1		59	1643		
5	40		0.009			58	62	1		63	1644		
6	50		0.008	↓	↓	59	63	1		65	1650		
7	60	657.806	0.009						↓		1672		
8			0.010								1685		
9			0.010								1676		
10			0.011								1660		
11			0.010								1662		
12			0.010								1651		
S1			0.006								1660		
2			0.007								1653		
3			0.007								1660		
4			0.008								1674		
5			0.006								1667		
6			0.006								1629		
7			0.005								1638		
8			0.007								1638		
9			0.007								1628		
10			0.007								1622		
11			0.006								1620		
12			0.005								1622		
			$\sqrt{(\Delta P)^2}$		1.00 / ΔH	58.8 / T_m					1646.2 / T_s		
		33.568											

SAMPLE TRAIN INFORMATION

Fill Out One Sheet Per Site and Per Test Type

Client: Parametrics @ Midway Landfill

Location: Flare #3 Flare Outlet Stack

Site: ↓

Date(s): 11/7-8/91

Test Team: KSM / GAW

Number of Runs: 3 M4/HCl

If this information is not accurate for all runs, note all exceptions:

Thimble: ___yes _✓_no **Nozzle type:** ___✓quartz _____steel

Probe liner: ___✓quartz ___glass _____steel _____teflon

Probe type: _____✓regular _____water-cooled

Front-half filter: ~~___~~yes _✓_no **Size (mm):** __90 __110 __125

Support: N/A steel _____glass frit _____teflon

Gasket: N/A silicon _____teflon

Filter media: (None Used) quartz fiber _____glass fiber _____teflon

Impinger Train Solutions/Quantity of Solution Charged
#1 100 ml DI H_2O
#2 100 ml DI H_2O
#3 Empty
#4 Silica Gel
#5
#6

Note: Show the back-half filter location with an arrow

Back-half filter type: __quartz fiber __glass fiber __teflon
___tared ___untared

GAS LOG MEASUREMENT DATA

FILE NAME: 124/MIDWAY
CLIENT: Parametrix, Inc.
LOCATION: Seattle, Washington - Midway Landfill
SITE: Flare #3 Outlet
SAMPLE DATE: November 7, 1991

TIME	NITROGEN OXIDES ppm	SULFUR OXIDES ppm	CARBON MONOXIDE ppm	CARBON DIOXIDE %	OXYGEN %
RUN 1 - 11:10-12:10					
11:10:00	7.8	2.2	1	6.9	12.3
11:11:00	7.6	2.1	1	6.7	12.4
11:12:00	7.4	2.0	1	6.4	12.9
11:13:00	8.0	1.9	1	7.1	12.5
11:14:00	9.0	2.2	1	7.9	11.7
11:15:00	7.6	2.2	1	6.6	12.4
11:16:00	7.8	2.2	1	6.8	12.4
11:17:00	6.9	2.2	1	6.0	12.7
11:18:00	7.1	2.1	1	6.1	13.7
11:19:00	7.9	2.2	1	7.0	12.3
11:20:00	6.5	2.1	1	5.6	13.4
11:21:00	8.7	2.1	1	7.5	12.3
11:22:00	7.8	2.1	1	6.9	12.4
11:23:00	8.2	2.2	1	7.1	11.9
11:24:00	7.3	2.1	1	6.3	13.3
11:25:00	7.2	2.0	1	6.1	12.8
11:26:00	7.8	2.1	1	6.7	12.9
11:27:00	7.1	2.1	1	6.2	12.8
11:28:00	7.6	2.1	1	6.5	13.0
11:29:00	7.8	2.0	1	6.7	12.8
11:30:00	8.3	1.9	1	7.3	12.1
11:31:00	8.3	1.8	1	7.3	12.0
11:32:00	8.0	1.6	1	7.0	12.2
11:33:00	7.6	1.6	1	6.6	12.6
11:34:00	7.6	1.6	1	6.8	12.6
11:35:00	8.4	1.5	1	7.2	12.3
11:36:00	8.6	1.6	1	7.6	11.8
11:37:00	8.7	1.5	1	7.7	11.8
11:38:00	8.7	1.6	1	7.7	11.6
11:39:00	8.1	1.5	1	7.0	12.1
11:40:00	8.2	1.5	1	7.1	12.3
11:41:00	7.1	1.7	1	6.1	12.8
11:42:00	6.7	1.7	1	5.9	13.2
11:43:00	6.3	1.7	1	5.6	13.6
11:44:00	7.7	1.7	1	6.6	12.9
11:45:00	8.0	1.8	1	6.9	12.6
11:46:00	7.3	1.9	1	6.2	12.8
11:47:00	6.2	1.9	1	5.4	13.4
11:48:00	7.3	1.9	1	6.3	13.2
11:49:00	7.8	2.0	1	6.8	12.6
11:50:00	6.3	2.0	1	5.6	13.6
11:51:00	7.8	2.0	1	6.8	13.0
11:52:00	7.5	1.9	1	6.5	12.4

11:53:00	7.9	1.7	1	6.9	12.9
11:54:00	7.9	1.8	1	7.0	12.0
11:55:00	8.2	1.7	1	7.1	12.3
11:56:00	9.0	1.7	1	7.8	12.0
11:57:00	8.5	1.7	1	7.5	11.4
11:58:00	8.3	1.7	1	7.2	12.1
11:59:00	8.3	1.6	1	7.2	12.2
12:00:00	8.5	1.7	1	7.3	12.0
12:01:00	7.9	1.8	1	6.8	12.4
12:02:00	8.1	1.9	1	7.0	12.4
12:03:00	8.4	2.0	1	7.2	12.2
12:04:00	8.9	1.9	1	7.8	11.9
12:05:00	8.4	1.9	1	7.4	11.8
12:06:00	8.8	1.9	1	7.5	11.8
12:07:00	8.7	2.0	1	7.4	12.0
12:08:00	8.7	2.0	1	7.6	11.9
12:09:00	8.3	2.1	1	7.2	11.9
12:10:00	6.8	1.9	1	5.9	12.2
AVERAGE RUN 1	7.8	1.9	1	6.8	12.5
	ppm	ppm	ppm	%	%
	NITROGEN OXIDES	SULFUR OXIDES	CARBON MONOXIDE	CARBON DIOXIDE	OXYGEN

SAMPLING SYSTEM BIAS CHECK

CLIENT: PARAMETRIX

DATE: 11/7/91

LOCATION: MIDWAY LANDFILL

SAMPLE TIME(S): 1110-1210

SAMPLE SITE: FLARE 3 OUTLET

CONDITION:

RUN #: 1

PARAMETER	MEASUREMENT UNIT	INITIAL ZERO CHECK	FINAL ZERO CHECK	INITIAL SPAN CHECK	FINAL SPAN CHECK	UPSCALE CAL. GAS VALUE Cma	AVERAGE MEASURED CONC. C
Carbon Dioxide (CO2)	%	0.0	0.0	12.0	11.9	12.0	
Oxygen (O2)	%	0.0	0.0	9.8	9.8	9.8	
Carbon Monoxide (CO)	ppm	0	0	501	504	500	
Sulfur Dioxide (SO2)	ppm	0.0	0.0	538	92.3	93.8	
Nitrogen Oxides (NOx)	ppm	0.0	0.0	94.8	96.1	94.8	
Non Methane Hydrocarbons (NMHC)	ppm						

MANUFACTURER/TYPE: CO2 ANALYZER _____ CYLINDER NO.: CC-10167

MANUFACTURER/TYPE: O2 ANALYZER _____ CYLINDER NO.: 1

MANUFACTURER/TYPE: CO ANALYZER _____ CYLINDER NO.: _____

MANUFACTURER/TYPE: SO2 ANALYZER _____ CYLINDER NO.: CC-72505

MANUFACTURER/TYPE: NOx ANALYZER _____ CYLINDER NO.: 1

MANUFACTURER/TYPE: NMHC ANALYZER _____ CYLINDER NO.: _____

TIME	NITROGEN OXIDES ppm	SULFUR OXIDES ppm	CARBON MONOXIDE ppm	CARBON DIOXIDE %	OXYGEN %
RUN 2 - 13:10-14:10					
13:10:00	9.6	1.1	0	8.8	11.0
13:11:00	9.7	1.3	1	9.0	10.5
13:12:00	9.9	1.5	1	8.8	10.5
13:13:00	9.3	1.7	1	8.6	10.7
13:14:00	9.5	1.9	1	8.5	11.1
13:15:00	9.6	2.1	1	8.7	10.9
13:16:00	9.3	2.2	1	8.5	10.8
13:17:00	8.8	2.5	1	8.0	11.4
13:18:00	8.6	2.6	1	7.8	11.5
13:19:00	8.8	2.7	0	7.9	11.6
13:20:00	8.6	2.8	1	7.7	11.7
13:21:00	8.4	2.9	0	7.7	11.9
13:22:00	9.2	3.1	0	8.3	11.3
13:23:00	9.3	3.1	0	8.5	11.0
13:24:00	8.7	3.0	0	8.2	11.1
13:25:00	9.4	2.9	0	8.6	11.1
13:26:00	9.5	2.8	0	8.6	10.8
13:27:00	9.6	2.7	0	8.7	10.8
13:28:00	9.4	2.7	0	8.4	11.1
13:29:00	8.7	2.7	1	7.8	11.5
13:30:00	8.0	2.9	1	6.9	12.0
13:31:00	6.4	3.0	1	5.5	13.1
13:32:00	8.1	3.0	1	7.1	13.1
13:33:00	8.8	3.1	0	7.9	11.7
13:34:00	8.0	3.3	0	6.9	12.0
13:35:00	8.1	3.3	1	7.3	12.5
13:36:00	9.4	3.3	0	8.2	11.4
13:37:00	7.7	3.4	0	7.0	11.7
13:38:00	7.5	3.2	1	6.7	13.2
13:39:00	8.5	3.0	0	7.6	11.9
13:40:00	7.8	3.1	1	6.8	12.2
13:41:00	5.9	3.1	1	5.2	13.8
13:42:00	6.6	2.9	1	5.8	13.4
13:43:00	8.6	2.9	1	7.7	12.6
13:44:00	9.6	3.3	0	8.5	11.0
13:45:00	9.9	3.7	0	8.6	11.0
13:46:00	7.1	3.6	1	6.2	12.4
13:47:00	9.0	3.3	1	8.1	11.9
13:48:00	6.5	3.3	1	5.5	12.7
13:49:00	7.8	2.9	1	7.0	13.5
13:50:00	9.5	3.1	0	8.4	11.3
13:51:00	8.1	3.2	0	6.9	11.8
13:52:00	9.2	3.2	1	8.2	11.9
13:53:00	7.8	3.3	1	6.7	12.1
13:54:00	8.1	3.2	1	7.1	12.5
13:55:00	8.9	3.2	0	7.7	11.8
13:56:00	9.2	3.3	0	7.7	11.6
13:57:00	8.0	3.2	1	7.1	12.5
13:58:00	9.3	3.4	0	8.0	11.6
13:59:00	9.9	3.4	0	8.4	11.1
14:00:00	10.0	3.6	0	8.6	11.0
14:01:00	9.0	3.7	0	7.8	11.0

14:02:00	9.8	3.4	0	8.6	11.5
14:03:00	9.6	3.6	0	8.2	10.6
14:04:00	6.4	3.3	1	5.7	13.6
14:05:00	9.3	3.1	0	8.1	11.5
14:06:00	9.4	3.3	0	8.2	11.4
14:07:00	8.9	3.4	0	7.9	11.4
14:08:00	9.7	3.5	0	8.3	11.3
14:09:00	8.9	3.5	0	7.8	11.6
14:10:00	8.8	3.3	0	7.8	11.2
AVERAGE RUN 2	8.7	3.0	0	7.7	11.7
	ppm	ppm	ppm	%	%
	NITROGEN OXIDES	SULFUR OXIDES	CARBON MONOXIDE	CARBON DIOXIDE	OXYGEN

SAMPLING SYSTEM BIAS CHECK

CLIENT: PARAMOUNT DATE: 11/7/91

LOCATION: MIDWAY LANDFILL SAMPLE TIME(S): 1310-1410

SAMPLE SITE: FLARE #3 OUTLET CONDITION:

RUN #: 2

PARAMETER	MEASUREMENT UNIT	INITIAL ZERO CHECK	FINAL ZERO CHECK	INITIAL SPAN CHECK	FINAL SPAN CHECK	UPSCALE CAL. GAS VALUE Cma	AVERAGE MEASURED CONC. C	
Carbon Dioxide (CO2)	%	0.0	0.0	12.0	11.9	12.0		
Oxygen (O2)	%	0.0	0.0	9.8	9.8	9.8		
Carbon Monoxide (CO)	ppm	0	0	499	521	500		
Sulfur Dioxide (SO2)	ppm	0.0	0.7	93.6	53.3	53.9		
Nitrogen Oxides (NOx)	ppm	0.0	0.0	94.7	95.2	94.8		✓
Non Methane Hydrocarbons (NMHC)	ppm							

MANUFACTURER/TYPE: CO2 ANALYZER CYLINDER NO.:

MANUFACTURER/TYPE: O2 ANALYZER CYLINDER NO.:

MANUFACTURER/TYPE: CO ANALYZER CYLINDER NO.:

MANUFACTURER/TYPE: SO2 ANALYZER CYLINDER NO.:

MANUFACTURER/TYPE: NOx ANALYZER CYLINDER NO.:

MANUFACTURER/TYPE: NMHC ANALYZER CYLINDER NO.:

CLIENT: Parametrix, Inc.
LOCATION: Seattle, Washington - Midway Landfill
SITE: Flare #3 Outlet
SAMPLE DATE: November 8, 1991

TIME	NITROGEN OXIDES ppm	SULFUR OXIDES ppm	CARBON MONOXIDE ppm	CARBON DIOXIDE %	OXYGEN %
RUN 3 - 09:05-10:05					
09:05:00	10.6	1.5	0	9.0	10.3
09:06:00	10.0	1.7	0	8.6	10.8
09:07:00	10.3	1.8	0	8.9	10.8
09:08:00	10.5	1.9	0	9.1	10.5
09:09:00	10.8	2.1	0	9.2	10.1
09:10:00	10.7	2.2	0	9.2	10.4
09:11:00	10.8	2.4	0	9.2	10.2
09:12:00	10.9	2.4	0	9.2	10.3
09:13:00	10.6	2.5	0	9.0	10.2
09:14:00	10.3	2.5	0	9.0	10.6
09:15:00	10.5	2.6	0	9.0	10.6
09:16:00	10.2	2.6	0	8.9	10.5
09:17:00	10.1	2.7	0	8.8	10.9
09:18:00	10.1	2.7	0	8.9	10.5
09:19:00	10.9	2.7	0	9.3	10.2
09:20:00	10.6	2.9	0	9.1	10.4
09:21:00	10.3	2.9	0	9.0	10.5
09:22:00	10.4	2.9	0	9.0	10.4
09:23:00	10.2	2.9	0	8.8	10.7
09:24:00	9.8	3.1	0	8.6	10.9
09:25:00	9.8	3.1	0	8.4	11.1
09:26:00	9.7	3.1	0	8.4	11.0
09:27:00	9.8	3.0	0	8.5	11.2
09:28:00	10.3	3.0	0	8.9	10.7
09:29:00	10.3	3.2	0	8.9	10.4
09:30:00	10.1	3.1	0	8.8	10.7
09:31:00	10.0	3.3	0	8.7	10.7
09:32:00	10.4	3.3	0	9.0	10.6
09:33:00	10.2	3.4	0	8.9	10.7
09:34:00	10.5	3.4	0	9.0	10.4
09:35:00	9.2	3.3	0	7.9	10.8
09:36:00	9.0	3.4	0	7.9	12.0
09:37:00	9.9	3.3	0	8.6	11.0
09:38:00	10.7	3.5	0	9.2	10.5
09:39:00	9.5	3.4	0	8.3	10.9
09:40:00	9.9	3.3	0	8.6	11.1
09:41:00	9.6	3.4	0	8.4	10.8
09:42:00	9.9	3.6	0	8.7	11.1
09:43:00	9.9	3.7	0	8.5	10.6
09:44:00	10.1	3.6	0	8.9	10.9
09:45:00	10.0	3.6	0	8.7	10.8
09:46:00	10.8	3.6	0	9.3	10.2
09:47:00	10.8	3.6	0	9.2	10.2
09:48:00	10.0	3.7	0	8.8	10.5
09:49:00	10.7	3.8	0	9.3	10.5
09:50:00	10.2	3.6	0	8.9	10.4

09:51:00	10.7	3.7	0	9.3	10.2
09:52:00	10.0	3.8	0	8.8	10.6
09:53:00	10.6	3.7	0	9.1	10.4
09:54:00	11.1	3.9	0	9.4	10.1
09:55:00	10.9	4.1	0	9.3	10.0
09:56:00	10.0	3.9	0	8.7	10.7
09:57:00	9.9	3.7	0	8.8	10.7
09:58:00	10.3	3.7	0	8.8	10.8
09:59:00	10.4	3.8	0	9.1	10.4
10:00:00	10.1	3.9	0	8.9	10.4
10:01:00	10.5	3.9	0	9.2	10.4
10:02:00	10.3	3.9	0	9.0	10.2
10:03:00	10.4	3.9	0	9.2	10.5
10:04:00	10.5	3.8	0	9.0	10.4
10:05:00	10.7	3.9	0	9.4	10.2
AVERAGE RUN 3	10.2	3.2	0	8.9	10.6
	ppm	ppm	ppm	%	%
	NITROGEN OXIDES	SULFUR OXIDES	CARBON MONOXIDE	CARBON DIOXIDE	OXYGEN

SAMPLING SYSTEM BIAS CHECK

CLIENT: PARAMATRIX

DATE: 11-8-91

LOCATION: MIDWAY LANDFILL

SAMPLE TIME(S): 0905 - 1005

SAMPLE SITE: FLARE #3

CONDITION:

RUN #: 3

PARAMETER	MEASUREMENT UNIT	INITIAL ZERO CHECK	FINAL ZERO CHECK	INITIAL SPAN CHECK	FINAL SPAN CHECK	UPSCALE CAL. GAS VALUE Cma	AVERAGE MEASURED CONC. C	
Carbon Dioxide (CO2)	%	0.0	0.0	12.9	12.0	12.9		
Oxygen (O2)	%	0.0	0.0	9.8	9.8	9.8		
Carbon Monoxide (CO)	ppm	0	0	500	500	500		
Sulfur Dioxide (SO2)	ppm	0.0	0.0	93.7	94.3	93.9		
Nitrogen Oxides (NOx)	ppm	0.0	0.0	94.9	95.1	94.8		✓
Non Methane Hydrocarbons (NMHC)	ppm							

MANUFACTURER/TYPE: CO2 ANALYZER _____ CYLINDER NO.: _____

MANUFACTURER/TYPE: O2 ANALYZER _____ CYLINDER NO.: _____

MANUFACTURER/TYPE: CO ANALYZER _____ CYLINDER NO.: _____

MANUFACTURER/TYPE: SO2 ANALYZER _____ CYLINDER NO.: _____

MANUFACTURER/TYPE: NOx ANALYZER _____ CYLINDER NO.: _____

MANUFACTURER/TYPE: NMHC ANALYZER _____ CYLINDER NO.: _____

IO577-1 114

CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: Inlet Run 1
SITE ADDRESS: Parametrix
midway landfill
SAMPLING DATE: 2/7/92

SHIPPING DATE:
CANISTER SERIAL NO. 453
SAMPLER ID: ~~KSM~~
OPERATOR: KSM
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START	42	42	X	X
STOP	42	42		

PRESSURE

CANISTER PRESSURE	
	-29.5
X	0

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	1050	
STOP	1120	

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT
	~200 ml/min	

SAMPLING SYSTEM CERTIFICATION DATE:
QUARTERLY RECERTIFICATION DATE:

C. LABORATORY INFORMATION

DATE RECEIVED:
RECEIVED BY:
INITIAL PRESSURE: +1.0 psi
FINAL PRESSURE: +14.7 psi CSR 2/12/92 cryo He
DILUTION FACTOR:
ANALYSIS
GC-FID-ECD DATE:
GC-MSD-SCAN DATE: 2/12/92 EJA
GC-MSD-SIM DATE:
RESULTS :

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

Geshang Dai
SIGNATURE/TITLE

IO577-2

CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: Run 2 Inlet
SITE ADDRESS: Parametrix @ Midway land fill
SAMPLING DATE: 2/7/92

SHIPPING DATE:
CANISTER SERIAL NO. 476
SAMPLER ID:
OPERATOR: KSM
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START	42	42	X	X
STOP	42	42		

PRESSURE

CANISTER PRESSURE	
	-27.5
X	0

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	1125	
STOP	1155	

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT
	~200 ml/min	

SAMPLING SYSTEM CERTIFICATION DATE:
QUARTERLY RECERTIFICATION DATE:

C. LABORATORY INFORMATION

DATE RECEIVED:
RECEIVED BY:
INITIAL PRESSURE: +1.0 psi
FINAL PRESSURE: +14.3 psi ck 2/12/92 cryo He
DILUTION FACTOR:
ANALYSIS
GC-FID-ECD DATE:
GC-MSD-SCAN DATE: 2/12/92 EJA
GC-MSD-SIM DATE:
RESULTS :

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

Geosheng Dai
SIGNATURE/TITLE

CANISTER SAMPLING FIELD DATA SHEET

I0577-3

A. GENERAL INFORMATION

SITE LOCATION: Run 3 Inlet
SITE ADDRESS: Parametrix @ Midway Land Fill

SAMPLING DATE:

SHIPPING DATE:
CANISTER SERIAL NO. 481
SAMPLER ID:
OPERATOR: KSM
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START	42	42	X	X
STOP	42	42		

PRESSURE

CANISTER PRESSURE	
	-29.5
X	0

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	1200 1230	
STOP		

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT
	~200 lit/min	

SAMPLING SYSTEM CERTIFICATION DATE:
QUARTERLY RECERTIFICATION DATE:

C. LABORATORY INFORMATION

DATE RECEIVED:
RECEIVED BY:
INITIAL PRESSURE: Ø
FINAL PRESSURE: +14.5 psi Ox 2/12/92 cryo He
DILUTION FACTOR:
ANALYSIS
GC-FID-ECD DATE:
GC-MSD-SCAN DATE: 2/12/92 EOA
GC-MSD-SIM DATE:
RESULTS :

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

Geoshay Dai
SIGNATURE/TITLE

CANISTER SAMPLING FIELD DATA SHEET T0577-4

A. GENERAL INFORMATION

SITE LOCATION: Run 1 outlet stack
SITE ADDRESS: Paragonetics @ Midway Landfill
SAMPLING DATE: 2/7/92

SHIPPING DATE:
CANISTER SERIAL NO. 477
SAMPLER ID:
OPERATOR: LOZ
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START	42	42	X	X
STOP	42	42		

PRESSURE

CANISTER PRESSURE	
	-29.5
X	0

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	1050	
STOP	1120	

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT
	~ 200 lit/min	

SAMPLING SYSTEM CERTIFICATION DATE:
QUARTERLY RECERTIFICATION DATE:

C. LABORATORY INFORMATION

DATE RECEIVED:
RECEIVED BY:
INITIAL PRESSURE: +1.0 psi
FINAL PRESSURE: +14.7 psi OK 2/12/92 cryo He
DILUTION FACTOR:
ANALYSIS
GC-FID-ECD DATE:
GC-MSD-SCAN DATE: 2/12/92 EJA
GC-MSD-SIM DATE:
RESULTS :

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

Gesheng Dai
SIGNATURE/TITLE

CANISTER SAMPLING FIELD DATA SHEET

I0577-5

A. GENERAL INFORMATION

SITE LOCATION: Run 2 outlet stack
SITE ADDRESS: Paramount & Midway Landfill
SAMPLING DATE: 2/7/92

SHIPPING DATE:
CANISTER SERIAL NO. 540
SAMPLER ID:
OPERATOR: LDZ
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START	42	42	X	X
STOP	42	42		

PRESSURE

CANISTER PRESSURE	
	-29.5
X	0

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	1125	
STOP	1155	

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT
	~200 lit/min	

SAMPLING SYSTEM CERTIFICATION DATE:
QUARTERLY RECERTIFICATION DATE:

C. LABORATORY INFORMATION

DATE RECEIVED:
RECEIVED BY:
INITIAL PRESSURE: 0
FINAL PRESSURE: +15.0 psi On 2/12/92 cryo'd
DILUTION FACTOR:
ANALYSIS
GC-FID-ECD DATE:
GC-MSD-SCAN DATE: 2/12/92 EJA
GC-MSD-SIM DATE:
RESULTS :

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

Gesheng Dai
SIGNATURE/TITLE

IO577-6

CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: Run 3
SITE ADDRESS: Parametrix @ Midway Landfill
SAMPLING DATE: 2/7/92

SHIPPING DATE:
CANISTER SERIAL NO. 543
SAMPLER ID:
OPERATOR: LDZ
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START	42	42	X	X
STOP	42	42		

PRESSURE

CANISTER PRESSURE	
	-29.5
X	0

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	1200	
STOP	1230	

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT
	~200 lit/min	

SAMPLING SYSTEM CERTIFICATION DATE:
QUARTERLY RECERTIFICATION DATE:

C. LABORATORY INFORMATION

DATE RECEIVED:
RECEIVED BY:
INITIAL PRESSURE: +1.0 psi
FINAL PRESSURE: +14.5 psi 2/12/92 cryo He
DILUTION FACTOR:
ANALYSIS
GC-FID-ECD DATE:
GC-MSD-SCAN DATE: 2/12/92 EJA
GC-MSD-SIM DATE:
RESULTS :

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

Gresheng Dai
SIGNATURE/TITLE

APPENDIX E

Miscellaneous Supporting Information

CROSS SECTIONAL AREA

Traverse Point	Distance (inches)
1	1.85
2	5.90
3	10.38
4	15.58
5	22.00
6	31.33
7	56.67
8	66.00
9	72.42
10	77.62
11	82.10
12	86.15

STACK DIMENSIONS

88 inch diameter circular stack

4 ports at 90 degrees

A = 10 feet

B = 15 feet

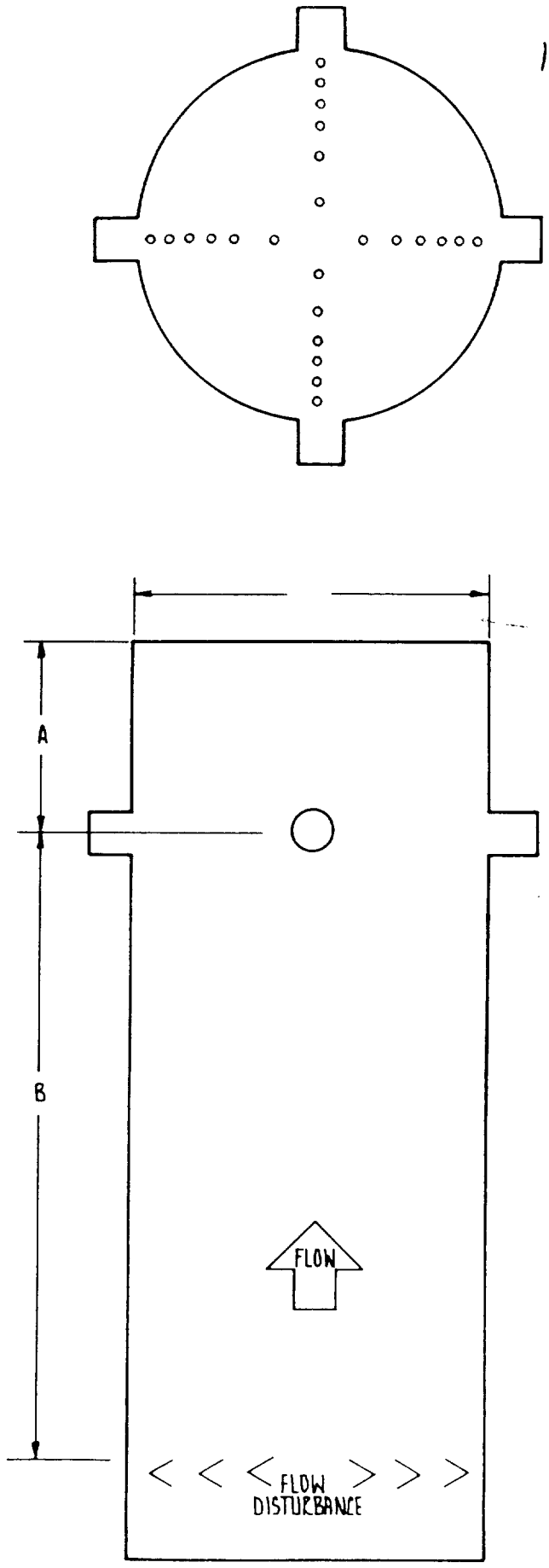


Figure 1. Location of sampling ports and traverse points.

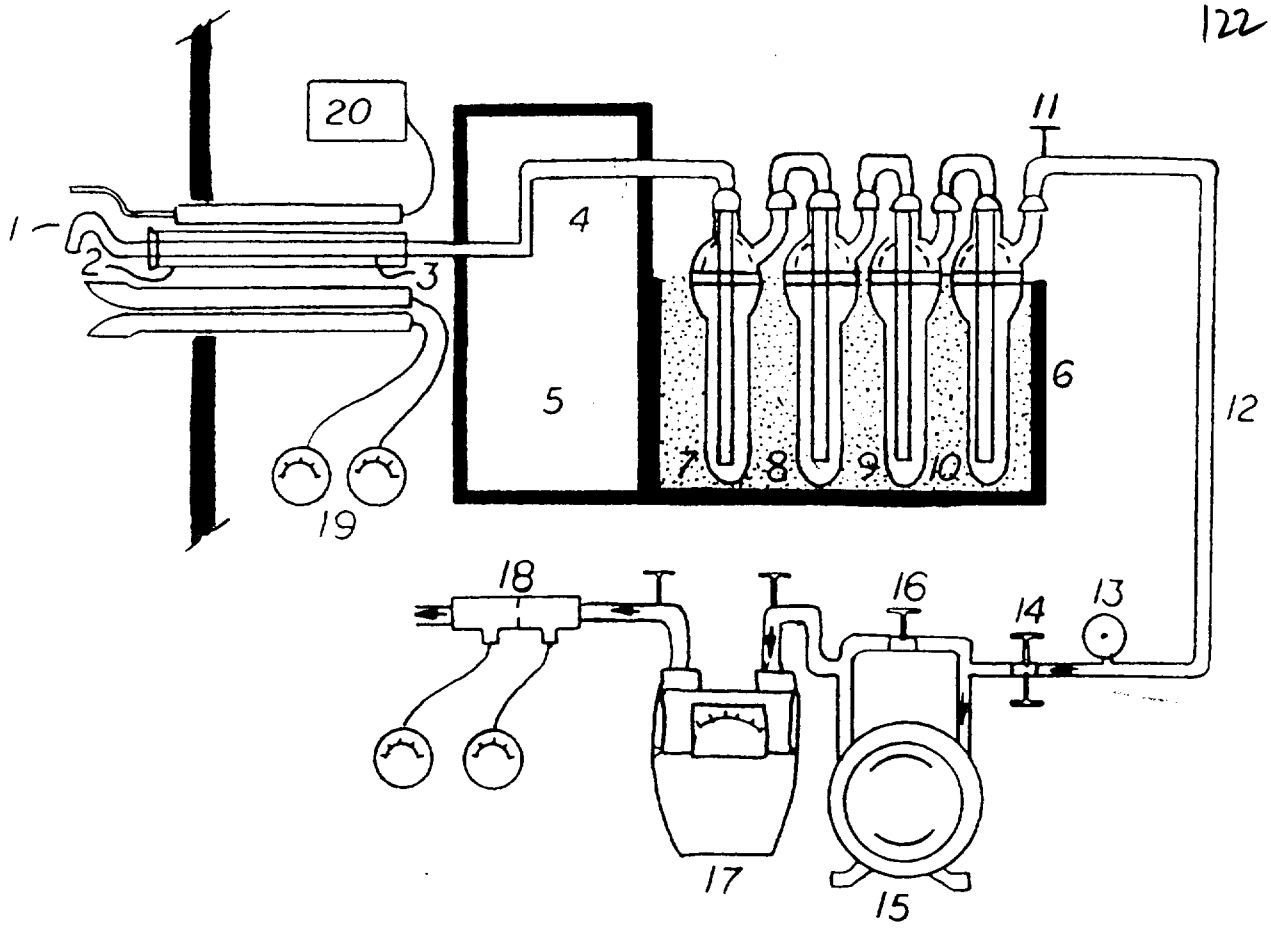


Figure 2. EPA Method 4 Moisture Sample Train.

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

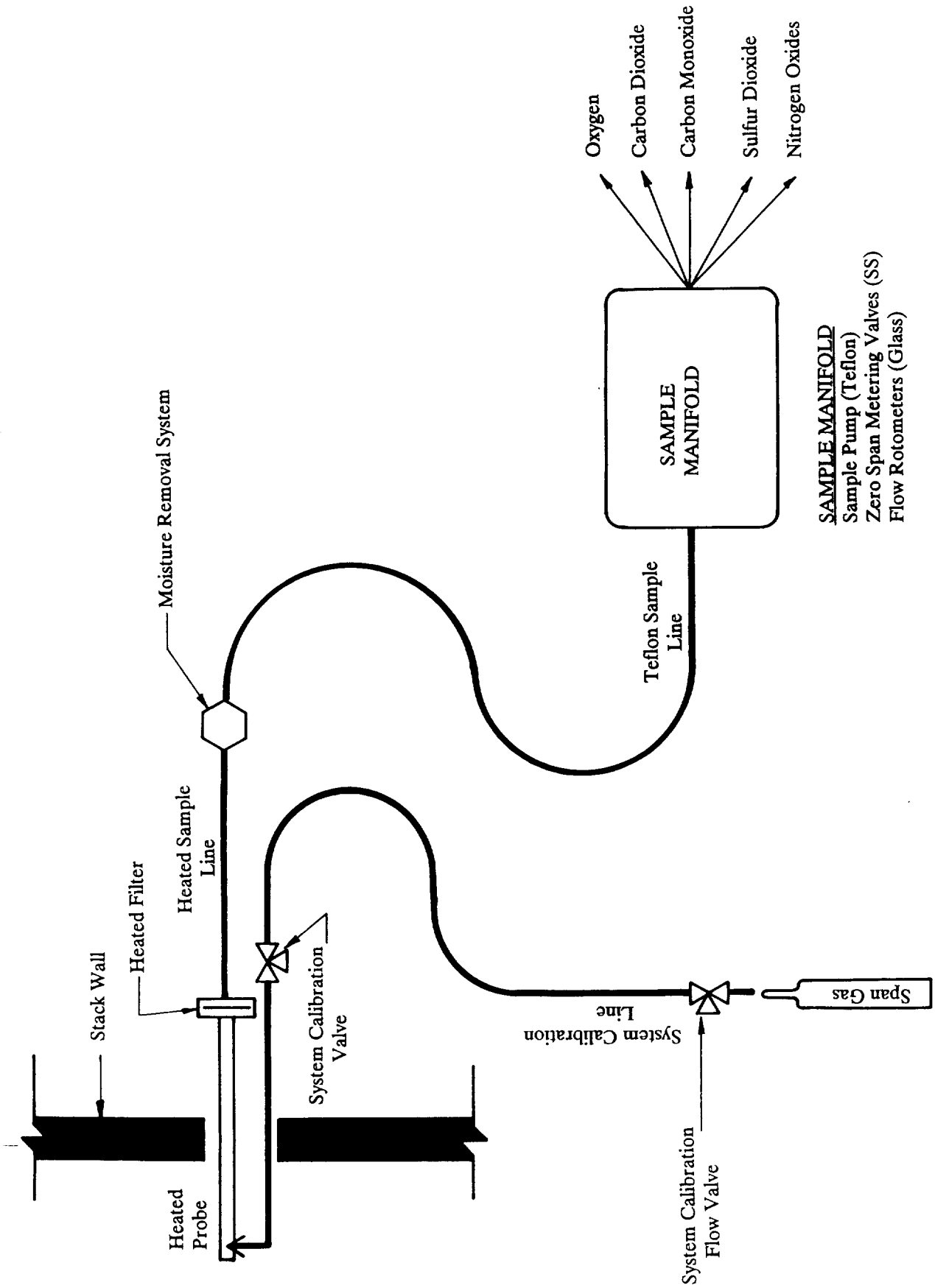


Figure 3 . EPA Method 3A, 6C, 7E and 10 Sample Train

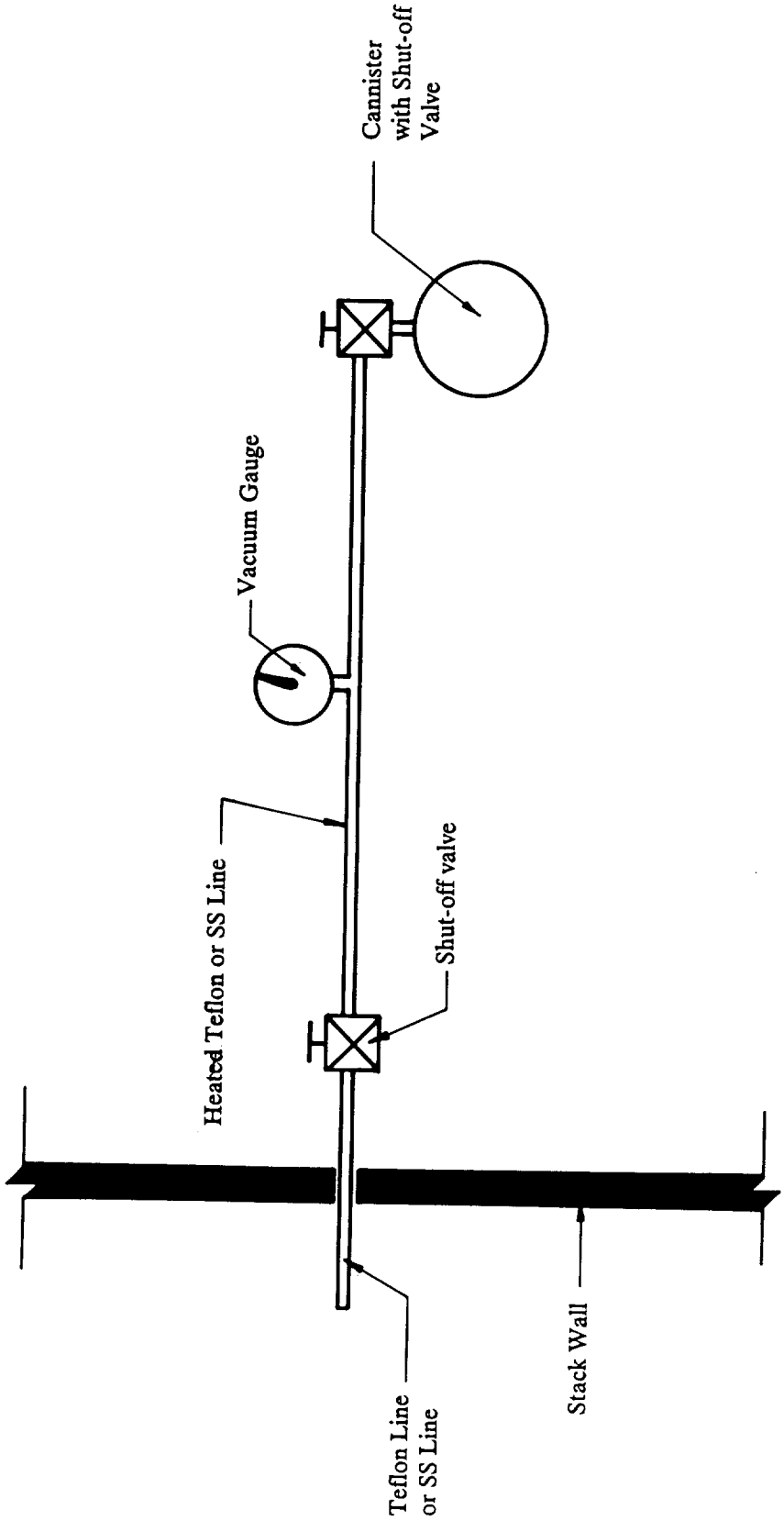


Figure 4. TO-14 Sample System Schematic

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

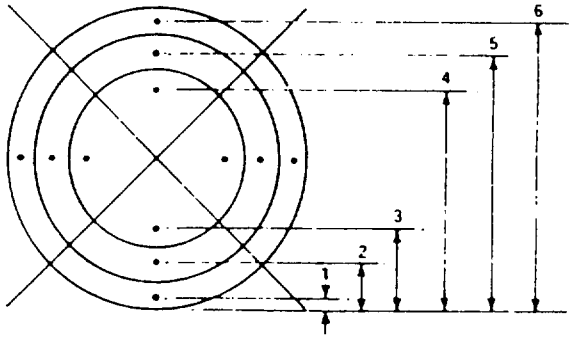


Figure 1-3. Example showing circular stack cross section divided into 12 equal areas, with location of traverse points indicated.

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.

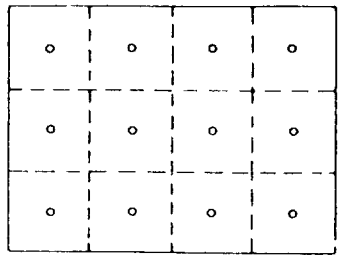


Figure 1-4. Example showing rectangular stack cross section divided into 12 equal areas, with a traverse point at centroid of each area.

METHOD 1 - MINIMUM NUMBER OF TRAVERSE POINTS

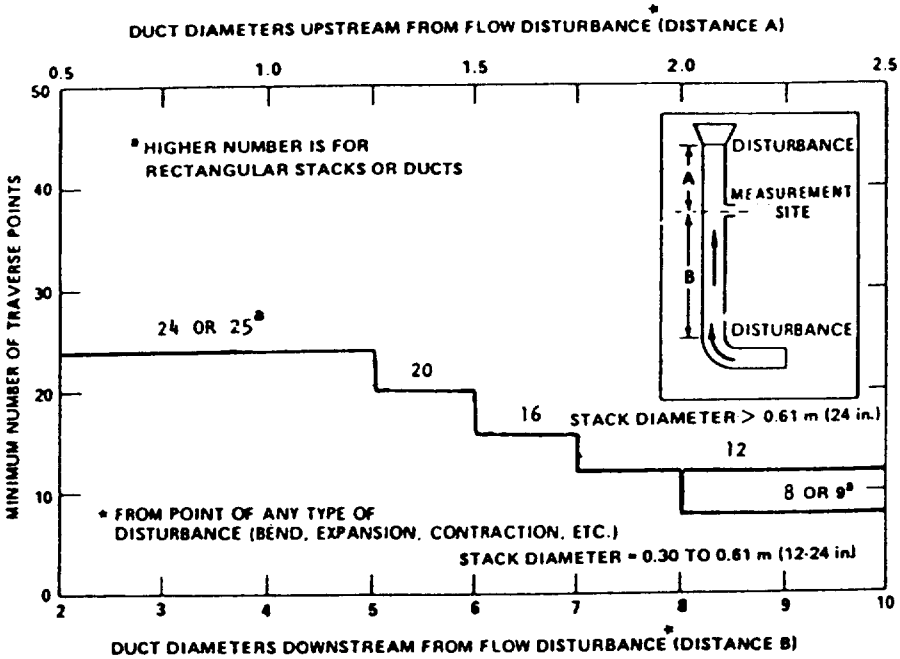


Figure 1-1. Minimum number of traverse points for particulate traverses.

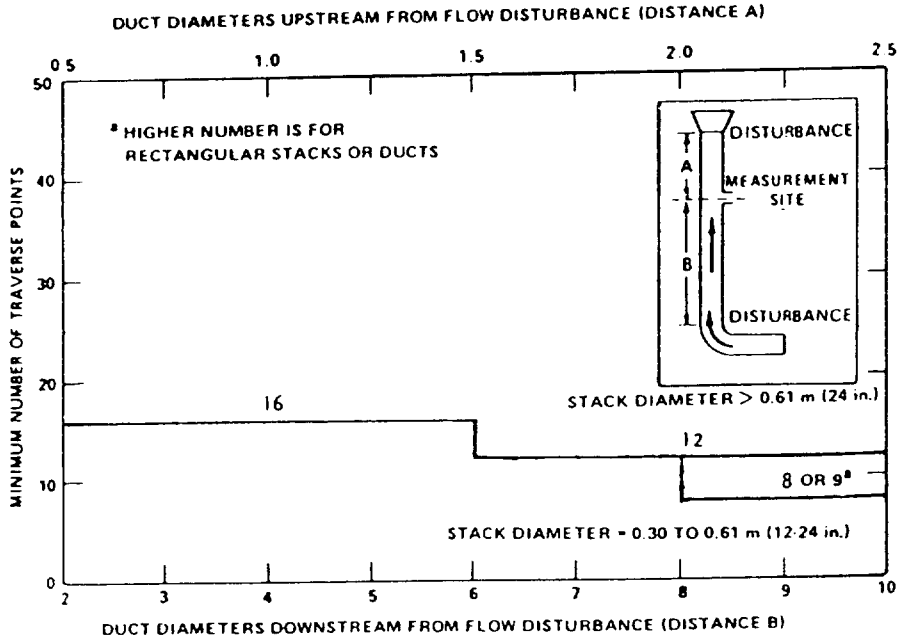


Figure 1-2. Minimum number of traverse points for velocity (nonparticulate) traverses.

METHOD 2 - STACK GAS VELOCITY AND VOLUMETRIC FLOW CALCULATIONS

5.1 Nomenclature.

A = Cross-sectional area of stack, m^2 (ft^2).
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,

$$34.97 \frac{m}{sec}\left[\frac{(g/g\text{-mole})(mm\ Hg)}{(°K)(mm\ H_2O)}\right]^{1/2}$$

for the metric system and

$$85.49 \frac{ft}{sec}\left[\frac{(lb/lb\text{-mole})(in.\ Hg)}{(°R)(in.\ H_2O)}\right]^{1/2}$$

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_{sd} = 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.

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

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.

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)

AMTEST
AIR QUALITY, INC.

DRY GAS METER CALIBRATION
AM TEST AIR QUALITY, INC.

FILE NAME: RWW991
METER BOX #: RED RWW BOX
CALIBRATION DATE: SEPTEMBER 25, 1991
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 H@
11.617	0.5	577.425	582.152	81.0	76.5	29.46	349.200	353.900	71.0	69.5	0.998	1.0069	1.729
12.547	1.0	583.565	590.687	82.0	77.0	29.46	355.300	362.400	72.5	70.5	0.998	1.0074	1.775
12.322	1.5	592.079	600.581	84.0	77.5	29.46	363.800	372.300	74.0	72.0	0.998	1.0085	1.800
11.055	2.0	602.782	611.546	86.0	78.5	29.46	374.500	383.300	75.0	73.0	0.998	1.0125	1.806
13.327	2.5	639.753	651.578	88.5	81.5	29.44	411.500	423.400	77.0	75.5	0.998	1.0144	1.800
AVERAGE												1.010	1.782

132

TYPE S PITOT TUBE INSPECTION DATA FORM

Date 5/1/91 Pitot Tube # P8A

Client Midway Landfill Parametrix

Location Midway Landfill

Site(s) Flare #3

Test Date(s) 2/7/92

Pitot tube assembly level? X yes _____ no

Pitot tube openings damaged? _____ yes (explain below) X no

α_1 = 2 ° (<10°), α_2 = 3 ° (<10°), β_1 = 2 ° (<5°),

β_2 = 3 ° (<5°)

γ = 4 °, θ = 1 °, A = 1.13 cm (in.)

z = A sin γ = 0.08 cm (in.); <0.32 cm (<1/8 in.),

w = A sin θ = 0.02 cm (in.); <.08 cm (<1/32 in.)

P_A 0.56 cm (in.) P_b 0.57 cm (in.)

D_t = 0.380 cm (in.)

Comments:

_____

_____

_____

Calibration required? _____ yes* X no

*If yes, tag and take out of service until repaired.

STACK TEMPERATURE SENSOR CALIBRATION DATA FORM

Date 5/2/91 Thermocouple Indicator # Black HH

Ambient Temperature 55 °F Barometric Pressure 29.57 in Hg

THERMOCOUPLE # OR REFERENCE	REFERENCE THERMOMETER TEMPERATURE °F	THERMOCOUPLE TEMPERATURE °F	TEMPERATURE DIFFERENCE °F	TEMPERATURE DIFFERENCE %
T8-1	215	215	0	0
	60	60	0	0
	32	32	0	0

$$\frac{(\text{ref temp, °F} + 460) - (\text{test therm. temp, °F} + 460)}{(\text{ref temp, °F} + 460)} * 100 \leq 1.5\%$$

134

P.O. BOX 570, LA PORTE, TX 77572-0570 AGT SPECIALTY GAS PRODUCTS (713) 471-3666 FAX (713) 471-3672

Applied Gas Technology

CERTIFICATE OF ANALYSIS

GENERAL WELDING SUPPLY, INC.
3623 E. Marginal Way
Seattle, WA 98134

DATE: 6-07-91

PURCHASE ORDER: 70692

CYLINDER NO. CC-101190

CARBON MONOXIDE	498 PPM
OXYGEN	9.99%
CARBON DIOXIDE	12.01%
NITROGEN	BALANCE

±1% PRIMARY STANDARD

CYLINDER NO. CC-101167

CARBON MONOXIDE	500 PPM
OXYGEN	9.85%
CARBON DIOXIDE	12.00%
NITROGEN	BALANCE

±1% PRIMARY STANDARD

ANALYST

AIRCO

Airco Special Gases
Union Landing & River Roads
P.O. Drawer No. 272
Riverton
New Jersey 08077
Telephone 609-829-7878

135a

CERTIFICATE OF ANALYSIS - EPA PROTOCOL GAS MIXTURE

CUSTOMER: General WeldingSupply

CYLINDER #: CC-72505
CYLINDER PRESSURE: 2000 psig
LABORATORY: Riverton, NJ

CERTIFICATION DATE: 6/24/91
EXPIRATION DATE: 12/24/92
REFERENCE #: 12737

MIXTURE COMPONENT	ACTUAL MIXTURE CONCENTRATION	NIST SRM NO.	NIST SRM SERIAL#	NIST SRM CONC.
Sulfur Dioxide	93.9 ppm	1694A	FF-28592	97.0 ppm

BALANCE GAS: Nitric Oxide & Nitrogen

GAS ANALYZER:
MAKE: Beckman MODEL: 865 SERIAL#: 0103986
PRINCIPAL: Non-Dispersive Infrared
LAST MULTIPOINT CALIBRATION DATE: 6/1/91

R=REFERENCE STANDARD Z=ZERO GAS S=SAMPLE GAS

1ST ANALYSIS: DATE 6/17/91 ANALYST A. Lattanze

1)	Z 0000	R 2673	S 2600	CONC (1)	94.4 ppm
2)	R 2685	Z 0000	S 2602	CONC (2)	94.0 ppm
3)	R 2679	S 2590	Z 0000	CONC (3)	93.8 ppm
				AVE CONC	94.0 ppm

2ND ANALYSIS: DATE 6/24/91 ANALYST A. Lattanze

1)	Z 0000	R 2772	S 2665	CONC (1)	93.3 ppm
2)	R 2775	Z 0000	S 2697	CONC (2)	94.2 ppm
3)	R 2775	S 2684	Z 0000	CONC (3)	93.8 ppm
				AVE CONC	93.8 ppm

THIS CALIBRATION STANDARD HAS BEEN CERTIFIED VERSUS EPA TRACEABILITY PROTOCOL NO. 1, PROCEDURE G1, AND ANALYSES PERFORMED PER SECTION 3.0.4.

CERTIFIED CONCENTRATION: Nitric Oxide = 94.8 ppm Sulfur Dioxide = 93.9 ppm
Nitrogen = Balance

APPROVED BY J. Long
LABORATORY MANAGER

AIRCO

Airco Special Gases
Union Landing & River Roads
P.O. Drawer No. 272
Riverton
New Jersey 08077
Telephone 609-829-7878

1356

CERTIFICATE OF ANALYSIS - EPA PROTOCOL GAS MIXTURE

CUSTOMER: General Welding Supply

CYLINDER #: CC-72505
CYLINDER PRESSURE: 2000 psig
LABORATORY: Riverton, NJ

CERTIFICATION DATE: 6/24/91
EXPIRATION DATE: 12/24/92
REFERENCE #: 12737

MIXTURE COMPONENT	ACTUAL MIXTURE CONCENTRATION	AIRCO INTERMEDIATE STANDARD CYLINDER #	CONC.	NIST SRM#
Nitric Oxide	94.8 ppm	CC-16550	77.2 ppm	1684B

BALANCE GAS: Sulfur Dioxide & Nitrogen

GAS ANALYZER:
MAKE: Beckman MODEL: 952 SERIAL#: 0100204
PRINCIPAL: Chemiluminescence
LAST MULTIPOINT CALIBRATION DATE: 6/1/91

R=REFERENCE STANDARD Z=ZERO GAS S=SAMPLE GAS

1ST ANALYSIS: DATE 6/17/91 ANALYST A. Lattanze

1)	Z 0000	R 7223	S 8900	CONC (1)	95.1 ppm
2)	R 7230	Z 0000	S 8850	CONC (2)	94.5 ppm
3)	R 7240	S 8830	Z 0000	CONC (3)	94.2 ppm
				AVE CONC	94.6 ppm

2ND ANALYSIS: DATE 6/24/91 ANALYST A. Lattanze

1)	Z 0000	R 7140	S 8790	CONC (1)	95.0 ppm
2)	R 7150	Z 0000	S 8790	CONC (2)	94.9 ppm
3)	R 7150	S 8780	Z 0000	CONC (3)	94.8 ppm
				AVE CONC	94.9 ppm

THIS CALIBRATION STANDARD HAS BEEN CERTIFIED VERSUS EPA TRACEABILITY PROTOCOL NO. 1, PROCEDURE G1, AND ANALYSES PERFORMED PER SECTION 3.0.4.

CERTIFIED CONCENTRATION: Nitric Oxide = 94.8 ppm Sulfur Dioxide = 93.9 ppm
Nitrogen = Balance

APPROVED BY _____
LABORATORY MANAGER

AIRCO

Airco Special Gases
Union Landing & River Roads
P.O. Drawer No. 272
Riverton
New Jersey 08077
Telephone 609-829-7878

136

CERTIFICATE OF ANALYSIS - EPA PROTOCOL GAS MIX

CUSTOMER: General Welding Supply
CYLINDER #: CC-17221 CERTIFICATION DATE: 6/24/91
CYLINDER PRESSURE: 2000 psig EXPIRATION DATE: 12/24/92
LABORATORY: Riverton, NJ REFERENCE #: 12738

MIXTURE COMPONENTS	ACTUAL MIXTURE CONCENTRATION	AIRCO INTERMEDIATE STANDARD CYLINDER #	CONC.	NIST SRM#
Nitric Oxide	59.4 ppm	CC-18993	46.5 ppm	1693A
Sulfur Dioxide	57.0 ppm	CC-13959	50.4 ppm	1683B

BALANCE GAS: Nitrogen

COMPONENT 1 GAS ANALYSIS PROCEDURE Chemiluminescence
MAKE/MODEL/SER#: Beckman/952/0100204
LAST MULTIPOINT CALIBRATION DATE: 6/1/91

COMPONENT 2 GAS ANALYSIS PROCEDURE Non-Dispersive Infrared
MAKE/MODEL/SER#: Beckman, 865,0103986
LAST MULTIPOINT CALIBRATION DATE: 6/1/91
R=REFERENCE STANDARD Z=ZERO GAS S=SAMPLE GAS

1ST COMPONENT Nitric Oxide

1ST ANALYSIS: DATE 6/17/91				ANALYST A. Lattanze	
1) Z 0000	R 4340	S 5570		CONC (1)	59.7 ppm
2) R 4340	Z 0000	S 5570		CONC (2)	59.7 ppm
3) R 4345	S 5570	Z 0000		CONC (3)	59.6 ppm
			AVE CONC		59.7 ppm

2ND ANALYSIS: DATE 6/24/91				ANALYST A. Lattanze	
1) Z 0000	R 4320	S 5491		CONC (1)	59.1ppm
2) R 4320	Z 0000	S 5470		CONC (2)	58.9 ppm
3) R 4312	S 5470	Z 0000		CONC (3)	59.0 ppm
			AVE CONC		59.0 ppm

2ND COMPONENT Sulfur Dioxide

1ST ANALYSIS: DATE 6/17/91				ANALYST A. Lattanze	
1) Z 0000	R 5150	S 5787		CONC (1)	56.6 ppm
2) R 5130	Z 0000	S 5780		CONC (2)	56.8 ppm
3) R 5130	S 5785	Z 0000		CONC (3)	56.8 ppm
			AVE CONC		56.7 ppm

2ND ANALYSIS: DATE 6/24/91				ANALYST A. Lattanze	
1) Z 0000	R 5085	S 5753		CONC (1)	57.0 ppm
2) R 5085	Z 0000	S 5780		CONC (2)	57.3 ppm
3) R 5070	S 5776	Z 0000		CONC (3)	57.4 ppm
			AVE CONC		57.2 ppm

THIS CALIBRATION STANDARD HAS BEEN CERTIFIED VERSUS EPA TRACEABILITY PROTOCOL NO. 1, PROCEDURE G1, AND ANALYSES PERFORMED PER SECTION 3.0.4.
CERTIFIED CONCENTRATION: Nitric Oxide = 59.4ppm Sulfur Dioxide = 57.0 ppm
Nitrogen = Balance

APPROVED BY _____
LABORATORY MANAGER

1.1 GENERAL DESCRIPTION

The Infrared Industries, Inc. Model IR-2200 is an electrochemical oxygen analyzer which offers superior performance by continuously monitoring the concentration of oxygen gas in a sample stream. The analyzer is designed utilizing a disposable sensor cell with a guaranteed 6 month life for ambient oxygen level measurements. This life is extended for lower levels of oxygen. Acid gases can have a detremental effect on cell life.

The analyzer offers a three range digital display of oxygen concentration. A recorder output voltage is provided with the standard instrument. Optional equipment includes 4-20mA current output, dual setpoint alarms, and anon board sample pump, and corrosion resistant flow regulator.

Features include low cost, easily replaced sensor cell, built-in pressure regulator, ambient air calibration, and simple field servicing.

1.2 SPECIFICATIONS

GAS SAMPLE QUALITY -

Temp (gas sample)	32 to 158°F

Temp (ambient)	40° to 105°F
Input Pressure	1 to 10 psig - standard limits
Flow Rate	0.3 to 3.0 scfh (Factory set at 1 scfh)
Moisture	0-100% (avoid condensation)

PERFORMANCE -

Accuracy	±2%fs is at 72°F - all ranges
Response Time	30 sec. for 90% response, 10 sec. typical for small step change
Stability	±2%fs over 30 days typical

ELECTRICAL

Power Input	100/120/220/240 Vac 50/60 Hz - standard
Output Signal	0 to 100 mV range - standard. Also available 0 to 10 mV, 0 to 1V, 0 to 5V
Visual	3 1/2 digital display

GAS FLOW SYSTEM -

Gas Connection	Stainless Steel, Polypropylene, Polyethylene 1/4" tube fittings
Cell Life	6 month min, for ambient O_2 levels longer for lower O_2 concentrations
Shelf Life	6 months storage, off load, refrigerated in airtight package

STANDARD RANGES

Percent Analyzers 0 to 1/10/25%

721AT2 ANALYZER DATA

S/N 90 -721AT2 -7722

CUSTOMER: AMTEST INC

LOCATION: WASH.

P.O. #: 0976

CALIBRATION

CELL LENGTH 35.0 cm

CALIBRATION PRESSURE 760 mm Hg

CALIBRATION TEMP. 25 °C + 273 = 298 °K

MOLAR ABSORBTIVITY CONSTANT "k" 258

ELECTRONIC SPAN VALUE 809 ppm

SCALING RATIO 2mV /ppm

	RANGE 1	RANGE 2
FULL SCALE	200 ppm	2000 ppm
LOW OUTPUT	0.1 VDC	0.1 VDC
HIGH OUTPUT	1.0 VDC	1.0 VDC
V/I	— mA	— mA

LAMP TYPE SMG15MB

PMT TYPE R928HA

MEASURING PMT S/N 1A0361

REFERENCE PMT S/N YC6031

MEASURING FILTER WAVELENGTH 285 nM S/N 89-12

REFERENCE FILTER WAVELENGTH 585 nM S/N 90-04

PRIMARY OUTPUT CARD

TJ1 (DPM)	0.00 Vdc
TJ2 (AGC1)	3.49 Vdc
TJ3 (AGC2)	3.56 Vdc
TJ4 (I_{avg})	4.00 Vdc
TJ5 (M1)	9.00 Vdc
TJ6 (M2)	7.98 Vdc
TJ7 (M1B)	4.51 Vdc
TJ8 (M2B)	4.50 Vdc
TJ9 (OPACITY)	0.00 Vdc

JUMPERS

JH1 A (B) C
JH2 A (B) C D
JH3 A (B) C D
JH4 (A) B (C) D

SWITCHES

SW1-1 (OP) CAL
SW1-2 (ZERO) SPAN

SECONDARY OUTPUT CARD

JUMPERS

JH1 (A) B C (D)
JH2 (A) (B) C D
JH3 (1) (2) 3 4 5 6 7 8
JH4 (1) 2 3 4 (5) 6 7 8
JH5 (1) (2) 3 4 5 6 7 8
JH6 (1) 2 3 4 (5) 6 7 8

HARD WIRED JUMPERS

JW1 JW6
JW2 JW7
(JW3) (JW8)
(JW4) (JW9)
(JW5) (JW10)

721AT2 ANALYZER DATA

LAMP POWER SUPPLY

TEST POINTS

TP1	10.15 Vdc (OC1)	
TP2	10.15 Vdc (OC2)	
TP3 (Scope Measurement)		
Base	0.50 Vdc	
Measuring Pulse	8.80 Vdc	
Reference Pulse	2.60 Vdc	
TJ1 I_{avg}	4.00 Vdc	
LAMP VOLTAGE	150.1 Measured Across TB2 Terminals	

JUMPERS

JH1 (1) 3
JH2 (1) 3
JH3 (1) 3

DETECTOR CARD

TEST JACKS

TJ1 (AGC1)	3.49 Vdc
TJ2 (AGC2)	3.56 Vdc
TJ3 (R1)	8.03 Vdc
TJ4 (R2)	8.05 Vdc
TJ5 (M1)	9.00 Vdc
TJ6 (M2)	7.98 Vdc

TEST POINTS

TP1 (RSIG1)	-0.80 Vdc
TP2 (RSIG2)	-0.80 Vdc
TP3 (MSIG1)	-0.90 Vdc
TP4 (MSIG2)	-0.80 Vdc
TP5 (PMTSIG1)	-1.71 Vdc
TP6 (PMTSIG2)	-1.61 Vdc

SWITCHES

SW1-1	(AUTO)	MANUAL
SW1-2	(AUTO)	MANUAL
SW1-3	(ON)	OFF
SW1-4	(ON)	OFF

H-4394-1

TRAVERSE SAMPLING DATA SHEET

158

Client Paramatrix @ Midway L.F
Location Midway, WA
Sample Site #3 Flare Outlet

Stack Diameter 12.0" Ø
Date 11/7/91
Operators KSM
Run I.D. 1 - Inlet Velocity/Moisture

EQUIPMENT CHECKS

	Initial/Final
Leak Rate cfm	— / —
Leak Test Vacuum	— / —
✓ Pitots, Pre Leak Ck	
✓ Pitots, Post Leak Ck	
— Gas Sampling System	
— Integrated Bag	
— Thermocouples @ ___ °F	

QA FORMS COMPLETED

Stack Schematic ✓
Sample Train ✓
Pitot Tube Insp. —
Magnehelic Cal. —
Temp. Probe Cal. ✓
Gas Meter Calib. ✓

Filter # — Box # —

	Final Wt. gram	Initial Wt. gram	Net Wt. gram
#1 Imp.	Dry Bulb = 87°F		
#2 Imp.	Wet Bulb = 75°F		
#3 Imp.	-	=	
#4 Imp.	-	=	
#5 Imp.	-	=	
#6 S.G.	-	=	

Total H_2O Volume ___ g

Start Time 11:10
Stop Time 12:10
Barometric Pressure "Hg 29.87
Static Pres "H_2O +6.4
Production Rate

SAMPLING PARAMETERS

% Moisture
Meter Temp.
Stack Temp.
ΔH@ Y
Pitot # Std Side # —
Cp .99
Nozzle Diameter ___ inch
D_1 ___ D_2 ___ D_3 ___

K Factor

% Moisture = 2.5%

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu.Ft.	Pitot Reading Δ P " H_2O	Orifice Setting (Δ H) " H_2O Ideal	Orifice Setting (Δ H) " H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vac. Gauge " Hg	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	O_2 %	
Dry Center	0		.08								86		
	10		.08								86		
	20		.08								86		
	30		.08								86		
	40		.09								87		
	50		.08								87		
	60												

$\sqrt{(\Delta P)^2}$ $\overline{\Delta H}$ T_m T_s 86.3

H-4394-2

TRAVERSE SAMPLING DATA SHEET

Client Paramount @ Midway Landfill
Location Midway WA
Sample Site #3 Flare Inlet Duct

Stack Diameter 12.0" Ø
Date 11/7/91
Operators KSM/GAW
Run I.D. 2 - Inlet Velocity/Moisture

EQUIPMENT CHECKS

Initial/Final
Leak Rate cfm ____/____
Leak Test Vacuum ____/____
____ Pitots, Pre Leak Ck
____ Pitots, Post Leak Ck
____ Gas Sampling System
____ Integrated Bag
____ Thermocouples @ ____ °F

QA FORMS COMPLETED

Stack Schematic ____
Sample Train ____
Pitot Tube Insp. ____
Magnehelic Cal. ____
Temp. Probe Cal. ____
Gas Meter Calib. ____

Filter # — Box # ____

	Final Wt. gram	Initial Wt. gram	Net Wt. gram
#1 Imp.	Wet Bulb = 76°F		
#2 Imp.	Dry Bulb = 90°F		
#3 Imp.		-	=
#4 Imp.		-	=
#5 Imp.		-	=
#6 S.G.		-	=

Total H_2O Volume ____ g

Start Time 13:10
Stop Time 14:10
Barometric Pressure "Hg 29.80
Static Pres "H_2O +6.5
Production Rate ____

SAMPLING PARAMETERS

% Moisture ____
Meter Temp. ____
Stack Temp. ____
ΔH@ ____ Y ____
Pitot # ____ Side # ____
Cp .99
Nozzle Diameter ____ inch
D_1 ____ D_2 ____ D_3 ____

K Factor ____

% Moisture = 2.5%

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu.Ft.	Pitot Reading Δ P " H_2O	Orifice Setting (Δ H) " H_2O Ideal	Orifice Setting (Δ H) " H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vac. Gauge " Hg	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	O_2 %	
Duct Gas	0	~~5.760~~	.08								90		
	10		.08								90		
	20		.08								90		
	30		.08								90		
	40		.08								90		
	50		.08								91		
	60												

$\sqrt{(\Delta P)^2}$ ____ $\overline{\Delta H}$ ____ T_m ____ T_s ____

#H-4394-3 TRAVERSE SAMPLING DATA SHEET

Page 1 of 1
160

Client Parametrix @ Midway Landfill
Location Midway, WA
Sample Site #3 Flare Inlet Duct

Stack Diameter 12.0" ϕ
Date 11/8/01
Operators KSM
Run I.D. 3 - Inlet

EQUIPMENT CHECKS

	Initial/Final
Leak Rate cfm	____/____
Leak Test Vacuum	____/____
____ Pitots, Pre Leak Ck	
____ Pitots, Post Leak Ck	
____ Gas Sampling System	
____ Integrated Bag	
____ Thermocouples @ ___ °F	

QA FORMS COMPLETED
Stack Schematic ___
Sample Train ___
Pitot Tube Insp. ___
Magnehelic Cal. ___
Temp. Probe Cal. ___
Gas Meter Calib. ___

Filter # — Box #____

	Final Wt. gram	Initial Wt. gram	Net Wt. gram
#1 Imp.	Dry Wt = 82°F		
#2 Imp.	Wet Wt = 71°F		
#3 Imp.	____	____	____
#4 Imp.	____	____	____
#5 Imp.	____	____	____
#6 S.G.	____	____	____

Total H_2O Volume ____ g

Start Time 9:05
Stop Time 10:05
Barometric Pressure "Hg 29.75
Static Pres "H_2O +0.7
Production Rate ____

SAMPLING PARAMETERS

% Moisture ____
Meter Temp. ____
Stack Temp. ____
ΔH@ ____ Y ____
Pitot # Std Side # —
Cp 0.99
Nozzle Diameter ____ inch
D_1 ____ D_2 ____ D_3 ____

K Factor ____

% Moisture = 2.1 %

Sample Point	Elap Time Min.	Dry Gas Meter Reading Cu.Ft.	Pitot Reading Δ P " H_2O	Orifice Setting (Δ H) " H_2O Ideal	Orifice Setting (Δ H) " H_2O Actual	Gas Meter Temp °F In	Gas Meter Temp °F Out	Pump Vac. Gauge " Hg	Filter Box Temp °F	Imp. Exit Temp °F	Stack Temp °F	O_2 %
Duct Traverse	0		.08								80	
	10		.08								80	
	20		.80								81	
	30		.80								81	
	40		.80								81	
	50		.80								82	
	60											

$\sqrt{(\Delta P)^2}$ $\overline{\Delta H}$ T_m T_s

COAST - TO - COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

San Luis Obispo, CA • Goleta, CA • Benicia, CA • Camarillo, CA • Newport Beach, CA • Valparaiso, IN

San Luis Obispo Division
141 Suburban Road, San Luis Obispo, California 93401

(805) 543-2553
FAX (805) 543-2685

162

CLIENT: Angela Blaisdell
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : H-4394-1
Project : Parametrix @ Midway Landfill
Analyzed : 11/12/91
Analyzed by: EA
Method : GC/TCD

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Run 1 Inlet (flare #3) C#525	Air	K. Steven Macky	11/07/91	11/12/91

CONSTITUENT	(CAS RN)	*PQL PERCENT	RESULT PERCENT	NOTE
FIXED GASES AND METHANE				
Carbon Dioxide	(124389)	0.1	11.	
Oxygen	(7782447)	0.01	15.	
Nitrogen	(7727379)	0.02	65.	
Methane	(74828)	0.005	8.6	
Carbon Monoxide	(630080)	0.1	ND	

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

11/15/91
TCD/11129105
LRH/ge
HK12M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

COAST - TO - COAST ANALYTICAL SERVICES

Air, Water & Hazardous Waste Sampling, Analysis & Consultation
Certified Hazardous Waste, Chemistry, Bacteriology & Bioassay Laboratories

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163

CLIENT: Angela Blaisdell
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

QC Batch ID: HK12M1 H-4394-1
Project : Parametrix @ Midway Landfill
Analyzed : 11/12/91
Analyzed by: EA
Method : GC/TCD

QC DUPLICATE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Run 1 Inlet (flare #3) C#525	Air	K. Steven Macky	11/07/91	11/12/91

CONSTITUENT	(CAS RN)	*PQL PERCENT	RESULT PERCENT	%DIFF	NOTE
FIXED GASES AND METHANE					
Carbon Dioxide	(124389)	0.1	11.	0.	
Oxygen	(7782447)	0.01	15.	0.	
Nitrogen	(7727379)	0.02	65.	0.	
Methane	(74828)	0.005	8.7	1.2	
Carbon Monoxide	(630080)	0.1	ND		

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

11/15/91
TCD/11129106
LRH/ge
H4394-1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

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164

CLIENT: Angela Blaisdell
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : H-4394-2
Project : Parametrix @ Midway Landfill
Analyzed : 11/12/91
Analyzed by: EA
Method : GC/TCD

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Run 2 Inlet (flare #3) C#522	Air	K. Steven Macky	11/07/91	11/12/91

CONSTITUENT	(CAS RN)	*PQL PERCENT	RESULT PERCENT	NOTE
FIXED GASES AND METHANE				
Carbon Dioxide	(124389)	0.1	10.	
Oxygen	(7782447)	0.01	15.	
Nitrogen	(7727379)	0.02	66.	
Methane	(74828)	0.005	8.6	
Carbon Monoxide	(630080)	0.1	ND	

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

11/15/91
TCD/11129104
LRH/ge
HK12TA

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

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Vice President

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165

CLIENT: Angela Blaisdell
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : H-4394-3
Project : Parametrix @ Midway Landfill
Analyzed : 11/12/91
Analyzed by: EA
Method : GC/TCD

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Run 3 Inlet (flare #3) C#529	Air	K. Steven Macky	11/08/91	11/12/91

CONSTITUENT	(CAS RN)	*PQL PERCENT	RESULT PERCENT	NOTE
FIXED GASES AND METHANE				
Carbon Dioxide	(124389)	0.1	10.	
Oxygen	(7782447)	0.01	16.	
Nitrogen	(7727379)	0.02	66.	
Methane	(74828)	0.005	8.	
Carbon Monoxide	(630080)	0.1	ND	

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

11/15/91
TCD/11129103
LRH/ge
HK12TA

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

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166

QC Batch ID: HK12M1

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 11/12/91
Analyzed by: GD
Method : GC/TCD

QC SPIKE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
QC SPIKE	Air			

CONSTITUENT	*PQL PERCENT	SPIKE AMOUNT	RESULT PERCENT	%REC	NOTE
FIXED GASES AND METHANE					
Carbon Dioxide	0.1	15.	15.	100.	
Oxygen	0.01	7.1	7.1	100.	
Nitrogen	0.02	66.	66.	100.	
Methane	0.005	4.6	4.8	104.	
Carbon Monoxide	0.1	7.1	7.1	100.	

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

11/15/91
TCD/11129107
LRH/ge
H4394-1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

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Vice President

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167

CLIENT: Angela Blaisdell
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : H-4394-1
Project : Parametrix @ Midway Landfill
Analyzed : 11/12/91
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
Run 1 Inlet (flare #3) C#525	Air	K. Steven Macky	11/07/91	11/12/91

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT ug/cu M	NOTE
VOLATILE ORGANICS BY EPA TO-14				1
Acetone	20.	70.	170.	
Benzene	2.	160.	550.	
Bromodichloromethane	2.	ND	ND	
Bromomethane (Methyl Bromide)	5.	ND	ND	
Bromoform	2.	ND	ND	
1,3-Butadiene	2.	ND	ND	
2-Butanone (MEK)	2.	ND	ND	
Carbon Disulfide	5.	ND	ND	
Carbon Tetrachloride	2.	ND	ND	
Chlorobenzene	2.	140.	680.	
Chloroethane (Ethyl Chloride)	2.	31.	89.	
2-Chloroethyl Vinyl Ether	20.	ND	ND	
Chloroform	2.	ND	ND	
Chloromethane (Methyl Chloride)	2.	40.	90.	
Dibromochloromethane	2.	ND	ND	
1,2-Dibromoethane (EDB)	2.	ND	ND	
1,2-Dichlorobenzene	2.	20.	130.	
1,3-Dichlorobenzene	2.	ND	ND	
1,4-Dichlorobenzene	2.	56.	370.	
1,1-Dichloroethane	2.	21.	91.	
1,2-Dichloroethane (EDC)	2.	ND	ND	

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) Canister received at 0 psig and pressurized to 29 psig with He.

11/15/91
MSD1/1LO5D
LRH/ge
HK12M1

COAST - TO - COAST ANALYTICAL SERVICES

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168

CLIENT: Angela Blaisdell
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : H-4394-1
Project : Parametrix @ Midway Landfill
Analyzed : 11/12/91
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Run 1 Inlet (flare #3) C#525	Air	K. Steven Macky	11/07/91	11/12/91

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT ug/cu M	NOTE
1,1-Dichloroethene	2.	ND	ND	
cis-1,2-Dichloroethene	2.	72.	310.	
trans-1,2-Dichloroethene	2.	ND	ND	
Dichloromethane	20.	ND	ND	
1,2-Dichloropropane	2.	ND	ND	
cis-1,3-Dichloropropene	2.	ND	ND	
trans-1,3-Dichloropropene	2.	ND	ND	
Ethylbenzene	5.	1700.	8000.	
2-Hexanone	2.	ND	ND	
4-Methyl-2-Pentanone (MIBK)	2.	ND	ND	
Styrene	5.	ND	ND	
1,1,2,2-Tetrachloroethane	2.	ND	ND	
Tetrachloroethene (PCE)	2.	ND	ND	
Toluene	5.	560.	2300.	
1,1,1-Trichloroethane (TCA)	2.	ND	ND	
1,1,2-Trichloroethane	2.	ND	ND	
Trichloroethene (TCE)	2.	10.	58.	
Trichlorofluoromethane (F-11)	2.	ND	ND	
Trichlorotrifluoroethane (F-113)	5.	ND	ND	
Vinyl Acetate	20.	ND	ND	
Vinyl Chloride	5.	290.	800.	
Xylenes, Total	5.	1800.	8400.	
Percent Surrogate Recovery			103.	

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

11/15/91
MSD1/1L05D
LRH/ge
HK12M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

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169

CLIENT: Angela Blaisdell
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : H-4394-2
Project : Parametrix @ Midway Landfill
Analyzed : 11/12/91
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Run 2 Inlet (flare #3) C#522	Air	K. Steven Macky	11/07/91	11/12/91

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT ug/cu M	NOTE
VOLATILE ORGANICS BY EPA TO-14				1
Acetone	20.	80.	210.	
Benzene	2.	120.	430.	
Bromodichloromethane	2.	ND	ND	
Bromomethane (Methyl Bromide)	5.	ND	ND	
Bromoform	2.	ND	ND	
1,3-Butadiene	2.	ND	ND	
2-Butanone (MEK)	2.	ND	ND	
Carbon Disulfide	5.	ND	ND	
Carbon Tetrachloride	2.	ND	ND	
Chlorobenzene	2.	110.	560.	
Chloroethane (Ethyl Chloride)	2.	28.	81.	
2-Chloroethyl Vinyl Ether	20.	ND	ND	
Chloroform	2.	ND	ND	
Chloromethane (Methyl Chloride)	2.	38.	86.	
Dibromochloromethane	2.	ND	ND	
1,2-Dibromoethane (EDB)	2.	ND	ND	
1,2-Dichlorobenzene	2.	14.	89.	
1,3-Dichlorobenzene	2.	ND	ND	
1,4-Dichlorobenzene	2.	38.	250.	
1,1-Dichloroethane	2.	18.	80.	
1,2-Dichloroethane (EDC)	2.	ND	ND	

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) Canister received at 0 psig and pressurized to 30 psig with He.

11/15/91
MSD1/1LO4D
LRH/ge
HK12M1

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170

CLIENT: Angela Blaisdell
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : H-4394-2
Project : Parametrix @ Midway Landfill
Analyzed : 11/12/91
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Run 2 Inlet (flare #3) C#522	Air	K. Steven Macky	11/07/91	11/12/91

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT ug/cu M	NOTE
1,1-Dichloroethene	2.	ND	ND	
cis-1,2-Dichloroethene	2.	58.	250.	
trans-1,2-Dichloroethene	2.	ND	ND	
Dichloromethane	20.	ND	ND	
1,2-Dichloropropane	2.	ND	ND	
cis-1,3-Dichloropropene	2.	ND	ND	
trans-1,3-Dichloropropene	2.	ND	ND	
Ethylbenzene	5.	1400.	6700.	
2-Hexanone	2.	ND	ND	
4-Methyl-2-Pentanone (MIBK)	2.	ND	ND	
Styrene	5.	ND	ND	
1,1,2,2-Tetrachloroethane	2.	ND	ND	
Tetrachloroethene (PCE)	2.	ND	ND	
Toluene	5.	440.	1800.	
1,1,1-Trichloroethane (TCA)	2.	ND	ND	
1,1,2-Trichloroethane	2.	ND	ND	
Trichloroethene (TCE)	2.	11.	62.	
Trichlorofluoromethane (F-11)	2.	ND	ND	
Trichlorotrifluoroethane (F-113)	5.	ND	ND	
Vinyl Acetate	20.	ND	ND	
Vinyl Chloride	5.	240.	680.	
Xylenes, Total	5.	1400.	6800.	
Percent Surrogate Recovery			110.	

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

11/15/91
MSD1/1LO4D
LRH/ge
HK12M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

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171

CLIENT: Angela Blaisdell
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : H-4394-3
Project : Parametrix @ Midway Landfill
Analyzed : 11/12/91
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Run 3 Inlet (flare #3) C#529	Air	K. Steven Macky	11/08/91	11/12/91

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT ug/cu M	NOTE
VOLATILE ORGANICS BY EPA TO-14				1
Acetone	20.	100.	260.	
Benzene	2.	130.	450.	
Bromodichloromethane	2.	ND	ND	
Bromomethane (Methyl Bromide)	5.	ND	ND	
Bromoform	2.	ND	ND	
1,3-Butadiene	2.	ND	ND	
2-Butanone (MEK)	2.	ND	ND	
Carbon Disulfide	5.	ND	ND	
Carbon Tetrachloride	2.	ND	ND	
Chlorobenzene	2.	120.	610.	
Chloroethane (Ethyl Chloride)	2.	32.	91.	
2-Chloroethyl Vinyl Ether	20.	ND	ND	
Chloroform	2.	ND	ND	
Chloromethane (Methyl Chloride)	2.	44.	99.	
Dibromochloromethane	2.	ND	ND	
1,2-Dibromoethane (EDB)	2.	ND	ND	
1,2-Dichlorobenzene	2.	14.	90.	
1,3-Dichlorobenzene	2.	ND	ND	
1,4-Dichlorobenzene	2.	38.	250.	
1,1-Dichloroethane	2.	21.	92.	
1,2-Dichloroethane (EDC)	2.	ND	ND	

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) Canister received at 0 psig and pressurized to 23 psig with He.

11/15/91
MSD1/1LO3D
LRH/ge
HK12M1

COAST - TO - COAST ANALYTICAL SERVICES

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172

CLIENT: Angela Blaisdell
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : H-4394-3
Project : Parametrix @ Midway Landfill
Analyzed : 11/12/91
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
Run 3 Inlet (flare #3) C#529	Air	K. Steven Macky	11/08/91	11/12/91

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT ug/cu M	NOTE
1,1-Dichloroethene	2.	ND	ND	
cis-1,2-Dichloroethene	2.	67.	290.	
trans-1,2-Dichloroethene	2.	ND	ND	
Dichloromethane	20.	ND	ND	
1,2-Dichloropropane	2.	ND	ND	
cis-1,3-Dichloropropene	2.	ND	ND	
trans-1,3-Dichloropropene	2.	ND	ND	
Ethylbenzene	5.	1700.	8100.	
2-Hexanone	2.	ND	ND	
4-Methyl-2-Pentanone (MIBK)	2.	ND	ND	
Styrene	5.	ND	ND	
1,1,2,2-Tetrachloroethane	2.	ND	ND	
Tetrachloroethene (PCE)	2.	ND	ND	
Toluene	5.	510.	2100.	
1,1,1-Trichloroethane (TCA)	2.	ND	ND	
1,1,2-Trichloroethane	2.	ND	ND	
Trichloroethene (TCE)	2.	11.	63.	
Trichlorofluoromethane (F-11)	2.	ND	ND	
Trichlorotrifluoroethane (F-113)	5.	ND	ND	
Vinyl Acetate	20.	ND	ND	
Vinyl Chloride	5.	290.	820.	
Xylenes, Total	5.	1700.	8200.	
Percent Surrogate Recovery			122.	

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

11/15/91
MSD1/1LO3D
LRH/ge
HK12M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

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Vice President

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173

CLIENT: Angela Blaisdell
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : H-4394-4
Project : Parametrix @ Midway Landfill
Analyzed : 11/12/91
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Run 1 Outlet (flare #3) C#405	Air	K. Steven Macky	11/07/91	11/12/91

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT ug/cu M	NOTE
VOLATILE ORGANICS BY EPA TO-14				1
Acetone	1.	29.	75.	
Benzene	0.1	1.	3.5	
Bromodichloromethane	0.1	ND	ND	
Bromomethane (Methyl Bromide)	0.2	ND	ND	
Bromoform	0.1	ND	ND	
1,3-Butadiene	0.1	ND	ND	
2-Butanone (MEK)	0.2	ND	ND	
Carbon Disulfide	0.2	ND	ND	
Carbon Tetrachloride	0.1	ND	ND	
Chlorobenzene	0.1	ND	ND	
Chloroethane (Ethyl Chloride)	0.2	ND	ND	
2-Chloroethyl Vinyl Ether	1.	ND	ND	
Chloroform	0.1	ND	ND	
Chloromethane (Methyl Chloride)	0.1	ND	ND	
Dibromochloromethane	0.1	ND	ND	
1,2-Dibromoethane (EDB)	0.1	ND	ND	
1,2-Dichlorobenzene	0.2	ND	ND	
1,3-Dichlorobenzene	0.2	ND	ND	
1,4-Dichlorobenzene	0.2	ND	ND	
1,1-Dichloroethane	0.1	ND	ND	
1,2-Dichloroethane (EDC)	0.1	ND	ND	

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) Canister received at 0 psig and pressurized to 23 psig with He.

11/15/91
MSD1/1L02D
LRH/ge
HK12M1

COAST · TO · COAST ANALYTICAL SERVICES

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174

CLIENT: Angela Blaisdell
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : H-4394-4
Project : Parametrix @ Midway Landfill
Analyzed : 11/12/91
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Run 1 Outlet (flare #3) C#405	Air	K. Steven Macky	11/07/91	11/12/91

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT ug/cu M	NOTE
1,1-Dichloroethene	0.1	ND	ND	
cis-1,2-Dichloroethene	0.1	ND	ND	
trans-1,2-Dichloroethene	0.1	ND	ND	
Dichloromethane	1.	ND	ND	
1,2-Dichloropropane	0.1	ND	ND	
cis-1,3-Dichloropropene	0.1	ND	ND	
trans-1,3-Dichloropropene	0.1	ND	ND	
Ethylbenzene	0.2	ND	ND	
2-Hexanone	0.1	ND	ND	
4-Methyl-2-Pentanone (MIBK)	0.1	ND	ND	
Styrene	0.2	ND	ND	
1,1,2,2-Tetrachloroethane	0.1	ND	ND	
Tetrachloroethene (PCE)	0.1	ND	ND	
Toluene	0.2	1.6	6.7	
1,1,1-Trichloroethane (TCA)	0.2	0.6	3.8	
1,1,2-Trichloroethane	0.2	ND	ND	
Trichloroethene (TCE)	0.1	0.38	2.2	
Trichlorofluoromethane (F-11)	0.2	ND	ND	
Trichlorotrifluoroethane (F-113)	0.2	10.	85.	
Vinyl Acetate	1.	ND	ND	
Vinyl Chloride	0.2	ND	ND	
Xylenes, Total	0.2	1.6	7.4	
Percent Surrogate Recovery			118.	

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

11/15/91
MSD1/1LO2D
LRH/ge
HK12M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

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175

CLIENT: Angela Blaisdell
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : H-4394-5
Project : Parametrix @ Midway Landfill
Analyzed : 11/12/91
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Run 2 Outlet (flare #3) C#417	Air	K. Steven Macky	11/07/91	11/12/91

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT ug/cu M	NOTE
VOLATILE ORGANICS BY EPA TO-14				1
Acetone	1.	16.	41.	
Benzene	0.1	0.7	2.4	
Bromodichloromethane	0.1	ND	ND	
Bromomethane (Methyl Bromide)	0.2	ND	ND	
Bromoform	0.1	ND	ND	
1,3-Butadiene	0.1	ND	ND	
2-Butanone (MEK)	0.2	ND	ND	
Carbon Disulfide	0.2	ND	ND	
Carbon Tetrachloride	0.1	ND	ND	
Chlorobenzene	0.1	ND	ND	
Chloroethane (Ethyl Chloride)	0.2	ND	ND	
2-Chloroethyl Vinyl Ether	1.	ND	ND	
Chloroform	0.1	ND	ND	
Chloromethane (Methyl Chloride)	0.1	ND	ND	
Dibromochloromethane	0.1	ND	ND	
1,2-Dibromoethane (EDB)	0.1	ND	ND	
1,2-Dichlorobenzene	0.2	ND	ND	
1,3-Dichlorobenzene	0.2	ND	ND	
1,4-Dichlorobenzene	0.2	ND	ND	
1,1-Dichloroethane	0.1	ND	ND	
1,2-Dichloroethane (EDC)	0.1	ND	ND	

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*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) Canister received at 0 psig and pressurized to 23 psig with He.

11/15/91
MSD1/1LO1D
LRH/ge
HK12M1

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176

CLIENT: Angela Blaisdell
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : H-4394-5
Project : Parametrix @ Midway Landfill
Analyzed : 11/12/91
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Run 2 Outlet (flare #3) C#417	Air	K. Steven Macky	11/07/91	11/12/91

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT ug/cu M	NOTE
1,1-Dichloroethene	0.1	ND	ND	
cis-1,2-Dichloroethene	0.1	ND	ND	
trans-1,2-Dichloroethene	0.1	ND	ND	
Dichloromethane	1.	ND	ND	
1,2-Dichloropropane	0.1	ND	ND	
cis-1,3-Dichloropropene	0.1	ND	ND	
trans-1,3-Dichloropropene	0.1	ND	ND	
Ethylbenzene	0.2	ND	ND	
2-Hexanone	0.1	ND	ND	
4-Methyl-2-Pentanone (MIBK)	0.1	ND	ND	
Styrene	0.2	ND	ND	
1,1,2,2-Tetrachloroethane	0.1	ND	ND	
Tetrachloroethene (PCE)	0.1	ND	ND	
Toluene	0.2	0.7	3.	
1,1,1-Trichloroethane (TCA)	0.2	1.	6.1	
1,1,2-Trichloroethane	0.2	ND	ND	
Trichloroethene (TCE)	0.1	0.24	1.4	
Trichlorofluoromethane (F-11)	0.2	ND	ND	
Trichlorotrifluoroethane (F-113)	0.2	50.	420.	
Vinyl Acetate	1.	ND	ND	
Vinyl Chloride	0.2	ND	ND	
Xylenes, Total	0.2	0.7	3.5	
Percent Surrogate Recovery			101.	

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

11/15/91
MSD1/1L01D
LRH/ge
HK12M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

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177

CLIENT: Angela Blaisdell
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : H-4394-6
Project : Parametrix @ Midway Landfill
Analyzed : 11/12/91
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED	DATE RECEIVED
Run 3 Outlet (flare #3) C#407	Air	K. Steven Macky	11/08/91	11/12/91

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT ug/cu M	NOTE
VOLATILE ORGANICS BY EPA TO-14				1
Acetone	1.	6.	15.	
Benzene	0.1	0.5	1.6	
Bromodichloromethane	0.1	ND	ND	
Bromomethane (Methyl Bromide)	0.2	ND	ND	
Bromoform	0.1	ND	ND	
1,3-Butadiene	0.1	ND	ND	
2-Butanone (MEK)	0.2	ND	ND	
Carbon Disulfide	0.2	ND	ND	
Carbon Tetrachloride	0.1	ND	ND	
Chlorobenzene	0.1	ND	ND	
Chloroethane (Ethyl Chloride)	0.2	ND	ND	
2-Chloroethyl Vinyl Ether	1.	ND	ND	
Chloroform	0.1	ND	ND	
Chloromethane (Methyl Chloride)	0.1	ND	ND	
Dibromochloromethane	0.1	ND	ND	
1,2-Dibromoethane (EDB)	0.1	ND	ND	
1,2-Dichlorobenzene	0.2	ND	ND	
1,3-Dichlorobenzene	0.2	ND	ND	
1,4-Dichlorobenzene	0.2	ND	ND	
1,1-Dichloroethane	0.1	ND	ND	
1,2-Dichloroethane (EDC)	0.1	ND	ND	

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) Canister received at 0 psig and pressurized to 24 psig with He.

11/15/91
MSD1/1K99D
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HK12M1

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178

CLIENT: Angela Blaisdell
AMTest Inc.
30545 S. E. 84th Street #5
Preston, WA 98050

Lab Number : H-4394-6
Project : Parametrix @ Midway Landfill
Analyzed : 11/12/91
Analyzed by: EA
Method : EPA TO-14

REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE	RECEIVED
Run 3 Outlet (flare #3) C#407	Air	K. Steven Macky	11/08/91	11/12/91

CONSTITUENT	*PQL ppbv	RESULT ppbv	RESULT ug/cu M	NOTE
1,1-Dichloroethene	0.1	ND	ND	
cis-1,2-Dichloroethene	0.1	0.5	2.2	
trans-1,2-Dichloroethene	0.1	ND	ND	
Dichloromethane	1.	ND	ND	
1,2-Dichloropropane	0.1	ND	ND	
cis-1,3-Dichloropropene	0.1	ND	ND	
trans-1,3-Dichloropropene	0.1	ND	ND	
Ethylbenzene	0.2	ND	ND	
2-Hexanone	0.1	ND	ND	
4-Methyl-2-Pentanone (MIBK)	0.1	ND	ND	
Styrene	0.2	ND	ND	
1,1,2,2-Tetrachloroethane	0.1	ND	ND	
Tetrachloroethene (PCE)	0.1	ND	ND	
Toluene	0.2	1.3	5.3	
1,1,1-Trichloroethane (TCA)	0.2	ND	ND	
1,1,2-Trichloroethane	0.2	ND	ND	
Trichloroethene (TCE)	0.1	0.72	4.2	
Trichlorofluoromethane (F-11)	0.2	ND	ND	
Trichlorotrifluoroethane (F-113)	0.2	6.9	58.	
Vinyl Acetate	1.	ND	ND	
Vinyl Chloride	0.2	ND	ND	
Xylenes, Total	0.2	3.8	18.	
Percent Surrogate Recovery			105.	

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

11/15/91
MSD1/1K99D
LRH/ge
HK12M1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

Gesheng Dai, Ph.D., Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

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179

QC Batch ID: HK12M1

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 11/12/91
Analyzed by: CR
Method : EPA TO-14

INSTRUMENT BLANK
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED
INSTRUMENT BLANK	Air		

CONSTITUENT	(CAS RN)	*PQL µg/cu M	RESULT µg/cu M	NOTE
VOLATILE ORGANICS BY EPA TO-14				
Acetone	(67641)	3.	ND	
Benzene	(71432)	0.5	ND	
Bromodichloromethane	(75274)	1.	ND	
Bromomethane (Methyl Bromide)	(74839)	1.	ND	
Bromoform	(75252)	1.	ND	
1,3-Butadiene	(106990)	0.2	ND	
2-Butanone (MEK)	(78933)	.5	ND	
Carbon Disulfide	(75150)	1.	ND	
Carbon Tetrachloride	(56235)	1.	ND	
Chlorobenzene	(108907)	0.5	ND	
Chloroethane (Ethyl Chloride)	(75003)	0.5	ND	
2-Chloroethyl Vinyl Ether	(110758)	5.	ND	
Chloroform	(67663)	0.5	ND	
Chloromethane (Methyl Chloride)	(74873)	0.2	ND	
Dibromochloromethane	(124381)	1.	ND	
1,2-Dibromoethane (EDB)	(106934)	1.	ND	
1,2-Dichlorobenzene	(95501)	1.	ND	
1,3-Dichlorobenzene	(541731)	1.	ND	
1,4-Dichlorobenzene	(106467)	1.	ND	
1,1-Dichloroethane	(75343)	0.5	ND	
1,2-Dichloroethane (EDC)	(107062)	0.5	ND	
1,1-Dichloroethene	(75354)	0.5	ND	

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

11/15/91
MSD1/1K84D
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180

QC Batch ID: HK12M1

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 11/12/91
Analyzed by: CR
Method : EPA TO-14

INSTRUMENT BLANK
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED
INSTRUMENT BLANK	Air		

CONSTITUENT	(CAS RN)	*PQL µg/cu M	RESULT µg/cu M	NOTE
cis-1,2-Dichloroethene	(156694)	0.5	ND	
trans-1,2-Dichloroethene	(156605)	0.5	ND	
Dichloromethane	(75092)	5.	ND	
1,2-Dichloropropane	(78875)	0.5	ND	
cis-1,3-Dichloropropene	(10061015)	0.5	ND	
trans-1,3-Dichloropropene	(10061026)	0.5	ND	
Ethylbenzene	(100411)	1.	ND	
2-Hexanone	(591786)	0.5	ND	
4-Methyl-2-Pentanone (MIBK)	(108101)	0.5	ND	
Styrene	(100425)	1.	ND	
1,1,2,2-Tetrachloroethane	(79345)	1.	ND	
Tetrachloroethene (PCE)	(127184)	1.	ND	
Toluene	(108883)	1.	ND	
1,1,1-Trichloroethane (TCA)	(71556)	1.	ND	
1,1,2-Trichloroethane	(79005)	1.	ND	
Trichloroethene (TCE)	(79016)	0.5	ND	
Trichlorofluoromethane (F-11)	(75694)	1.	ND	
Trichlorotrifluoroethane (F-113)	(76131)	2.	ND	
Vinyl Acetate	(108054)	5.	ND	
Vinyl Chloride	(75014)	0.5	ND	
Xylenes, Total		1.	ND	
Percent Surrogate Recovery			110.	

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

11/15/91
MSD1/1K84D
LRH/ge
H4391-1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

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181

QC Batch ID: HK12M1

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 11/12/91
Analyzed by: EA
Method : EPA TO-14

QC SPIKE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED
QC SPIKE	Air		

CONSTITUENT	*PQL µg/cu M	SPIKE AMOUNT	RESULT µg/cu M	%REC	NOTE
VOLATILE ORGANICS BY EPA TO-14					1
Acetone	3.		NS		
Benzene	0.5	17.	21.	124.	
Bromodichloromethane	1.		NS		
Bromomethane (Methyl Bromide)	1.		NS		
Bromoform	1.		NS		
1,3-Butadiene	0.2		NS		
2-Butanone (MEK)	.5		NS		
Carbon Disulfide	1.		NS		
Carbon Tetrachloride	1.	34.	33.	97.	
Chlorobenzene	0.5	25.	23.	92.	
Chloroethane (Ethyl Chloride)	0.5		NS		
2-Chloroethyl Vinyl Ether	5.		NS		
Chloroform	0.5	27.	27.	100.	
Chloromethane (Methyl Chloride)	0.2		NS		
Dibromochloromethane	1.		NS		
1,2-Dibromoethane (EDB)	1.	40.	33.	83.	
1,2-Dichlorobenzene	1.		NS		
1,3-Dichlorobenzene	1.		NS		
1,4-Dichlorobenzene	1.		NS		
1,1-Dichloroethane	0.5		NS		
1,2-Dichloroethane (EDC)	0.5	22.	20.	91.	

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* RESULTS listed as 'NS' were not spiked. PQL = Practical Quantitation Limit
(1) Zero Air spiked with NIST SRM 1804.

11/15/91
MSD1/1LO6D
LRH/ge
H4391-1

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182

QC Batch ID: HK12M1

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 11/12/91
Analyzed by: EA
Method : EPA TO-14

QC SPIKE
REPORT OF ANALYTICAL RESULTS

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED
QC SPIKE	Air		

CONSTITUENT	*PQL µg/cu M	SPIKE AMOUNT	RESULT µg/cu M	%REC	NOTE
1,1-Dichloroethene	0.5		NS		
cis-1,2-Dichloroethene	0.5		NS		
trans-1,2-Dichloroethene	0.5		NS		
Dichloromethane	5.	19.	19.	100.	
1,2-Dichloropropane	0.5	25.	26.	104.	
cis-1,3-Dichloropropene	0.5		NS		
trans-1,3-Dichloropropene	0.5		NS		
Ethylbenzene	1.	22.	18.	82.	
2-Hexanone	0.5		NS		
4-Methyl-2-Pentanone (MIBK)	0.5		NS		
Styrene	1.		NS		
1,1,2,2-Tetrachloroethane	1.		NS		
Tetrachloroethene (PCE)	1.	37.	38.	103.	
Toluene	1.	20.	21.	105.	
1,1,1-Trichloroethane (TCA)	1.	30.	30.	100.	
1,1,2-Trichloroethane	1.		NS		
Trichloroethene (TCE)	0.5	29.	26.	90.	
Trichlorofluoromethane (F-11)	1.		NS		
Trichlorotrifluoroethane (F-113)	2.		NS		
Vinyl Acetate	5.		NS		
Vinyl Chloride	0.5	15.	15.	100.	
Xylenes, Total	1.	24.	19.	79.	
Percent Surrogate Recovery			127.		

San Luis Obispo Division is certified by CA Department of Health Services: ELAP #1598
* RESULTS listed as 'NS' were not spiked. PQL = Practical Quantitation Limit

11/15/91
MSD1/1L06D
LRH/ge
H4391-1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai

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Chain of Custod

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Client: Am Test - Air Quality Inc	Contact: Angela BLAISDELL	Phone # (206) 222-7746	FAX # (206) 222-784
Address: 30545 S.E. 84th #5	City: Preston	State: WA 98045	Zip
Project Name/Number: Parametrix @ Midway Landfill		Project MGR	
Bill (If different than above)	Address		
Sampler (Print and sign): K. Steven Macky	K. Steven Macky	Due Date	Circle for RUSH*
Copies To: Am Test - Air Quality Inc	Auth. Init.		

* Subject to Availability

Sample Description	Date/Time Coll'd	*Matrix	# of Containers	Pres.	Filt. y/n	Analysis	Remarks	Lab ID #
Run1 Inlet (Flare#3)	11/7/91 1910	A/G	1			VOC's as per TO-14 ; Fixed Gases	Tank# 525	H4394
Run2 Inlet	11/7/91 1310	A/G	1			VOC's as per TO-14 ; Fixed Gases	Tank #522	
Run3 Inlet	11/8/91 905	A/G	1			VOC's as per TO-14 ; Fixed Gases	Tank #529	
Run1 Outlet	11/7/91 1910	A/G	1			VOC's by TO-14	Tank #405	
Run2 Outlet	11/7/91 1310	A/G	1			VOC's by TO-14	Tank #417	
Run3 Outlet	11/8/91 905	A/G	1			VOC's by TO-14	Tank #407	

Relinquished By	Date/Time	Received By	Relinquished By	Date/Time	Received By
Steve Macky	11/8/91 3:00PM				

Shipping Method	Shipping #	Received By	Date/Time	Condition (See Remarks) Cold	Sealed	Intact
		NEDA NOORAFSHANI	11-12-91 1130		Y	Y

REMARKS

* Matrix:
DW - Drinking Water
WW - Wastewater
GW - Groundwater
SW - Surface Water
IM - Impinger
FI - Filter
FP - Free Product
A/G - Air/Gas
SL - Sludge/Soil/Solid
OT - Other

183

FOR LAB USE ONLY

ORIGINAL

CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: [illegible]
SITE ADDRESS: Madison Landfill
Milwaukee WA
SAMPLING DATE: 11/7/91

SHIPPING DATE:
CANISTER SERIAL NO. 525
SAMPLER ID: RUN 1 Inlet (Flare #3)
OPERATOR: KSM/GAW
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START		56°F	X	X
STOP		56°F		

PRESSURE

CANISTER PRESSURE	
	-29.5" Hg
X	

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	11:10	
STOP	12:10	

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT
	~100 ml/min	
	↓	

SAMPLING SYSTEM CERTIFICATION DATE:
QUARTERLY RECERTIFICATION DATE:

C. LABORATORY INFORMATION

DATE RECEIVED:
RECEIVED BY:
INITIAL PRESSURE:
FINAL PRESSURE:
DILUTION FACTOR:
ANALYSIS
GC-FID-ECD DATE:
GC-MSD-SCAN DATE:
GC-MSD-SIM DATE:
RESULTS :

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

SIGNATURE/TITLE

185

CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: Paramount Gas
SITE ADDRESS: Midway Landfill
Midway, WA
SAMPLING DATE: 11/7/91

SHIPPING DATE:
CANISTER SERIAL NO. 522
SAMPLER ID: RUN 2 Inlet (Flare #3)
OPERATOR: KSM/GAW
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START		59	X	X
STOP		59		

PRESSURE

CANISTER PRESSURE	
	-29.5" Hg
X	

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	1310	
STOP	1410	

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT
	~100 ml/min	
	↓	

SAMPLING SYSTEM CERTIFICATION DATE:
QUARTERLY RECERTIFICATION DATE:

C. LABORATORY INFORMATION

DATE RECEIVED:
RECEIVED BY:
INITIAL PRESSURE:
FINAL PRESSURE:
DILUTION FACTOR:
ANALYSIS
GC-FID-ECD DATE:
GC-MSD-SCAN DATE:
GC-MSD-SIM DATE:
RESULTS :

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

SIGNATURE/TITLE

186

CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: Paramount Midway Landfill
SITE ADDRESS: Midway, WA

SAMPLING DATE: 11/8/91

SHIPPING DATE:
CANISTER SERIAL NO. 529
SAMPLER ID: RVM 3 Inlet
OPERATOR: GAW
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START		50°F	X	X
STOP		50°F		

PRESSURE

CANISTER PRESSURE	
	-29.5" Hg
X	

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	9:05	
STOP	10:05	

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT
	~100 mL/MM	
	↓	

SAMPLING SYSTEM CERTIFICATION DATE:
QUARTERLY RECERTIFICATION DATE:

C. LABORATORY INFORMATION

DATE RECEIVED:
RECEIVED BY:
INITIAL PRESSURE:
FINAL PRESSURE:
DILUTION FACTOR:
ANALYSIS
- GC-FID-ECD DATE:
- GC-MSD-SCAN DATE:
- GC-MSD-SIM DATE:

RESULTS :

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

SIGNATURE/TITLE

CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: Roosevelt Landfill
SITE ADDRESS: Midway Landfill
Midway, WA
SAMPLING DATE: 11/7/01

SHIPPING DATE:
CANISTER SERIAL NO. 405
SAMPLER ID: RUN 1 Outlet (Flare #3)
OPERATOR: KSM
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START		56°F	X	X
STOP		56°F		

PRESSURE

CANISTER PRESSURE	
	-29.5" Hg
X	

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	11:10	
STOP	12:10	

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT
	~100 mL/min	
	↓	

SAMPLING SYSTEM CERTIFICATION DATE:
QUARTERLY RECERTIFICATION DATE:

C. LABORATORY INFORMATION

DATE RECEIVED:
RECEIVED BY:
INITIAL PRESSURE:
FINAL PRESSURE:
DILUTION FACTOR:
ANALYSIS
GC-FID-ECD DATE:
GC-MSD-SCAN DATE:
GC-MSD-SIM DATE:
RESULTS :

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

SIGNATURE/TITLE

CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: Parametrix @
SITE ADDRESS: Midway Landfill
Midway, WA
SAMPLING DATE: 11/7/91

SHIPPING DATE:
CANISTER SERIAL NO. 417
SAMPLER ID: RUN 2 Outlet (Hare #3)
OPERATOR: MSM
CANISTER LEAK CHECK DATE:

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START		59	X	X
STOP		59		

PRESSURE

CANISTER PRESSURE	
	-29.5
X	

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	1310	
STOP	1410	

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT
	~100 mL/min	
	↓	

SAMPLING SYSTEM CERTIFICATION DATE:
QUARTERLY RECERTIFICATION DATE:

C. LABORATORY INFORMATION

DATE RECEIVED:
RECEIVED BY:
INITIAL PRESSURE:
FINAL PRESSURE:
DILUTION FACTOR:
ANALYSIS
GC-FID-ECD DATE:
GC-MSD-SCAN DATE:
GC-MSD-SIM DATE:
RESULTS :

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

SIGNATURE/TITLE

189

CANISTER SAMPLING FIELD DATA SHEET

A. GENERAL INFORMATION

SITE LOCATION: Parametrix @
SITE ADDRESS: Midway Landfill
Midway, WA
SAMPLING DATE: 11/8/01

SHIPPING DATE: _____
CANISTER SERIAL NO. 407
SAMPLER ID: Run 3 Outlet
OPERATOR: KSM
CANISTER LEAK CHECK DATE: _____

B. SAMPLING INFORMATION

TEMPERATURE

	INTERIOR	AMBIENT	MAXIMUM	MINIMUM
START		50°F	X	X
STOP		50°F		

PRESSURE

CANISTER PRESSURE	
	-29.5" H_g
X	✓

SAMPLING TIMES

	LOCAL TIME	ELAPSED TIME METER READING
START	905	
STOP	10:05	

FLOW RATES

MANIFOLD FLOW RATE	CANISTER FLOW RATE	FLOW CONTROLLER READOUT
	~100 inHg/min	
	↓	

SAMPLING SYSTEM CERTIFICATION DATE: _____
QUARTERLY RECERTIFICATION DATE: _____

C. LABORATORY INFORMATION

DATE RECEIVED: _____
RECEIVED BY: _____
INITIAL PRESSURE: _____
FINAL PRESSURE: _____
DILUTION FACTOR: _____
ANALYSIS
GC-FID-ECD DATE: _____
GC-MSD-SCAN DATE: _____
GC-MSD-SIM DATE: _____
RESULTS : _____

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

_____
SIGNATURE/TITLE