HORIZON

AIR MEASUREMENT SERVICES, INC.

Horizon Test #W07-036-FRA
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Report Date: October 21, 2003
Revision Number: 0

RESULTS OF THE BIENNIAL CRITERIA SOURCE TEST ON THE SIMI VALLEY LANDFILL FLARE NO. 1 (McGill)

VCAPCD Permit to Operate #1395

Prepared for:

Simi Valley Landfill and Recycling Center
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Prepared by:

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HORIZON

R MEASUREMENT SERVICES, INC.

October 21, 2003

Mr. Jim Riley
Simi Valley Landfill and Recycling Center
2801 Madera Road
Simi Valley, California 93065

Dear Mr. Riley:

Please find enclosed four copies of the final report entitled "Results of the Biennial Criteria Source Test on the Simi Valley Landfill Flare No. 1 (McGill)."

If you have any questions, please call me at (805) 498-8781.

Sincerely,

HORIZON AIR MEASUREMENT SERVICES, INC.

Scott H. Bunch
Project Manager

SB:lmg

Enclosures

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1. INTRODUCTION

Under the requirements of Ventura County Air Pollution Control District (VCAPCD) Permit to Operate #1395, Simi Valley Landfill and Recycling Center (SVLRC) is required to conduct a biennial source test on the landfill gas flare located at the landfill to determine emissions of criteria pollutants. Horizon Air Measurement Services, Inc. (Horizon) had been retained for this purpose.

All testing/analytical procedures conformed to the Source Test Protocol (Horizon # W07-036-TP) of August 2003. Sampling and analytical procedures utilized in the testing program are provided, in detail, in Section 4 of this report. All testing was completed on September 18, 2003.

The criteria pollutants and associated emission parameters tested for and the associated Permit limits are provided in Table 1-1. The destruction efficiency of the flare with respect to ROC was also determined as well as the landfill gas heating value, composition and C_1 to C_3 reduced sulfur compound (including H_2S) concentration. Three replicate test runs were completed for each parameter of interest.

A summary of the criteria emissions results and the associated Permit limits are provided in Section 2. A more detailed description and discussion of the criteria pollutants results and air toxics are provided in Section 5. Results of the QA/QC procedures are discussed in Section 6.

During testing, the flare was operating under normal operating conditions. Landfill gas flow rate was 1234 standard cubic feet per minute (scfm), based upon the facility's continuous flow monitor/recorder (see Appendix E). Flare temperature was set at 1800°F Fahrenheit (°F). Stack temperature thermocouple readings were verified throughout the initial portion of the testing program. A description of the flare and landfill gas collection system and its operation during testing is summarized in Section 3 of this report. All pertinent documentation can be found in the Appendices.

Table 1-1
Compounds of Interest
Simi Valley Landfill
Flare No. 1 (McGill)
September 18, 2003

Parameter	Permit Limit
Reactive Organic Compounds (ROC)	1.09 lb/hr
Oxides of Nitrogen	0.05 lb/MMBtu 2.20 lb/hour
Carbon Monoxide	0.2 lb/MMBtu 8.80 lb/hour
ROC Destruction Efficiency	98.0%
Fuel Consumption*	2,044 MMSCF/year 991,340 MMBtu/year

* Total for two existing flares at SVLFRC.

2. SUMMARY OF RESULTS

2.1 Criteria Pollutants

The results of the criteria testing test program are summarized in Table 2-1. Emission rate of ROC, NO_x and CO were within the allowable emission limits under the Permit to Operate #1395.

Emission rate of NO_X averaged 1.23 lb/hr and 0.0304 lb/MMBtu which is below the VCAPCD Rule 74.17.1 limit of 2.20 lb/hr and 0.05 lb/MMBtu, respectively. Emissions of CO averaged 1.69 lb/hr and 0.0424 lb/MMBtu which is well below the VCAPCD Rule 74.17.1 limit of 8.80 lb/hr and 0.2 lb/MMBtu. The ROC destruction efficiency average of 99.3% is within the Rule 74.17.1 limit of 98.0%.

A more detailed discussion of the criteria testing results are provided in Section 5.

Table 2-1
Summary of Results
Simi Valley Landfill
Flare No. 1 (McGill)
September 18, 2003

	Emission Rate								Allowable Emissions	
	Run 1		Run 2		Run 3		Average			
	(lb/hr)	(lb/MMBtu)	(lb/hr)	(lb/MMBtu)	(lb/hr)	(lb/MMBtu)	(lb/hr)	(lb/MMBtu)	(lb/hr)	(lb/MMBtu)
Reactive Organic Compounds (ROC), as CH_4	0.188	NA	0.104	NA	0.200	NA	0.164	NA	1.09	NA
Oxides of Nitrogen, as NO_2	1.19	0.0295	1.40	0.0327	1.10	0.0289	1.23	0.0304	2.20	0.06
Carbon Monoxide	3.29	0.0820	0.480	0.0113	1.29	0.0340	1.69	0.0424	8.80	0.20

Destruction Efficiency

							Average		
Reactive Organic Compounds	99.1%	----	99.5%	----	99.2%	----	99.3%		98.0%

3. PROCESS DESCRIPTION

The landfill gas collection system consists of a series of landfill gas collection wells, a gas collection manifold, a pumping system and the landfill gas flare. Landfill gas, collected from various wells located throughout the landfill, is manifolded to a common duct. The landfill gas then passes through a condensation collection system, a blower, then to the flare.

The landfill gas flare consists of an insulated steel cylinder eight feet in diameter and 40 feet above ground level. The four sample ports utilized are located 36 feet from ground level and four feet from the top of the flare. Landfill gas was supplied to the flare burners at a rate of approximately 1234 standard cubic feet per minute (scfm). Flare combustion temperature was maintained above 1800 °F to ensure complete combustion and is monitored by a thermocouple recording temperature on a strip chart. The flare was equipped with automatic air control louvers and a temperature controller to maintain the pre-set flare temperature. A flame failure detector automatically shuts off gas flow from the blower in the event of a flame out.

4. SAMPLING/ANALYSES

Criteria Pollutants

The target compounds quantified as part of the criteria pollutant testing and the associated sampling methods are provided in Table 4-1. Three, replicate test runs were conducted for each parameter of interest using the procedures detailed in subsequent subsections. All methods followed the applicable CARB/EPA testing procedure without modification with the exception of EPA Method 25 as detailed in Section 4.2.

4.1 Sampling Location

4.1.1 Flare Exhaust

Sample ports are located on the flare approximately 36 feet above ground level and four feet from the flare exit. Two sample ports were utilized. Twenty-four traverse points (12 per port) were utilized for velocity, oxides of nitrogen, carbon monoxide and ROC sampling.

4.1.2 Flare Inlet - Landfill Gas

Reactive organic compound, fixed gas, and moisture samples were obtained from the landfill gas feed duct at a location at least two diameters downstream and one diameter upstream from a flow disturbance. Landfill gas flow rate was monitored using the on-line, calibrated flow meter operated by Simi Valley Landfill. The flow meter is corrected to standard temperature/pressure and gas density.

Table 4-1
Test Methods
Simi Valley Landfill
Flare No. 1 (McGill)
September 18, 2003

Parameter	Test Method
Inlet and Outlet	
Flow Rate	Continuous, On-Line Monitor (Inlet) CARB Method 2 (Outlet)
Fixed Gases (O_2, CO_2, N_2)	CARB Method 100/EPA Method 3A (Outlet) CARB Method 3/EPA Method 3 (Inlet)
Moisture	Wet Bulb/Dry Bulb CARB Method 4 (Outlet)
ROC/Methane	EPA Method 25 (Inlet) EPA Method 25 (Outlet)
Outlet Only	
Carbon Monoxide	CARB Method 100/EPA Method 10
Sulfur Dioxide	Calculated (Based on the inlet reduced sulfur compounds concentration and flow rate)
Oxides of Nitrogen	CARB Method 100/EPA Method 7E
Inlet Only	
C_1-C_3 Sulfur Compounds (with H_2S)	Tedlar Bag/GC-Hall Detection & GC/MS
Heating Value	ASTM D3588-91

4.2 Methane and Reactive Organic Compounds (ROC)

Methane and Reactive Organic Compounds (ROC) concentration were determined at the landfill gas flare inlet and exhaust using modified EPA Method 25 or EPA Method 25C as provided in VCAPCD Rule 74.17. The modification eliminates the use of a condensate trap and filter in the sample collection system.

Method 25 samples were collected using the SUMMA canister Method outlined in EPA Method 25C as depicted in Appendix A.

The organic content of the sample collected in each SUMMA canister is measured by injecting a portion into the FID/TCA analysis system which uses a two phase gas chromatography (GC) column to separate carbon monoxide (CO), methane (CH_4), and carbon dioxide (CO_2) from each other and from the total gaseous non-methane organics (TGNMO) which are eluted as backflush. All eluted components are first oxidized to CO_2 by a hopcalite catalyst and then reduced to methane by a nickel catalyst. The resulting methane is detected using the flame ionization detector. A gas standard containing CO, CH_4, CO_2 and propane, prepared by Scott Specialty Gases, traceable to NBS, is used to calibrate the FID/TCA analysis system.

4.3 Moisture

4.3.1 Inlet

Moisture content of the stack gas was determined using a wet bulb/dry bulb thermometer.

4.3.2 Outlet

Moisture content of the stack gas was determined in accordance with CARB/EPA Method 4 "Determination of Moisture Content in Stack Gases" as outlined in Appendix A.

4.4 Flow Rate

4.4.1 Inlet

Inlet flow rate was determined using the facility's calibrated on-line flow meter and recorder.

4.4.2 Outlet

The flare exhaust flow rate was determined using EPA/CARB Method 2 as detailed in Appendix A.

4.5 Oxides of Nitrogen, Carbon Monoxide, Carbon Dioxide, Oxygen (Continuous Emissions Monitoring)

Three test runs were conducted at the landfill gas flare exhaust. Twenty-four points, per Method 1, were sampled. All sampling was performed under the guidelines of CARB Method 100/EPA Method 7E, CARB Method 100/EPA Method 3A and CARB Method 100/EPA Method 10 for the determination of NO_x, O_2, CO_2 and CO concentration. A description of Horizon's CEMS and the applicable EPA Methods, are detailed in Appendix A.

4.6 Hydrogen Sulfide (H_2S), and C_1 - C_3 Sulfur Compounds

Hydrogen sulfide and C_1 - C_3 sulfur compounds samples were collected at the inlet of the flare using the Tedlar bag collection system. All samples were analyzed within 24 hours of collection using SCAQMD Method 307.91 as described in Appendix A.

5. RESULTS DISCUSSION

The following subsections present and discuss the results of the criteria testing program.

5.1 Criteria Pollutants

Three replicate test runs were conducted for each criteria compound of interest. The results of the criteria testing program are provided in Table 5-1.

Table 5-1
Summary of Results
Simi Valley Landfill
Flare No. 1 (McGill)
September 18, 2003

	LANDFILL GAS			FLARE EXHAUST		
Run Number	1	2	3	1	2	3
STACK GAS CHARACTERISTICS						
Temperature, degrees F	-	-	-	1660	1659	1656
Moisture, %				8.6	8.7	9.0
Flow Rate, acfm	-	-	-	65412	63469	63446
Flow Rate, dscfm	1232	1229	1241	14379	13951	13915
Fixed Gases						
Oxygen, %	1.04	-	-	11.65	10.78	11.84
Carbon Dioxide, %	39.36	-	-	8.57	9.39	8.31
Methane, %	48.14	-	-			
BTU Value, Btu/scf	500	-	-	-	-	-
EMISSIONS						
Oxides of Nitrogen						
ppm	-	-	-	11.49	13.95	11.04
ppm @ 3 % O2	-	-	-	22.25	24.67	21.81
lb/hr	-	-	-	1.185	1.395	1.101
lb/MMBtu	-	-	-	0.0295	0.0327	0.0289
Carbon Monoxide						
ppm	-	-	-	52.45	7.88	21.33
ppm @ 3 % O2	-	-	-	101.54	13.93	42.15
lb/hr	-	-	-	3.291	0.480	1.295
lb/MMBtu	-	-	-	0.0820	0.0113	0.0340
Total Non-Methane Hydrocarbons (Reactive Organic Compounds)						
ppm, as Methane	6900	6810	7980	5.25	2.98	5.75
lb/hr, as Methane	21.19	20.87	24.70	0.188	0.104	0.200
Sulfur Compounds						
Hydrogen Sulfide, ppm	33.6	-	-		-	-
Total Sulfur, ppm as H2S	47.7	-	-		-	-
Oxides of Sulfur**						
lb/hr	-	-	-	0.596	-	-

* Flow Rate calculated stoichiometrically
** Calculated from sulfur balance

6. QA/QC SUMMARY

All QA/QC requirements of each respective Method were adhered to throughout the testing program. Also, the guidelines of Horizon's corporate QA/QC manual, as appearing in the Test Plan, were followed by all sampling and analytical personnel. In addition, QA/QC measures taken which were beyond their respective Method requirements were incorporated into the testing program and are discussed in detail herein.

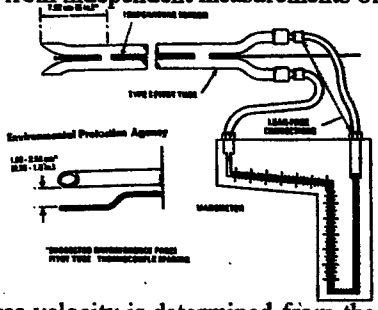
6.1 Continuous Emission Monitoring (CEM) - EPA Method 7E/10/3A

All CEM system performance checks, as detailed in Section 3, were within specifications including analyzer linearity, calibration drift, leak checks and system bias checks. The on-site CEM system performance checks can be found in Appendix A.

APPENDIX A - Test Method Descriptions

Method:	**Sample Velocity Traverses for Stationary Sources**
Applicable for Methods:	EPA Method 1, SCAQMD Method 1.1, CARB Method 1
Principle:	To aid in the representative measurements of pollutant emissions and/or total volumetric flow rate from a stationary source, a measurement site where the effluent stream is flowing in a known direction is selected, and the cross section of the stack is divided into a number of equal areas. A traverse point is then located within these equal areas. The method cannot be used when, 1) flow is cyclonic or swirling, 2) stack is small than about 0.30 meter (12 inches) in diameter or 3) the measurement of the site is less than two stack or duct diameters downstream or less than a half diameter upstream from the flow disturbance.

Method:	**Stack Gas Velocity and Volumetric Flow Rate**
Applicable for Methods:	EPA Method 2, CARB 2, SCAQMD Method 2.1
Principle:	The average gas velocity in a stack gas is determined from the gas density and from measurement of the average velocity head with a type S or standard pitot tube.
Sampling Procedure:	Set up the apparatus as shown in the figure. Measure the velocity head and temperature at the traverse points specified by EPA Method 2, CARB Method 2 or SCAQMD Method 2.1. Measure the static pressure in the stack and determine the atmospheric pressure. The stack gas molecular weight is determined from independent measurements of O_2, CO_2 and H_2O concentrations.



Sample Recovery: and Analyses:	The stack gas velocity is determined from the measured average velocity head, the measured dry concentrations of O_2 and CO_2 and the measured concentration of H_2O. The velocity is determined from the following set of equations:

Where,

ΔP = velocity head, inches in H_2O	Mwd = dry molecular weight
Ts = gas/temperature, degrees R	Mw = molecular weight
Ps = absolute static pressure	Cp = pitot flow coefficient

Dry molecular weight of stack gas

$$Mwd = 0.44\ (\%CO_2) + 0.32\ (\%O_2) + 0.28\ (\%N_2 + \%CO)$$

Molecular weight of stack gas, wet basis

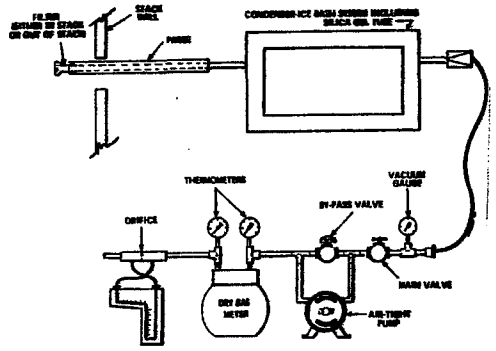
$$M_w = (M_{wd}\ x\ M_d) + 18\ (1 - M_d)$$

$$Where,\ M_d = \frac{100 - Bws}{100}$$

Stack gas velocity

$$(V_s)\ avg. = (5130)\ C_p\ x\ \sqrt{\Delta P}\ avg.\ x\ \sqrt{T_s}\ x\ \left(\frac{1}{P_s\ x\ M_w}\right)^{1/2}$$

Method:	**Determination of Moisture in Stack Gases**
Applicable for Methods:	EPA Method 4, ARB 1-4, SCAQMD Method 4.1
Principle:	A gas sample is extracted at a constant rate from the source; moisture is removed from the stream and determined either volumetrically or gravimetrically.
Sampling Procedure:	Set up train as shown in the following figure. Sample is drawn at a constant rate through a sufficiently heated probe. The probe is connected to the impinger train by Teflon or glass tubing. The train consists of two greenburg smith impinger (SCAQMD 4.1) or one modified and 1 greenburg smith impinger (CARB & EPA) each containing 100 ml of water, an empty impinger as a knock-out and an impinger containing silica gel to protect the pump from moisture.



Sample Recovery: and Analyses:	Following testing, moisture content is determined gravimetrically or volumetrically from initial and final impinger contents weights or volume.

CONTINUOUS EMISSIONS MONITORING SYSTEM - TRUCK

CARB Method 100

The continuous emissions monitoring system consists of a Thermo Electron Model 10AR chemiluminescence NO/NO_X analyzer, a Teledyne electro chemical O_2 analyzer, a Thermo Electron Model 48H CO gas filter correlation analyzer and a Horiba PIR2000 non dispersive infrared CO_2 analyzer. All analyzer specifications are provided in Table 1. All concentrations are determined on a dry basis. Concentrations of NO_X, CO, O_2 and CO_2 are continuously recorded on a Linseis 10-inch strip chart recorder. The extractive monitoring system conforms with the requirements of CARB Method 100.

The sampling probe (heated to 250°F), constructed of 1/2 inch-diameter 316 stainless steel, is connected to a condenser with a six foot length of 3/8 inch Teflon line (heated to 250°F). A Nupro stainless steel filter (10 micron) is connected at the tip of the probe and maintained at stack temperature.

The condenser consists of a series of two stainless steel moisture knock-out bottles immersed in an ethylene glycol/dry ice bath. The system is designed to minimize contact between the sample and the condensate. Condensate is continuously removed from the knock-out bottles via a peristaltic pump. The condenser outlet temperature is monitored either manually at 10-minute intervals or on a strip chart recorder/DAS system. The sample exiting the condenser is then transported through a filter, housed in a stainless steel holder, followed by 3/8 inch O.D. Teflon tubing and a Teflon coated (or stainless steel/viton) diaphragm pump to the sample manifold. The sample manifold is constructed of stainless steel tubing and directs the sample through each of five rotameters to the NO_X monitor, O_2 monitor, CO monitor, CO_2 monitor and excess sample exhaust line, respectively. Sample flow through each channel is controlled by a back pressure regulator and by stainless steel needle valves on each rotameter. All components of the sampling system that contact the sample are composed of stainless steel, Teflon or glass.

The calibration system is comprised of two parts: the analyzer calibration and the system bias check. The calibration gases are, at a minimum, certified to ± 1% by the manufacturer. Where necessary to comply with the reference method requirements, EPA Protocol 1 gases are used. The cylinders are equipped with pressure regulators which supply the calibration gas to the analyzers at the same pressure and flow rate as the sample. The selection of zero, span or sample gas directed to each analyzer is accomplished by operation of the zero, calibration or sample selector knobs located on the main flow control panel.

For CARB Method 100 the following procedures are conducted before and after each series of test runs:

Leak Check:

The leak check is performed by plugging the end of the sampling probe, evacuating the system to at least 20 inches of Hg. The leak check is deemed satisfactory if the system holds 20 inches of Hg vacuum for five minutes with less than one inch Hg loss.

Alternately the leak check is accomplished by plugging the probe at the tip and operating the system in the "sample" position. The excess sample vent is closed and the flow observed on the low-flow (0-140 cc/min) sample delivery system. If no flow is observed the system is deemed leak tight.

Pre-Test Calibration:

The NO_X analyzer calibration is performed by introducing, at a minimum, zero gas and high range calibration gas (80-100% scale). The CO analyzer calibration is performed by introducing zero gas and high range (80-100%) calibration gas. The oxygen (O_2) and carbon dioxide (CO_2) analyzer calibration is performed by introducing zero gas and high range calibration gas (80-100% of scale).

Stratification Check:

A stack stratification check is performed (pre-test only) by traversing the stack (6 points per traverse). If the gas composition is homogenous, <10% variation between any two points in the gas stream throughout the cross sectional diameter of the stacks, single point gas sampling is performed at an average point. If stratification exceeds the 10% criteria, then the stack cross section is traversed during sampling.

System Bias Check:

The system bias check is accomplished by transporting the same gases used to zero and span the analyzers to the sample system as close as practical to the probe inlet. This is accomplished by opening a valve located on the probe, allowing the gas to flow to the probe and back through the moisture knockout and sample line to the analyzers. During this check the system is operated at the normal sampling rate with no adjustments. The system bias check is considered valid if the difference between the gas concentration exhibited by the measurement system which a known concentration gas is introduced at the sampling probe tip and when the sample gas is introduced directly to the analyzer, does not exceed ± 5% of the analyzer range.

In between each sampling run the following procedures are conducted:

Analyzer Calibration:

The analyzer calibration is performed by introducing the zero and high range gases to each analyzer prior to each test run and adjusting the instrument calibration as necessary.

Zero and Calibration Drift Check:

The zero and calibration drift check is performed by introducing zero and high range calibration gases to the instruments, with no adjustments (with the exception of flow to instruments) after each test run. The analyzer response must be within ± 3% of the actual calibration gas value.

A schematic of the sample system and specific information on the analytical equipment is provided in the following pages.

TABLE 1

CONTINUOUS EMISSIONS MONITORING LABORATORY - TRUCK

NO_X CHEMILUMINESCENT ANALYZER -- THERMO ELECTRON MODEL 10 A

Response Time (0-90%)	1.5 sec -- NO mode/1.7 sec -- NO_x mode
Zero Drift	Negligible after 1/2 hour warmup
Linearity	± 1% of full scale
Accuracy	Derived from the NO or NO_2 calibration gas, ± 1% of full scale
Operating Ranges (ppm)	2.5, 10, 25, 100, 250, 1000, 2500, 10000
Output	0-1 volt

O_2 ANALYZER, FUEL TYPE -- TELEDYNE MODEL 326RA

Response Time (0-90%)	60 seconds
Accuracy	± 1% of scale at constant temperature ± 1% of scale of ± 5% of reading, whichever is greater, over the operation temperature range.
Operating Ranges (%)	0-5, 0-25, 0-100
Output	0-1 volt

O_2 ANALYZER, PARAMAGNETIC -- SERVOMEX MODEL 1400B

Response Time (0-90%)	15 seconds
Accuracy	0.1% oxygen
Linearity	± 1% scale
Operating Ranges (%)	0-25, 0-100
Output	0-1 volt

CO GAS FILTER CORRELATION -- THERMO ELECTRON MODEL 48H

Response Time (0-95%)	1 minute
Zero Drift	± 0.2 ppm CO
Span Drift	Less than 1% full scale in 24 hours
Linearity	± 1% full scale, all ranges
Accuracy	± 0.1 ppm CO
Operating Ranges (ppm)	50, 100, 250, 500, 1000, 2500, 5000, 10,000, 25,000, 50,000
Output	0-1 volt

CO_2 INFRARED GAS ANALYZER -- HORIBA - MODEL PIR 2000

Response Time (0-90%)	5 seconds
Zero Drift	± 1% of full scale in 24 hours
Span Drift	± 1% of full scale in 24 hours
Linearity	± 2% of full scale
Resolution	Less than 1% of full scale
Operating Ranges (%)	0-5, 0-15, 0-25
Output	0-1 volt

RATFISCH FID TOTAL HYDROCARBON ANALYZER -- MODEL 55CA

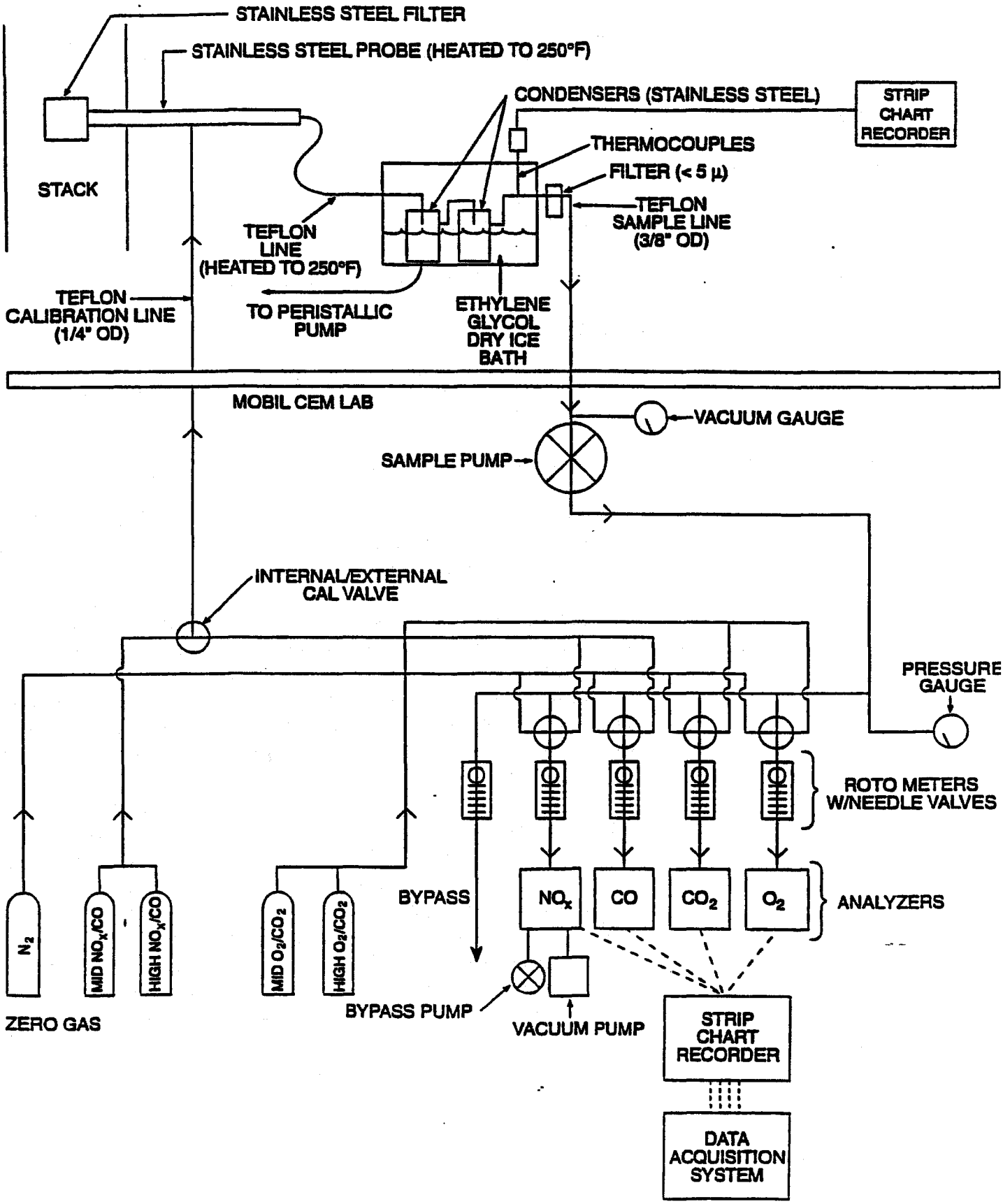
Response Time (0-90%)	5 seconds
Zero Drift	± 1% full scale in 24 hours
Span Drift	± 1% full scale in 24 hours
Linearity	± 1% full scale - constant
Accuracy	± 1% full scale at constant temp.
Operating Ranges (ppm)	10, 100, 1000, 10,000
Output	0 - 10 volts

LINSEIS MODEL L2045 FOUR PEN STRIP CHART RECORDER

Pen Speed	up to 120 cm/min
Measuring Response	0-20 volts
Linearity Error	0.25%
Accuracy	0.3%
Zero Suppression	Manual (from 1 to 10X full scale)

LINEAR 3 PEN CONTINUOUS -- MODEL 595 STRIP CHART

Pen Response	20 inches/second
Measuring Response	1 Mv through 5V
Zero Set	Electronically adjustable full scale with 1 full scale of zero suppression
Accuracy	Total limit of error ± 0.5%



CEM System Schematic

Method: **NO/NO_X by Continuous Analyzer**

Applicable Reference Methods: EPA 7E, EPA 20; CARB 100, BAAQMD ST-13A, SCAQMD 100.1

Principle: A sample is continuously withdrawn from the flue gas stream, conditioned and conveyed to the instrument for direct readout of NO or NO_X.

Analyzer: TECO Model 10AR

Measurement Principle: Chemiluminescence

Accuracy: 1% of full scale

Ranges: 0-2.5, 0-10, 0-25, 0-250, 0-1000, 0-2500, 0-10,000 ppm

Output: 0-10 V

Inferences: Compounds containing nitrogen (other than ammonia) may cause interference.

Response Time: 90%, 1.5 seconds (NO mode) and 1.7 seconds (NO_X mode)

Sampling Procedure: A representative flue gas sample is collected and conditioned using the CEM system described previously. If EPA Method 20 is used, that method's specific procedures for selecting sample points are used.

Analytical Procedure: The oxides of nitrogen monitoring instrument is a chemiluminescent nitric oxide analyzer. The operational basis of the instrument is the chemiluminescent reaction of NO and ozone (O_3) to form NO_2 in an excited state. Light emission results chemiluminescence is monitored through an optical filter by a high sensitivity photomultiplier tube, the output of which is electronically processed so it is linearly proportional to the NO concentration. The output of the instrument is in ppmV.

When NO_2 is expected to be present in the flue gas, a supercooled water dropout flask will be placed in the sample line to avoid loss of NO_2. Since NO_2 is highly soluble in water, "freezing out" the water will allow the NO_2 to reach the analyzers for analysis. The analyzer measures NO only. In the NO_X mode, the gas is passed through a moly converter which converts NO_2 to NO and a total NO_X measurement is obtained. NO_2 is determined as the difference between NO and NO_X. Use of a moly converter instead of a stainless steel converter eliminates NH_3 interference; NH_3 is converted to NO with a stainless converter, but not with a moly converter.

Method: **Oxygen (O_2) by Continuous Analyzer**

Applicable Reference Methods: EPA 3A, EPA 20, CARB 100, BAAQMD ST-14, SCAQMD 100.1

Principle: A sample is continuously withdrawn from the flue gas stream, conditioned and conveyed to the instrument for direct readout of O_2 concentration.

Analyzer: Teledyne Model 326R

Measurement Principle: Electrochemical cell

Ranges: 0-5, 0-25% 0-100%

Accuracy: 1% of full scale

Output: 0-1 V

Interferences: Halogens and halogenated compounds will cause a positive interference. Acid gases will consume the fuel cell and cause a slow calibration drift.

Response Time: 90% <60 seconds

Sampling Procedure: A representative flue gas sample is collected and conditioned using the CEM system described previously. If Method 20 is used, that method's specific procedures for selecting sample points are used. Otherwise, stratification checks are performed at the start of a test program to select single or multiple-point sample locations.

Analytical Procedure: An electrochemical cell is used to measure O_2 concentration. Oxygen in the flue gas diffuses through a Teflon membrane and is reduced on the surface of the cathode. A corresponding oxidation occurs at the anode internally and an electric current is produced that is proportional to the concentration of oxygen. This current is measured and conditioned by the instrument's electronic circuitry to give an output in percent O_2 by volume.

Method: **Carbon Dioxide (CO_2) by Continuous Analyzer**

Applicable Reference EPA 3A, CARB 100, BAAQMD ST-5, SCAQMD 100.1

Principle: A sample is continuously drawn from the flue gas stream, conditioned and conveyed to the instrument for direct readout of CO_2 concentration.

Analyzer: PIR 2000

Measurement Principle: Non-dispersive infrared (NDIR)

Accuracy: 1% of full scale

Ranges: 0-5, 0-15%

Output: 0-1 V

Interferences: A possible interference includes water. Since the instrument receives dried sample gas, this interference is not significant.

Response Time: 5 seconds

Sampling Procedure: A representative flue gas sample is collected and conditioned using the CEM system described previously.

Analytical Procedure: Carbon dioxide concentrations are measured by short path length non-dispersive infrared analyzers. These instruments measure the differential in infrared energy absorbed from energy beams passed through a reference cell (containing a gas selected to have minimal absorption of infrared energy in the wavelength absorbed by the gas component of interest) and a sample cell through which the sample gas flows continuously. The differential absorption appears as a reading on a scale of 0-100%.

Method: **Carbon Monoxide (CO) by NDIR/Gas Filter Correlation**

Applicable Reference Methods: EPA 10; CARB 1-100; BAAQMD ST-6, SCAQMD 100.1

Principle:	A sample is continuously drawn from the flue gas stream, conditioned and conveyed to the instrument for direct readout of CO concentration.
Analyzer:	TECO, Model 48H
Measurement Principle:	NDIR/Gas Filter Correlation
Precision:	0.1% ppm
Ranges:	0-50, 0-100, 0-250, 0-500, 0-1000, 0-2500, 0-5000, 0-10000, 0-2500, 0-3,000 ppm
Output:	0-1 V
Interferences:	Negligible interference from water and CO_2
Rise/Fall times (0-95%)	1 minute @ 1 lpm flow, 30 second integration time
Sampling Procedure:	A representative flue gas sample is collected and conditioned using the CEM system described previously. Sample point selection has been described previously.

Analytical Procedure: Radiation from an infrared source is chopped and then passed through a gas filter which alternates between CO and N_2 due to rotation of a filter wheel. The radiation then passes through a narrow band-pass filter and a multiple optical pass sample cell where absorption by the sample gas occurs. The IR radiation exits the sample cell and falls on a solid state IR detector.

Method:	**Hydrocarbons by Total Carbon Analyses**
Reference:	EPA Method 25 (modified without condensate trap)
Principle:	Gaseous samples are collected in 6-liter SUMMA polished stainless steel canisters. The canisters are then pressurized with nitrogen and analyzed for methane and total non methane hydrocarbons (TNMHC).
Sampling Procedure:	Samples are collected, in duplicate, using 6-liter SUMMA polished stainless steel canisters which are evacuated to less than 10 mm Hg absolute. The tanks are pressurized and evacuated three times with ultrapure nitrogen and leak checked prior to use. A gas flow metering device and stainless steel shutoff valve is located just upstream of the canister. Representative, integrated samples are collected through a heat conditioned 1/4" stainless steel probe. The gas samples are metered into the canisters through the vacuum regulator maintaining a constant flow rate throughout each sampling period. The sampling apparatus is checked for leaks prior to the sampling program by attaching the probe end to an absolute pressure gauge and vacuum pump in series. The sample lines were evacuated to less than 10 mm Hg and the gauge shutoff valve is then closed. The sample lines are deemed to be leak-free if no loss of vacuum occurs as indicated by the vacuum gauge. During sampling the tank pressures are monitored with a 0-30 inch vacuum gauge to ensure integrated sampling.
Analytical Procedure:	Samples are analyzed for methane and total non methane hydrocarbons (TNMHC) by total combustion analyses (TCA)/flame ionization detection.

AtmAA Inc.
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environmental consultant
laboratory services

Tandem Gas Chromatographic/Mass Spectroscopic-Electrolytic Conductivity Detector (GC/MS-ELCD) Method for Determination of Total Sulfur in Gas Samples

AtmAA, Inc.
03-060

3/30/93

This method measures selected reduced sulfur species, including but not limited to hydrogen sulfide, carbonyl sulfide, methyl mercaptan, ethyl mercaptan, dimethyl sulfide, carbon disulfide, isopropyl mercaptan, n-propyl mercaptan, and dimethyl disulfide in gaseous sample matrices using gas chromatographic separation and a mass spectrometric and electrolytic conductivity detector (ELCD), where the ELCD measures hydrogen sulfide only. A non-polar methyl silicon capillary gas chromatographic column is used for component separation and selected ion monitoring is used for component quantification. Component quantification is obtained using a multi-component external standard prepared by Scott Specialty Gases. The lower detection limit varies by component but is at least 0.1 ppmv ethyl mercaptan (component of lowest sensitivity) for a 0.31 ml sample volume injection. The upper quantitation limit has not been determined but is at least beyond 80 ppmv dimethyl disulfide, for which response remained linear from 0.1 ppmv to 80 ppmv.

Hydrogen sulfide is measured using an electrolytic conductivity detector operated in the oxidative sulfur mode. A Chromosil 310 column, operated isothermally at 45°C. is used to separate H_2S from other sulfur components. A fixed volume loop injection is used in the analysis for H_2S.

Lower Detection Limits (LDL's):

Using a 1 ml injection volume for H_2S by electrolytic conductivity detector and 0.40 ml injection volume for GC/MS measured sulfur compounds, the following LDL's are obtained:

	(ppmv)
Hydrogen sulfide	0.5
Carbonyl sulfide	0.03
Methyl mercaptan	0.03
Ethyl mercaptan	0.04
Dimethyl sulfide	0.02
Carbon disulfide	0.02
i-propyl mercaptan	0.03
n-propyl mercaptan	0.03
Dimethyl disulfide	0.02

Equipment:

A Hewlett-Packard 5890 series II gas chromatograph (GC), H[illegible]le
Packard 5971A Mass Selective Detector, 486 MS/DOS computer [illegible]nd
operating software are used for all sulfur species except H_2S. T[illegible]
GC is fitted with a heated 6-port Valco 1/16" line, sam[illegible]
injection valve. All gas transfer lines to the sample loop a[illegible]
fused silica lined Restek tubing. The fixed volume (0.40 m[illegible]
sample loop is Teflon. The transfer line from the valve to the [illegible]
column is cleaned and treated blank 0.53 mm OD fused silica l[illegible]
with polyimide coating.

H_2S is measured using a Varian 1400 GC with the Hall oxidat[illegible]
quartz tube furnace and electrolytic cell attached. Nitrogen [illegible]
used as carrier and oxygen is used as the combustion gas.

Multi-component gaseous standards are prepared by Scott Specia[illegible]
Gas and are contained in two separate aluminum cylinders and
Scotty IV canister as follows:

Cylinder A (CAL12250)		Cylinder B (CAL3563)	
Carbonyl sulfide	15.2 ppmv	Hydrogen sulfide	12.3 pp[illegible]
Ethyl mercaptan	13.4 ppmv	Methyl mercaptan	22.6 pp[illegible]
Carbon disulfide	16.1 ppmv	Dimethyl sulfide	20.3 ppmv
		Dimethyl disulfide	

Scotty IV (mix 252)

Hydrogen Sulfide 93.8 ppmv

Gas tight clean glass volumetric syringes of 10, 20, & 50 m
capacity, with smooth glass barrel (not sintered glass) are used t
make volumetric dilutions of sample or standard.

GC/MS SIM parameters:

	Dwell per ion	start time	Ions
Group 1:	75 msec.	8.0 min.	60
Group 2:	75 msec.	10.0 min.	47,48,64
Group 3:	75 msec.	14.5 min.	47,62,76,78,43,61
Group 4:	75 msec.	19.5 min.	79,94,122,142,156 128

Components monitored:

Group 1: carbonyl sulfide
Group 2: methyl mercaptan
Group 3: ethyl mercaptan, dimethyl ~~di~~sulfide, carbon disulfide, isopropyl mercaptan, n-propyl mer[illegible]pt[illegible]
Group 4: dimethyl sulfide

di

Component	Quantitation ion	Confirmation io
carbonyl sulfide	60	none
methyl mercaptan	47	48
ethyl mercaptan	62	47
dimethyl sulfide	62	47
carbon disulfide	76	78
iso-propyl mercaptan	76	43,47,61
n-propyl mercaptan	76	43,47,61
dimethyl disulfide	94	79

Sulfur dioxide is analyzed by monitoring mass 64 which is include in Group 2 ions.

Calibration:

Gaseous standards can be analyzed prior to or after a set of samples. Response factors are determined from a single point standard calibration. Multi-point calibrations are performed to verify linearity. Consistency of standard response with continuing calibrations is observed to indicate performance of multi-point calibration.

Samples containing components at less than the stated LDL can be analyzed by cryogenically focusing a measured volume of gaseous sample onto a glass bead filled Teflon loop immersed in liquid argon. The sample is thermally transferred upon injection by immersing the sample loop in near boiling temperature water. The LDL obtained by this technique is calculated as:

$$LDL_{cryo} = (\text{cryo volume}/0.40) * LDL_{0.40}$$

Acceptable volumes for cryogenic concentration range from 3 to 100 ml. and are determined based on amounts of other components in the sample such as water, carbon dioxide or hydrocarbons.

Procedure:

A volumetric sample of landfill or source collected gas is transferred from a Tedlar® bag to the 6-port valve injection line using a glass syringe of approximately 10 ml. A Teflon loop of 0.40 ml volume is used to inject the sample. When sample concentrations exceed that of the standard, appropriate volumetric sample dilutions are made using the glass syringes with dry nitrogen diluent. Immediately after sample injection, the GC/MS is started. Standards are analyzed in the same manner as samples. Appropriate component peaks are monitored and integrated after sample analysis data set has been obtained.

Hydrogen sulfide is measured using the electrolytic conductivity detector by a separate direct fixed loop valve injection using heated Teflon loop, transfer lines, and Teflon Chromosil 310 GC column.

A response factor for a standard component is calculated as:

rf = std. amt. / std. area

Sample concentration is calculated using the response factor:

conc. = rf x sample area

At least 10% of samples in a sample set, or minimum of one sam per set are analyzed twice to determine precision. A separ report showing repeat analyses results is included with analytical report of sulfur component concentrations per e sample set. Repeat analyses must agree within +/- 10% except component concentrations less than 1 ppmv. A nitrogen blank analyzed between standards and samples to verify that there is component carry-over. Samples are analyzed as soon after they ived as possible, preferably same day and within four hours ection. Data is being gathered to determine stability sulfur compounds in Tedlar® bag containers in an effort to ext sample holding time. Samples are usually analyzed before standa to prevent carry-over, since most sulfur components measured landfill gas samples are lower in concentration than those in standards.

GC/MS Analysis Conditions:

GC conditions: a 30 M x 0.2 mm, 0.50 um film methyl silicon PON column from Hewlett-Packard is temperature programmed as follows

-65 degrees C, hold min.
15 degrees C min. to 220 degrees C, hold 5 min.

Valve oven Temp. 150 degrees C
GC/MS transfer line 180 degrees C
Carrier gas is helium, pressure regulated at 21 psi.

MS Conditions:

MS calibration is performed periodically prior to performing analyses using PFTBA (perfluoro-tributylamine) as supplied Hewlett-Packard and as controlled by HP software under the mid-range auto tine program.
Solvent delay = 8 min.

Hall Detector/GC Analysis Conditions:

6' x 1/8" Teflon, Chromosil 310 analytical column
45 degrees C, isothermal
Valve oven & transfer line Temp. 105 degrees C.
Carrier gas is nitrogen, flow rate 18 cc/min.
Oxygen oxidation gas, flow rate 18 cc/min.
Quartz tube oxidation oven Temp. 650 degrees C.

APPENDIX B - Computer Printout of Results

Table 5-2
Trace Organic Species
Destruction Efficiency Results
Simi Valley Landfill
Flare #1 (McGill)
September 18, 2003

Run 1		INLET Flow rate	1232 dscfm		OUTLET Flow rate	14379 dscfm	
Species	Conc. (ppm)	Conc. (mg/dscf)	Em. Rate (lb/hr)	Conc. (ppm)	Conc. (mg/dscf)	Em. Rate (lb/hr)	Dest. Eff. (%)
TNMHC	6900	1.30E+02	2.12E+01	5.25	9.90E-02	1.88E-01	99.11

Run 2		INLET Flow rate	1229 dscfm		OUTLET Flow rate	13951 dscfm	
Species	Conc. (ppm)	Conc. (mg/dscf)	Em. Rate (lb/hr)	Conc. (ppm)	Conc. (mg/dscf)	Em. Rate (lb/hr)	Dest. Eff. (%)
TNMHC	6810	1.28E+02	2.09E+01	2.98	5.62E-02	1.04E-01	99.50

Run 3		INLET Flow rate	1241 dscfm		OUTLET Flow rate	13915 dscfm	
Species	Conc. (ppm)	Conc. (mg/dscf)	Em. Rate (lb/hr)	Conc. (ppm)	Conc. (mg/dscf)	Em. Rate (lb/hr)	Dest. Eff. (%)
TNMHC	7980	1.50E+02	2.47E+01	5.75	1.08E-01	2.00E-01	99.19

SCAQMD Method 100.1 Emission Rates

Facility: Simi Valley Landfill
Source: Flare #1 (McGill)
Job No.: W07-036
Date: 03/18/03

Run Number	******	1	2	3
Load	******	as Found	as Found	as Found
EPA F-Factor	dscf/MMBtu	9512	9512	9512
Stack Flow Rate	dscfm	14379	13951	13915
Oxygen	%	11.65	10.78	11.84
Carbon Dioxide	%	8.57	9.39	8.31
Oxides of Nitrogen				
Concentration	ppm	11.49	13.95	11.04
Concentration @ 3 % O2	ppm	22.25	24.67	21.81
Concentration	lb/dscf	1.37E-06	1.67E-06	1.32E-06
Emission Rate	lb/MMBtu	0.0295	0.0327	0.0289
Emission Rate	lb/hr	1.185	1.395	1.101
Carbon Monoxide				
Concentration	ppm	52.45	7.88	21.33
Concentration @ 3 % O2	ppm	101.54	13.93	42.15
Concentration	lb/dscf	3.81E-06	5.73E-07	1.55E-06
Emission Rate	lb/MMBtu	0.0820	0.0113	0.0340
Emission Rate	lb/hr	3.291	0.480	1.295

Facility: Simi Valley Landfill
Source: Flare #1 (McGill)
Job No.: W07-036
Date: 03/18/03

STANDARD TEMPERATURE	Degrees F	68		
RUN NUMBER	******	1	2	3
CLOCK TIME: INITIAL	******	834	1045	1230
CLOCK TIME: FINAL	******	947	1154	1337
AVG. STACK TEMPERATURE	Degrees F	1660	1659	1656
AVG. SQUARE DELTA P	Inches H20	0.2061	0.2003	0.1998
BAROMETRIC PRESSURE	Inches HG	28.90	28.90	28.90
SAMPLING TIME	Minutes	60	60	60
SAMPLE VOLUME	Cubic Feet	46.057	47.925	47.482
AVG. METER TEMP.	Degrees F	81	93	96
AVG. DELTA H	Inches H20	1.70	1.70	1.70
DGM CALIB. FACTOR [Y]	******	0.9851	0.9851	0.9851
WATER COLLECTED	Milliliters	86	88	90
CO 2	Percent	8.57	9.39	8.31
O 2	Percent	11.65	10.78	11.84
CO	Percent			
CH4	Percent			
N 2	Percent	79.77	79.83	79.85
STACK AREA	Square Inches	6647.6	6647.6	6647.6
STATIC PRESSURE	Inches WG.	-0.065	-0.060	-0.065
PITOT COEFFICIENT	******	0.84	0.84	0.84
SAMPLE VOLUME DRY	DSCF	42.95	43.71	43.07
WATER AT STD.	SCF	4.1	4.1	4.2
MOISTURE	Percent	8.6	8.7	9.0
MOLE FRACTION DRY GAS	******	0.91	0.91	0.91
MOLECULAR WT.DRY	lb/lb Mole	29.84	29.93	29.80
EXCESS AIR	Percent	124	105	128
MOLECULAR WT. WET	lb/lb Mole	28.82	28.90	28.74
STACK GAS PRESSURE	Inches HG	28.90	28.90	28.90
STACK VELOCITY	AFPM	1417	1375	1374
VOLUMETRIC FLOWRATE, DRY ST	DSCFM	14379	13951	13915
VOLUMETRIC FLOWRATE, ACTUAL	ACFM	65412	63469	63446

SCAQMD Method 307.91

Facility: Simi Valley Landfill
Source: Flare #1 (McGill)
Job No.: W07-036
Date: 03/18/03

Sulfur Compounds

Speciated Compound	Concentration ppm, as H2S	No. of S molecules in Compound	Total S ppm, as H2S	SO2 Conc. mg/dscf	* Avg. Inlet Flow Rate dscfm	SO2 Rate lb/hr
Hydrogen Sulfide	33.6	1	33.60	2.57	1234	0.420
Carbonyl Sulfide	0.20	1	0.20	0.02	1234	0.002
Methyl mercaptan	3.10	1	3.10	0.24	1234	0.039
Ethyl mercaptan	0.09	1	0.09	0.01	1234	0.001
Dimethyl sulfide	9.56	1	9.56	0.73	1234	0.119
Carbon disulfide	0.12	2	0.24	0.02	1234	0.003
Dimethyl disulfide	0.23	2	0.46	0.04	1234	0.006
iso-propyl mercaptan	0.41	1	0.41	0.03	1234	0.005
n-propyl mercaptan	0.06	1	0.06	0.00	1234	0.001
Total			47.72			0.596

* Based on the average flow rate of all three runs

EXPANSION AND F-FACTOR CALC. METHOD

Client:	Simi Valley Landfill	Date:	03/18/03
Location:	Simi Valley, CA	Job #:	W07-036
Unit:	Flare #1 (McGill)	Run#:	1

Fuel temperature		deg. F	Std. Temp.	**68**	deg. F
Fuel Pressure		psi			
Fuel Flow Rate		cfm	Fuel Flow	**1232**	dscfm
Exhaust Outlet O2	**11.65**	%			
Barometric Pressure	**28.90**				

COMPONENTS		MOLE %	HHV btu/ft3	LLV btu/ft3	Exp Factor dscf/scf fuel
Oxygen		**1.04**			0.010
Nitrogen		**10.70**			0.107
Carbon Dioxide		**39.36**			0.394
Methane		**48.14**	486.21	437.79	4.126
Ethane	C2	**0.753**	13.33	12.19	0.115
Propane	C3		0.00	0.00	0.000
Iso-Butane	C4		0.00	0.00	0.000
N-Butane			0.00	0.00	0.000
Iso-Pentane	C5		0.00	0.00	0.000
N-Pentane			0.00	0.00	0.000
Hexane	C6		0.00	0.00	0.000
Heptane	C7		0.00	0.00	0.000
Octane	C8		0.00	0.00	0.000
Nonane	C9		0.00	0.00	
Total		**99.99**	**499.54**	**449.97**	**4.75**

CALCULATIONS

EXHAUST FLOW RATE, Q = (scfm*Exp Fac)*(20.92(20.92-%O2)

13212 DSCFM

EPA F-Factor = (scf exhaust/scf fuel)/(btu/scf fuel)*(1000000 btu/MMbtu)

9512 dscf/Mmbtu

EXPANSION AND F-FACTOR CALC. METHOD

Client:	Simi Valley Landfill	Date:	03/18/03
Location:	Simi Valley, CA	Job #:	W07-036
Unit:	Flare #1 (McGill)	Run#:	2

Fuel temperature		deg. F	Std. Temp.		deg. F
Fuel Pressure		psi			
Fuel Flow Rate		cfm	Fuel Flow	**1229**	dscfm
Exhaust Outlet O2	**10.78**	%			
Barometric Pressure	**28.90**				

COMPONENTS		MOLE %	HHV btu/ft3	LLV btu/ft3	Exp Factor dscf/scf fuel
Oxygen		**1.04**			0.010
Nitrogen		**10.70**			0.107
Carbon Dioxide		**39.36**			0.394
Methane		**48.14**	486.21	437.79	4.126
Ethane	C2	**0.753**	13.33	12.19	0.115
Propane	C3		0.00	0.00	0.000
Iso-Butane	C4		0.00	0.00	0.000
N-Butane			0.00	0.00	0.000
Iso-Pentane	C5		0.00	0.00	0.000
N-Pentane			0.00	0.00	0.000
Hexane	C6		0.00	0.00	0.000
Heptane	C7		0.00	0.00	0.000
Octane	C8		0.00	0.00	0.000
Nonane	C9		0.00	0.00	
Total		**99.99**	**499.54**	**449.97**	**4.75**

CALCULATIONS

EXHAUST FLOW RATE, Q = (scfm*Exp Fac)*(20.92(20.92-%O2)

12046 DSCFM

EPA F-Factor = (scf exhaust/scf fuel)/(btu/scf fuel)*(1000000 btu/MMbtu)

9512 dscf/Mmbtu

EXPANSION AND F-FACTOR CALC. METHOD

Client:	Simi Valley Landfill	Date:	03/18/03
Location:	Simi Valley, CA	Job #:	W07-036
Unit:	Flare #1 (McGill)	Run#:	3

Fuel temperature		deg. F	Std. Temp.		deg. F
Fuel Pressure		psi			
Fuel Flow Rate		cfm	Fuel Flow	**1241**	dscfm
Exhaust Outlet O2	**11.84**	%			
Barometric Pressure	**28.90**				

COMPONENTS		MOLE %	HHV btu/ft3	LLV btu/ft3	Exp Factor dscf/scf fuel
Oxygen		**1.04**			0.010
Nitrogen		**10.70**			0.107
Carbon Dioxide		**39.36**			0.394
Methane		**48.14**	486.21	437.79	4.126
Ethane	C2	**0.753**	13.33	12.19	0.115
Propane	C3		0.00	0.00	0.000
Iso-Butane	C4		0.00	0.00	0.000
N-Butane			0.00	0.00	0.000
Iso-Pentane	C5		0.00	0.00	0.000
N-Pentane			0.00	0.00	0.000
Hexane	C6		0.00	0.00	0.000
Heptane	C7		0.00	0.00	0.000
Octane	C8		0.00	0.00	0.000
Nonane	C9		0.00	0.00	
Total		**99.99**	**499.54**	**449.97**	**4.75**

CALCULATIONS

EXHAUST FLOW RATE, Q = (scfm*Exp Fac)*(20.92(20.92-%O2)

13585 DSCFM

EPA F-Factor = (scf exhaust/scf fuel)/(btu/scf fuel)*(1000000 btu/MMbtu)

9512 dscf/Mmbtu

SCAQMD Method 100.1 Bias Adjustment

Facility: **Simi Valley Landfill**
Source: **Flare #1 (McGill)**
Job No.: **W07-036**
Date: **03/18/03**

Run No. 1

Parameter	Measured Conc. (ppm,%)	Reference Span gas (ppm.%)	Initial Bias Zero (ppm.%)	Final Bias Zero (ppm.%)	Average Bias Zero (ppm.%)	Initial Bias Span (ppm.%)	Final Bias Span (ppm.%)	Average Bias Span (ppm.%)	Bias Adjusted Conc. (ppm.%)
NOx	11.33	10.10	0.00	0.10	0.05	10.00	9.93	9.96	11.49
O2	11.61	12.01	0.05	0.05	0.05	11.95	11.98	11.96	11.65
CO	53.47	200.00	0.00	1.00	0.50	200.00	205.00	202.50	52.45
CO2	8.56	7.00	0.00	0.02	0.01	6.98	7.00	6.99	8.57

Run No. 2

Parameter	Measured Conc. (ppm,%)	Reference Span gas (ppm.%)	Initial Bias Zero (ppm.%)	Final Bias Zero (ppm.%)	Average Bias Zero (ppm.%)	Initial Bias Span (ppm.%)	Final Bias Span (ppm.%)	Average Bias Span (ppm.%)	Bias Adjusted Conc. (ppm.%)
NOx	13.71	10.10	0.10	0.15	0.13	9.93	10.00	9.96	13.95
O2	10.71	12.01	0.05	0.10	0.08	11.98	11.88	11.93	10.78
CO	8.34	200.00	1.00	0.00	0.50	205.00	194.00	199.50	7.88
CO2	9.39	7.00	0.02	0.00	0.01	7.00	7.00	7.00	9.39

Run No. 3

Parameter	Measured Conc. (ppm,%)	Reference Span gas (ppm.%)	Initial Bias Zero (ppm.%)	Final Bias Zero (ppm.%)	Average Bias Zero (ppm.%)	Initial Bias Span (ppm.%)	Final Bias Span (ppm.%)	Average Bias Span (ppm.%)	Bias Adjusted Conc. (ppm.%)
NOx	11.02	10.10	0.15	0.30	0.23	10.00	10.20	10.10	11.04
O2	11.77	12.01	0.10	0.20	0.15	11.88	12.00	11.94	11.84
CO	20.56	200.00	0.00	0.00	0.00	194.00	191.50	192.75	21.33
CO2	8.25	7.00	0.00	0.00	0.00	7.00	6.90	6.95	8.31

Client:	Waste Management	Date:	09/18/03
Job No.:	W07-036	Run #:	1
Site:	Simi Valley Landfill	Fuel:	L.F.G.
Unit:	Flare #1 (McGill)	Std. O2:	3

	O2 %	CO2 %	NOx ppm	CO ppm
Range:	25.00	20.00	25.00	500.00
Span:	12.01	7.00	10.10	200.00
Low:				
High:	20.90	12.01	21.00	398.00

** POST-TEST DRIFT **

Values				
Zero:	0.00	0.00	-0.13	0.00
Span:	12.00	7.00	10.10	205.00
Percent Drift				
Zero:	0.00	0.00	-0.50	0.00
Span:	-0.04	0.00	0.00	1.00

** RAW AVERAGE CONCENTRATION **

Average:		**11.61**	**8.56**	**11.33**	**53.47**
O2 adjust:	3.0			21.83	103.06
Date	Time	O2	CO2	NOx	CO
18-Sep-03	834	11.56	8.39	11.27	32.09
18-Sep-03	835	11.58	8.44	11.38	34.98
18-Sep-03	836	11.46	8.56	11.85	19.49
18-Sep-03	837	11.82	8.24	11.07	22.13
18-Sep-03	838	11.98	8.11	10.82	11.19
18-Sep-03	839	11.84	8.24	11.12	20.79
18-Sep-03	840	11.77	8.30	11.26	28.43
18-Sep-03	841	12.02	8.07	10.74	20.51
18-Sep-03	842	12.46	7.71	9.77	25.96
18-Sep-03	843	12.40	7.77	9.78	52.97
18-Sep-03	844	12.34	7.83	9.92	48.18
18-Sep-03	845	12.45	7.71	9.63	26.88
18-Sep-03	846	12.58	7.60	9.20	83.87
18-Sep-03	847	12.46	7.70	9.56	65.29
18-Sep-03	848	12.43	7.75	9.59	47.77
18-Sep-03	849	12.56	7.63	9.33	48.40
18-Sep-03	850	12.66	7.54	9.17	64.05
18-Sep-03	851	12.68	7.54	8.99	99.63
18-Sep-03	852	12.58	7.62	9.31	65.18
18-Sep-03	853	12.12	8.08	10.15	64.87
18-Sep-03	854	11.40	8.74	11.72	70.62
18-Sep-03	855	11.59	8.55	11.30	127.45
18-Sep-03	856	11.60	8.55	11.22	158.01

18-Sep-03	857	11.80	8.37	10.71	163.19
18-Sep-03	858	11.78	8.40	10.81	191.46
18-Sep-03	859	11.97	8.21	10.44	180.64
18-Sep-03	900	12.08	8.15	10.13	244.97
18-Sep-03	901	11.83	8.36	10.77	96.27
18-Sep-03	902	11.79	8.41	10.81	122.28
18-Sep-03	903	11.83	8.38	10.74	206.66
18-Sep-03	904	11.74	8.45	11.08	152.80
18-Sep-03	917	9.04	11.05	17.53	18.09
18-Sep-03	918	10.14	9.93	14.82	4.39
18-Sep-03	919	11.49	8.66	11.79	7.95
18-Sep-03	920	11.31	8.90	12.07	10.23
18-Sep-03	921	11.41	8.77	12.06	10.07
18-Sep-03	922	11.30	8.91	12.20	8.55
18-Sep-03	923	11.42	8.79	11.91	7.98
18-Sep-03	924	11.17	9.06	12.41	7.20
18-Sep-03	925	11.57	8.64	11.45	12.75
18-Sep-03	926	11.34	8.88	11.86	28.78
18-Sep-03	927	11.24	8.99	11.93	61.16
18-Sep-03	928	11.36	8.87	11.63	84.61
18-Sep-03	929	11.25	8.98	11.91	82.06
18-Sep-03	930	10.99	9.26	12.55	45.53
18-Sep-03	931	10.99	9.25	12.50	43.37
18-Sep-03	932	11.08	9.16	12.40	39.76
18-Sep-03	933	11.14	9.10	12.20	61.44
18-Sep-03	934	11.47	8.76	11.50	40.27
18-Sep-03	935	9.32	10.84	16.44	64.38
18-Sep-03	936	10.47	9.61	13.51	2.73
18-Sep-03	937	11.63	8.55	10.92	6.23
18-Sep-03	938	11.67	8.51	10.98	9.95
18-Sep-03	939	11.69	8.50	10.92	8.58
18-Sep-03	940	11.51	8.68	11.55	6.88
18-Sep-03	941	11.53	8.66	11.45	5.50
18-Sep-03	942	11.65	8.55	11.12	7.34
18-Sep-03	943	11.55	8.65	11.26	7.37
18-Sep-03	944	11.51	8.69	11.38	6.53
18-Sep-03	945	11.49	8.71	11.43	6.77
18-Sep-03	946	11.42	8.76	11.64	5.86
18-Sep-03	947	11.66	8.53	11.21	5.96

Client:	Waste Management	Date:	09/18/03
Job No.:	W07-036	Run #:	2
Site:	Simi Valley Landfill	Fuel:	L.F.G.
Unit:	Flare #1 (McGill)	Std. O2:	3

	O2 %	CO2 %	NOx ppm	CO ppm
Range:	25.00	20.00	25.00	500.00
Span:	12.01	7.00	10.10	200.00
Low:				
High:	20.90	12.01	21.00	398.00

** POST-TEST DRIFT **

Values				
Zero:	0.05	0.00	0.05	0.00
Span:	11.98	7.00	10.10	198.00
Percent Drift				
Zero:	0.20	0.00	0.20	0.00
Span:	-0.14	0.00	0.00	-0.40

** RAW AVERAGE CONCENTRATION **

Average:		**10.71**	**9.39**	**13.71**	**8.34**
O2 adjust:	3.0			24.09	14.66
Date	Time	O2	CO2	NOx	CO
18-Sep-03	1045	11.43	8.73	12.48	5.39
18-Sep-03	1046	11.41	8.72	12.48	2.66
18-Sep-03	1047	11.03	9.12	13.17	1.79
18-Sep-03	1048	11.28	8.85	12.60	1.54
18-Sep-03	1049	11.45	8.67	12.23	1.77
18-Sep-03	1050	10.88	9.29	13.38	1.89
18-Sep-03	1051	11.03	9.10	12.91	1.71
18-Sep-03	1052	11.52	8.60	11.93	2.45
18-Sep-03	1053	10.60	9.57	13.87	2.74
18-Sep-03	1054	9.88	10.28	15.70	1.85
18-Sep-03	1055	9.90	10.24	15.56	2.21
18-Sep-03	1056	9.89	10.24	15.62	2.85
18-Sep-03	1057	9.29	10.85	16.80	3.32
18-Sep-03	1058	9.35	10.73	16.52	4.30
18-Sep-03	1059	10.76	9.39	13.42	4.53
18-Sep-03	1100	10.37	9.80	14.50	3.70
18-Sep-03	1101	9.24	10.87	16.97	3.28
18-Sep-03	1102	10.13	10.00	15.06	3.31
18-Sep-03	1103	9.39	10.75	16.76	3.59
18-Sep-03	1104	9.49	10.63	16.58	3.13
18-Sep-03	1105	9.79	10.35	16.00	3.22
18-Sep-03	1106	8.87	11.23	17.97	3.13
18-Sep-03	1107	9.30	10.81	17.06	3.43

18-Sep-03	1108	10.06	10.09	15.47	3.22
18-Sep-03	1109	8.81	11.29	18.43	3.13
18-Sep-03	1110	9.59	10.54	16.76	2.72
18-Sep-03	1111	9.47	10.64	16.88	3.05
18-Sep-03	1112	9.97	10.16	15.69	2.12
18-Sep-03	1113	9.79	10.33	16.09	2.04
18-Sep-03	1114	8.93	11.19	18.07	2.04
18-Sep-03	1115	10.32	9.79	14.88	1.93
18-Sep-03	1124	10.35	9.65	14.79	0.78
18-Sep-03	1125	10.32	9.73	14.54	0.95
18-Sep-03	1126	10.72	9.34	13.77	1.70
18-Sep-03	1127	10.24	9.85	14.63	2.83
18-Sep-03	1128	10.92	9.16	13.29	3.30
18-Sep-03	1129	11.27	8.82	12.64	3.81
18-Sep-03	1130	11.36	8.74	12.01	5.76
18-Sep-03	1131	11.86	8.25	10.85	34.02
18-Sep-03	1132	11.95	8.17	10.53	62.03
18-Sep-03	1133	11.62	8.45	11.54	27.84
18-Sep-03	1134	11.68	8.41	11.22	31.03
18-Sep-03	1135	11.64	8.45	11.34	68.55
18-Sep-03	1136	11.14	8.98	12.44	17.65
18-Sep-03	1137	11.66	8.41	11.62	6.39
18-Sep-03	1138	11.56	8.51	11.71	5.02
18-Sep-03	1139	11.25	8.81	12.24	8.51
18-Sep-03	1140	11.40	8.66	12.18	3.44
18-Sep-03	1141	11.46	8.61	11.91	7.00
18-Sep-03	1142	11.25	8.84	12.32	8.05
18-Sep-03	1143	11.18	8.91	12.47	3.98
18-Sep-03	1144	11.23	8.84	12.16	3.16
18-Sep-03	1145	11.44	8.65	11.98	10.05
18-Sep-03	1146	11.25	8.84	12.28	6.19
18-Sep-03	1147	11.18	8.88	12.38	3.21
18-Sep-03	1148	11.08	9.02	12.65	6.75
18-Sep-03	1149	11.23	8.82	12.26	3.04
18-Sep-03	1150	11.84	8.23	11.11	7.93
18-Sep-03	1151	11.88	8.20	10.98	33.17
18-Sep-03	1152	11.79	8.29	11.25	18.44
18-Sep-03	1153	11.63	8.41	11.65	13.61
18-Sep-03	1154	11.62	8.43	11.40	21.14

Client:	Waste Management	Date:	09/18/03
Job No.:	W07-036	Run #:	3
Site:	Simi Valley Landfill	Fuel:	L.F.G.
Unit:	Flare #1 (McGill)	Std. O2:	3

	O2 %	CO2 %	NOx ppm	CO ppm
Range:	25.00	20.00	25.00	500.00
Span:	12.01	7.00	10.10	200.00
Low:				
High:	20.90	12.01	21.00	398.00

** POST-TEST DRIFT **

Values				
Zero:	0.10	0.00	0.15	0.00
Span:	11.98	7.00	10.05	195.00
Percent Drift				
Zero:	0.40	0.00	0.60	0.00
Span:	-0.14	0.00	-0.20	-1.00

** RAW AVERAGE CONCENTRATION **

Average:		**11.77**	**8.25**	**11.02**	**20.56**
O2 adjust:	3.0			21.60	40.30
Date	Time	O2	CO2	NOx	CO
18-Sep-03	1230	12.02	8.00	10.83	25.33
18-Sep-03	1231	11.51	8.45	11.64	6.66
18-Sep-03	1232	11.84	8.17	11.11	6.09
18-Sep-03	1233	11.63	8.38	11.42	7.81
18-Sep-03	1234	11.68	8.33	11.24	6.66
18-Sep-03	1235	11.72	8.30	11.22	4.88
18-Sep-03	1236	11.73	8.29	11.13	6.99
18-Sep-03	1237	11.83	8.21	10.92	4.87
18-Sep-03	1238	11.53	8.49	11.66	9.94
18-Sep-03	1239	11.88	8.16	11.06	5.64
18-Sep-03	1240	11.81	8.23	11.01	10.07
18-Sep-03	1241	11.34	8.67	11.78	9.72
18-Sep-03	1242	11.11	8.90	12.03	2.58
18-Sep-03	1243	11.59	8.41	11.11	3.64
18-Sep-03	1244	12.08	7.98	10.42	6.95
18-Sep-03	1245	11.71	8.32	11.01	12.53
18-Sep-03	1246	11.74	8.29	11.05	8.19
18-Sep-03	1247	11.71	8.31	11.12	8.93
18-Sep-03	1248	11.92	8.12	10.68	7.01
18-Sep-03	1249	11.54	8.46	11.52	5.42
18-Sep-03	1250	11.59	8.41	11.35	4.64
18-Sep-03	1251	11.74	8.28	11.11	4.94
18-Sep-03	1252	11.96	8.08	10.76	8.92

18-Sep-03	1253	12.09	7.98	10.83	7.97
18-Sep-03	1254	11.97	8.08	11.06	15.80
18-Sep-03	1255	11.74	8.29	11.49	6.86
18-Sep-03	1256	11.81	8.22	11.17	3.75
18-Sep-03	1257	11.94	8.11	11.02	12.07
18-Sep-03	1258	11.75	8.28	11.28	8.26
18-Sep-03	1259	12.14	7.93	10.65	7.51
18-Sep-03	1300	12.00	8.06	10.94	7.26
18-Sep-03	1307	11.34	8.56	11.92	35.19
18-Sep-03	1308	11.72	8.27	11.09	30.29
18-Sep-03	1309	11.47	8.52	11.66	23.40
18-Sep-03	1310	11.48	8.52	11.50	22.16
18-Sep-03	1311	11.70	8.30	11.02	32.52
18-Sep-03	1312	11.83	8.20	10.76	30.60
18-Sep-03	1313	11.70	8.32	11.08	37.15
18-Sep-03	1314	11.62	8.39	11.22	25.36
18-Sep-03	1315	11.82	8.20	10.74	42.67
18-Sep-03	1316	11.80	8.22	10.85	39.68
18-Sep-03	1317	11.68	8.33	10.99	35.03
18-Sep-03	1318	11.77	8.24	10.83	33.78
18-Sep-03	1319	11.83	8.19	10.69	42.88
18-Sep-03	1320	11.86	8.16	10.65	25.86
18-Sep-03	1321	11.67	8.34	11.08	21.53
18-Sep-03	1322	11.78	8.24	10.81	41.89
18-Sep-03	1323	11.93	8.10	10.42	38.85
18-Sep-03	1324	11.96	8.08	10.43	32.74
18-Sep-03	1325	11.93	8.11	10.55	34.18
18-Sep-03	1326	11.81	8.21	10.79	27.63
18-Sep-03	1327	11.67	8.34	11.19	30.08
18-Sep-03	1328	11.66	8.35	11.15	21.99
18-Sep-03	1329	11.81	8.22	10.79	31.07
18-Sep-03	1330	11.67	8.33	11.23	29.82
18-Sep-03	1331	11.99	8.07	10.34	35.47
18-Sep-03	1332	12.01	8.05	10.37	42.68
18-Sep-03	1333	11.97	8.09	10.53	32.87
18-Sep-03	1334	11.91	8.14	10.75	48.62
18-Sep-03	1335	11.78	8.25	11.06	15.08
18-Sep-03	1336	11.89	8.15	10.61	30.64
18-Sep-03	1337	11.92	8.12	10.61	55.03

Method 100.1 Performance Data

Facility: Simi Valley Landfill
Source: Flare #1 (McGill)
Job No.: W07-036
Test Date: 03/18/03

PRETEST				
LEAK CHECK	PASSED			
	** LINEARITY CHECK **			
RANGE :	25 O2	20 CO2	500 CO	25 NOx
ZERO				
Instrument	0.00	0.00	1.0	0.00
Cylinder	0.00	0.00	0.0	0.00
Difference (%)	0.00	0.00	0.2	0.00
LOW LEVEL				
Instrument				
Cylinder				
Difference (%)				
MID LEVEL				
Instrument	12.03	7.00	201.5	10.25
Cylinder	12.01	7.00	200.0	10.10
Difference (%)	0.06	0.00	0.3	0.60
HIGH LEVEL				
Instrument	20.70	12.26	400.0	20.80
Cylinder	20.90	12.01	398.0	21.00
Difference (%)	-0.80	1.25	0.4	-0.80
POST TEST				
LEAK CHECK	PASSED			
	O2	CO2	CO	NOx
ZERO				
Instrument	0.10	0.00	0.0	0.15
Cylinder	0.00	0.00	0.0	0.00
Difference (%)	0.40	0.00	0.0	0.60
LOW LEVEL				
Instrument				
Cylinder				
Difference (%)				
MID LEVEL				
Instrument	11.98	7.00	195.0	10.05
Cylinder	12.01	7.00	200.0	10.10
Difference (%)	-0.12	0.00	-1.0	-0.20
HIGH LEVEL				
Instrument	20.50	12.40	402.5	21.05
Cylinder	20.90	12.01	398.0	21.00
Difference (%)	-1.60	1.95	0.9	0.20

SYSTEM BIAS	
PreTest	
	NOx
	10.00
	10.25
	-1.00
	pass
	O2
	11.95
	12.03
	-0.30
	pass
	CO
	200.0
	201.5
	-0.3
	pass
	CO2
	6.98
	7.00
	-0.10
	pass
Post test	
	NOx
	10.00
	10.05
	-0.20
	pass
	O2
	11.88
	11.98
	-0.42
	pass
	CO
	194.0
	195.0
	-0.2
	pass
	CO2
	7.00
	7.00
	0.00
	pass

System Response Time (seconds)			
	#1	#2	#3
Upscale			
NOx	53	55	55
CO	24	25	25
O2	25	25	25
CO2	23	23	24
Downscale			
NOx	51	52	52
CO	24	24	25
O2	23	24	23
CO2	20	20	20

NO2 to NO Converter Effeciency (%)			
	cylinder	instr.	effeciency
ppm	19.2	18.7	97.40

APPENDIX C - Laboratory Results

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LABORATORY ANALYSIS REPORT

Total Gaseous Non-Methane Organics (TGNMO) Methane
Analysis in Tank Samples

Report Date: October 7, 2003
Client: Horizon
Site: Simi Valley Landfill
Project No.: W07-036
Date Received: September 18, 2003
Date Analyzed: September 19, 2003

ANALYSIS DESCRIPTION

Total gaseous non-methane organics (TGNMO) was measured by flame ionization detection/ total combustion analysis (FID/TCA) Method 25. % level methane was measured by thermal conductivity detection / gas chromatography (TCD/GC).

AtmAA Lab No.	Sample ID	Methane (ppmv)	TGNMO (ppmv)
02613-1	Tank 17	15.1	5.25
02613-2	Tank 18	<1	2.98
02613-3	Tank 39	<1	5.75
02613-4	Tank D	470000	6900
02613-5	Tank T	466000	6810
02613-6	Tank U	470000	7980
02613-8	Tank 22	<1	3.44
02613-9	Tank 26	<1	1.22
02613-10	Tank 38	<1	4.96
02613-11	Tank J	466000	6680
02613-12	Tank K	260000	4020
02613-13	Tank L	469000	8070

TGNMO is total gaseous non-methane (excluding ethane) organics reported as ppm methane. No ethane was found in any sample at a lower detection limit of <1 ppmv for outlets, and <20 ppmv for inlets.

Michael L. Porter
Laboratory Director

QUALITY ASSURANCE SUMMARY
(Repeat Analysis)

Project No.: W07-036
Date Received: September 18, 2003
Date Analyzed: September 19, 2003

Components	Sample ID	Repeat Analysis Run #1 (Concentration in ppmv)	Repeat Analysis Run #2 (Concentration in ppmv)	Mean Conc. (Concentration in ppmv)	% Diff. From Mean (Concentration in ppmv)
Methane	Tank 17	15.2	14.9	15.1	1.0
	Tank D	470000	469000	470000	0.11
	Tank 22	<1	<1	---	---
	Tank J	466000	465000	466000	0.11
TGNMO	Tank 17	5.21	5.29	5.25	0.76
	Tank D	6930	6880	6900	0.36
	Tank 22	3.58	3.29	3.44	4.2
	Tank J	6450	6920	6680	3.5
	Tank K	4110	3940	4020	2.1

A set of 12 Tank samples, laboratory numbers 02613-(1-13), was analyzed for total gaseous non-methane organics (TGNMO), and methane. Agreement between repeat analyses is a measure of precision and is shown in the column "% Difference from Mean." Repeat analyses are an important part of AtmAA's quality assurance program. The average% Difference from Mean for 8 repeat measurements from the set of 12 Tank samples is 1.5%.

037

Calculated values for Specific Volume, BTU and F (factor)

Report Date: October 7, 2003
Client: Horizon
Project Location: Simi Valley Landfill
Date Received: September 18, 2003
Date Analyzed: September 19, 2003
AtmAA Lab Number: 02613-7, Inlet bag

Specific volume, BTU, and F factor are calculated using labortatory analysis results for methane, carbon dioxide, nitrogen, oxygen, total gaseous non-methane organics (TGNMO), and sulfur compounds in equations that include assumed values for the specific volume of gases (CH_4, CO_2, N_2, O_2, Ar) and for TGNMO $(CH_2)_n$. The specific volumes of gases were taken from the Air Products Speciality Gases catalogue, 1992, and represents as is gas at 70° F and 1 atm. The F factor is calculated according to the equation in ASTM D-3588.

Component	Mole %	Wt %	C,H,O,N,S, Wt.%	
Methane	47.70	27.05	Carbon	37.19
Carbon Dioxide	39.00	60.82	Hydrogen	6.82
Nitrogen	10.60	10.52	Oxygen	45.41
Oxygen	1.034	1.17	Nitrogen	10.52
Argon	0.046	0.07	Argon	0.07
$(CH_2)_n$	0.7460	0.37	Sulfur	0.00

Specific Volume	13.513
BTU/ft^3	487
BTU/ lb.	6578
F (factor)	9471

dry gas at 70° F, 1 atm, where CH4 = 1008 & TGNMO = 804 BTU/cu.ft.

Component	Specific volume reference values *
Methane	24.1 (ft^3/lb)
Carbon Dioxide	8.74
Nitrogen	13.8
Oxygen	12.1
Argon	9.7
(CH2)n	21

* reference, Air Products Specialty Gases Catalogue, 1992

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LABORATORY ANALYSIS REPORT

Hydrogen Sulfide and Reduced Sulfur Compounds
Analysis in Inlet Tedlar Bag Sample

Report Date: September 25, 2003
Client: Horizon
Project Location: WMNA / Simi Valley LF
Client Project No.: W07-036
Date Received: September 18, 2003
Date Analyzed: September 18 & 19, 2003

ANALYSIS DESCRIPTION

Hydrogen sulfide was analyzed by gas chromatography with a Hall electrolytic conductivity detector operated in the oxidative sulfur mode. All other components were measured by GC/ Mass Spec.

AtmAA Lab No.:	02613-7
Sample I.D.:	W0736-TB-F1

Components	*(Concentration in ppmv)*
Hydrogen sulfide	33.6
Carbonyl sulfide	0.20
Methyl mercaptan	3.10
Ethyl mercaptan	<0.09
Dimethyl sulfide	9.56
Carbon disulfide	0.12
isopropyl mercaptan	0.41
n-propyl mercaptan	<0.06
Dimethyl disulfide	0.23
TRS	47.6

TRS - total reduced sulfur

Michael L. Porter
Laboratory Director

030

QUALITY ASSURANCE SUMMARY
(Repeat Analyses)

Client Project No.: W07-036
Date Received: September 18, 2003
Date Analyzed: September 18 & 19, 2003

Components	Sample ID	Repeat Analysis Run #1	Repeat Analysis Run #2	Mean Conc.	% Diff. From Mean
		(Concentration in ppmv)			
Hydrogen sulfide	W0736-TB-F1	32.2	35.1	33.6	4.3
Carbonyl sulfide	W0736-TB-F1	0.21	0.20	0.20	2.4
Methyl mercaptan	W0736-TB-F1	3.03	3.16	3.1	2.1
Ethyl mercaptan	W0736-TB-F1	<0.09	<0.09	---	---
Dimethyl sulfide	W0736-TB-F1	9.47	9.65	9.56	0.94
Carbon disulfide	W0736-TB-F1	0.12	0.12	0.12	0.0
iso-propyl mercaptan	W0736-TB-F1	0.40	0.42	0.41	2.4
n-propyl mercaptan	W0736-TB-F1	<0.06	<0.06	---	---
Dimethyl disulfide	W0736-TB-F1	0.24	0.22	0.23	4.3

One Tedlar bag sample, laboratory number 02613-7, was analyzed for hydrogen sulfide and reduced sulfur compounds. Agreement between repeat analyses is a measure of precision and is shown above in the column "% Difference from Mean". Repeat analyses are an important part of AtmAA's quality assurance program. The average % Difference from Mean for 7 repeat measurements from the one Tedlar bag sample is 2.3%.

CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location
Waste Mgt. / Simi Valley LF	Simi Valley, CA
Project No.	**Field Logbook No.**
WO7-036	
Sampler: (*Signature*)	**Chain of Custody Tape No.**

ANALYSES: EPA Method 25C (NOG, CH4); SCAQMD 307.91 (C1-C3 Reduced sulfur compounds + H2S); ASTM D1826-77 (HHV)

Sample No./ Identification	Date	Time	Lab Sample Number	Type of Sample	EPA Method 25C (NOG, CH4)	SCAQMD 307.91 (C1-C3 Reduced sulfur compounds + H2S)	ASTM D1826-77 (HHV)	REMARKS
Tank# 17	9/18/03		02613-1	12 L Tedlar	X			Flare#1 outlet A1
" 18			-2		X			" " A2
" 39			-3		X			" " A3
" D			-4		X			" Inlet A1
" T			-5		X			" " A2
" U			-6		X			" " A3
WO36-TB-F1			-7	SL Tedlar Bag		X	X	"Inlet Bag

Relinquished by: (*Signature*)	Date	Time	Received by: (*Signature*)	Date	Time
	9/18/03	1526		9/19/03	15:40
Relinquished by: (*Signature*)	Date	Time	Received by: (*Signature*)	Date	Time
Relinquished by: (*Signature*)	Date	Time	Received for Laboratory: (*Signature*)	Date	Time
Sample Disposal Method:	Disposed of by: (*Signature*)			Date	Time

SAMPLE COLLECTOR

HORIZON AIR MEASUREMENT SERVICES, INC
996 Lawrence Drive, Suite 108
Newbury Park, CA 91320
(805) 498-8781 Fax (805) 498-3173

ANALYTICAL LABORATORY

ATM AN
Calabasas, CA

Nº 7881

CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location
Waste Mgt. / Simi Valley LF	Simi Valley, CA
Project No.	**Field Logbook No.**
W07-036	
Sampler: (*Signature*)	**Chain of Custody Tape No.**

Sample No./ Identification	Date	Time	Lab Sample Number	Type of Sample	ANALYSES: EPA Method 25C (ROG, CH4)	REMARKS
Tank # 22	9/17/03		02613-8	12 L Tank	X	Flare #2 Outlet A1
" 26			-9		X	" " A2
" 38			-10		X	" " A3
" J			-11		X	" Inlet A1
" K			-12		X	" " A2
" L			-13		X	" " A3

Relinquished by: (*Signature*)	Date	Time	Received by: (*Signature*)	Date	Time
	9/18/03	1526	Michael Porter	9/18/03	1526
Relinquished by: (*Signature*)	**Date**	**Time**	**Received by: (*Signature*)**	**Date**	**Time**
Relinquished by: (*Signature*)	**Date**	**Time**	**Received for Laboratory: (*Signature*)**	**Date**	**Time**
Sample Disposal Method:	**Disposed of by: (*Signature*)**			**Date**	**Time**

SAMPLE COLLECTOR

HORIZON AIR MEASUREMENT SERVICES, INC
996 Lawrence Drive, Suite 108
Newbury Park, CA 91320
(805) 498-8781 Fax (805) 498-3173

ANALYTICAL LABORATORY

Atm AA
Calabasas, CA

No. 7880

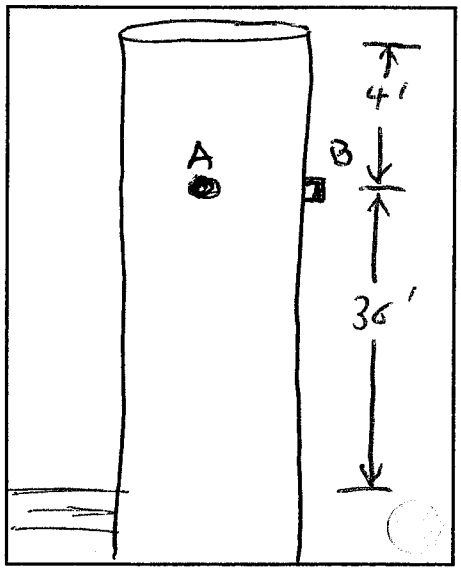
APPENDIX D - Field Data Sheets

VELOCITY DATA SHEET - METHOD 2

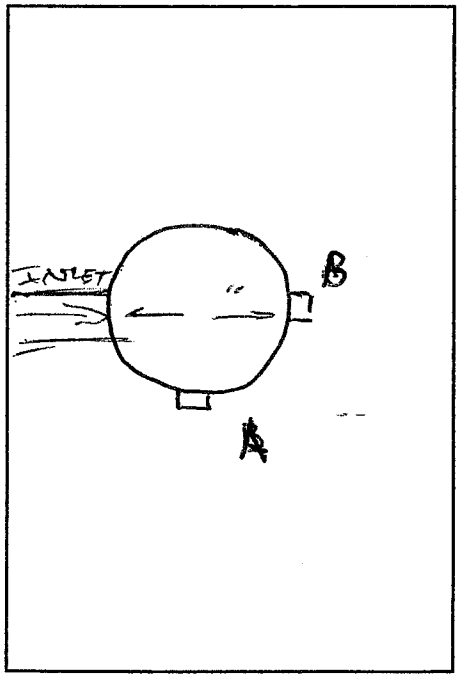
Facility:	Simi Valley L.F.	**Baro. Press:**	29.90	**D_1 upstream:**	0.52
Source:	Flare #1	**Static Press:**	-.065	**D_1 downstream:**	4.7
Job #:	W07 036	**Pitot Tube #:**	10-2	**Stack Diameter:**	92"
Date:	09/18/03	**Pitot Tube Type:**	"S"	**Leak Check**	
Operator:	JW	**Magnahelic:**	#2	**Initial:**	**Final:**
Run #:	1			✓✓	✓✓

Point #	Position in.	Velocity Head in. H_2O	Stack Temp °F	Cyclonic Flow Angle
A 12	90.1	.035	1640	1
11	85.8	.040	1648	0
10	81.1	.040	1648	0
9	~~78.7~~	.050	1650	0
8	69.0	.055	1654	1
7	59.2	.055	1662	1
6	32.8	.050	1670	1
5	23.0	.050	1665	1
4	16.3	.050	1660	2
3	10.8	.045	1664	0
2	6.2	.040	1655	0
1	1.9	.030	1650	0
B 12		.035	1650	0
11		.030	1656	0
10		.030	1657	0
9		.040	1665	1
8		.045	1672	0
7		.045	1671	0
6		.05	1670	1
5		.05	1673	1
4		.055	1674	1
3		.050	1654	0
2		.030	1658	0
1		.030	1653	0
Average		$\sqrt{\Delta P}$= ~~0.2319~~ 0.2061 SB	T_s= 1659.5 SB	∠=

Side View



Top View



PARTICULATE FIELD DATA

PLANT Simi Valley LF
DATE 9-18-03
LOCATION Simi Valley, CA
OPERATOR SB, TW
SOURCE Flare #1 Outlet
RUN NO. 1
PROBE BOX NO. C7

TIME START 0834

METER BOX NO. 5
METER ΔH @ 1.6866
Y= 0.9851
PROBE I.D. NO. 55
NOZZLE DIAMETER, in. NA
STACK DIAMETER, in. NA
PROBE HEATER SETTING NA
HEATER BOX SETTING NA
Δ Cp FACTOR NA
FILTER NO. NA

ASSUMED MOISTURE, % NA
AMBIENT TEMPERATURE 70°F
BARO. PRESS. 28.90
STATIC PRESS. NA
NOMAGRAPH INDEX NA

PRE TEST LEAK CHECKS
METER 0.005 @ 10 in. Hg
PITOTS NA @ in. Hg
ORSAT NA

P#	TIME	T_S °F	Δ P in H_2O	√Δ P	Δ H in H_2O	Vm ft^3	$T_{m\,IN}$ °F	T_m OUT °F	OVEN °F	IMP. OUT °F	VAC. (in Hg)
Single	00	NA	NA	NA	1.7	297.396	69	69	NA	58	3
	05				1.7	301.2	75	70		56	3
	10				1.7	305.3	78	70		55	3
	15				1.7	308.9	81	72		55	3
	20				1.7	312.7	84	75		55	3
	25				1.7	316.6	86	77		54	3
	30				1.7	320.527	84	80		58	3
	35				1.7	324.2	88	81		57	3
	40				1.7	327.9	91	82		55	3
	45				1.7	331.9	93	83		56	3
	50				1.7	335.9	94	84		55	3
	55				1.7	339.7	95	85		55	3
	60					343.453					
Avg.					1.70	46.057		81.1			

TIME END = 0947

SB SB SB

Volume of Liquid Water Collected	Impinger Volume 1	2	3	4	Silica Gel Wght. 5
Final	134	122	6		270
Initial	100	100	0		266
Liquid Collected	34	22	6		4
Total Vol. Collected					86

SB

POST TEST LEAK CHECKS
Meter 0.000 @ 10 in. Hg
Pitots NA @ in. Hg
Orsat NA

Orsat Meas.	Time	CO_2	O_2	CO	N_2
1					
2					
3					

Nozzle Cal	D_1	D_2	D_3	Average

VELOCITY DATA SHEET - METHOD 2

Facility:	Simi Valley L.F	**Baro. Press:**	28.90	**D_1 upstream:**	0.52
Source:	Flare #1	**Static Press:**	-.060	**D_1 downstream:**	4.7
Job #:	407-036	**Pitot Tube #:**	16-2	**Stack Diameter:**	92"
Date:	09/18/03	**Pitot Tube Type:**	"S"	**Leak Check**	
Operator:	JW	**Magnahelic:**	#2	**Initial:**	**Final:**
Run #:	2			✓✓	✓✓

Point #	Position in.	Velocity Head in. H_2O	Stack Temp °F	Cyclonic Flow Angle
A 12		.03	1645	0
11		.035	1650	0
10		.035	1657	0
9		.04	1670	0
8		.05	1668	1
7		.055	1666	0
6		.050	1660	1
5		.050	1665	1
4		.040	1670	1
3		.040	1650	0
2		.030	1654	0
1		.030	1651	0
B 12		.040	1648	0
11		.035	1652	0
10		.040	1657	0
9		.040	1663	1
8		.045	1672	1
7		.05	1670	1
6		.045	1668	0
5		.04	1660	1
4		.045	1661	1
3		.04	1650	1
2		.035	1653	0
1		.030	1652	1
Average		$\sqrt{\Delta P}$= 0.2003	T_s= 1658.8	∠=
		5B	5B	

Side View

See R-1

Top View

See R-1

Horizon Air Measurement Services, Inc.
Velocity Data Sheets - Method 2 (H:WPDOCS\FORMS\VELOCITY DATA SHEET - M2)

PARTICULATE FIELD DATA

PLANT Simi Valley LF
DATE 9-18-07
LOCATION Simi Valley, CA
OPERATOR SB, TW
SOURCE Flare #1 OUT/OUT
RUN NO. 2
SAMPLE BOX NO. C

TIME START 1045

METER BOX NO. 5
METER ΔH @ 1.6866
Y= 0.9851
PROBE I.D. NO. 55
NOZZLE DIAMETER, in. NA
STACK DIAMETER, in. NA
PROBE HEATER SETTING NA
HEATER BOX SETTING NA
Δ Cp FACTOR NA
FILTER NO. NA

ASSUMED MOISTURE, % NA
AMBIENT TEMPERATURE 80°F
BARO. PRESS. 28.00
STATIC PRESS. NA
NOMAGRAPH INDEX NA

PRE TEST LEAK CHECKS
METER 0.005 @ 11 in. Hg
PITOTS NA @ ____ in. Hg
ORSAT NA

P#	TIME	T_S °F	Δ P in H_2O	√Δ P	Δ H in H_2O	Vm ft^3	$T_{m\,IN}$ °F	T_m OUT °F	OVEN °F	IMP. OUT °F	VAC. (in Hg)
Single	00	NA	NA	NA	1.7	343.758	91	89	NA	59	3
|	05				1.7	349.5	97	88		56	3
|	10				1.7	351.3	99	89		55	3
|	15				1.7	355.1	99	89		55	3
|	20				1.7	358.7	98	99		54	3
|	25				1.7	362.7	97	90		54	3
|	30				1.7	367.328	91	89		58	3
|	35				1.7	370.3	93	90			
|	40				1.7	374.1	95	90			
|	45				1.7	377.9	96	90			
|	50				1.7	381.7	97	91			
|	55				1.7	385.4	98	91			
|	60					391.683					
Avg.					1.70	47.925		93.2			

TIME END = 1154

SB SB SB

Volume of Liquid Water Collected	Impinger Volume 1	2	3	4	Silica Gel Wght. 5
Final	154	119	4		278
Initial	100	100	0		267
Liquid Collected	54	19	4		11
Total Vol. Collected					88

SB

POST TEST LEAK CHECKS
Meter 0.000 @ 8 in. Hg
Pitots NA @ ____ in. Hg
Orsat NA

Orsat Meas.	Time	CO_2	O_2	CO	N_2
1					
2					
3					

Nozzle Cal	D_1	D_2	D_3	Average

VELOCITY DATA SHEET - METHOD 2

Facility:	Simi Valley L.F.	**Baro. Press:**	28.90	**D_1 upstream:**	0.52
Source:	Flare #1	**Static Press:**	-.065	**D_1 downstream:**	4.7
Job #:	407-036	**Pitot Tube #:**	10-2	**Stack Diameter:**	92 "
Date:	09/18/03	**Pitot Tube Type:**	"S"	**Leak Check**	
Operator:	TW	**Magnahelic:**	#2	**Initial:** ✓ ✓	**Final:** ✓ ✓
Run #:	3				

Point #	Position in.	Velocity Head in. H_2O	Stack Temp °F	Cyclonic Flow Angle
A 12		TW .035	1649	0
11		.035	1648	0
10		.040	1656	0
9		.045	1668	1
8		.050	1671	1
7		.050	1670	0
6		.045	1666	1
5		.045	1665	1
4		.040	1640	0
3		.030	1641	0
2		.035	1640	0
1		.030	1637	0
B 12		.035	1647	0
11		.040	1654	0
10		.040	1660	0
9		.045	1661	1
8		.045	1670	1
7		.050	1672	1
6		.050	1670	1
5		.050	1659	0
4		.035	1662	0
3		.035	1648	0
2		.030	1648	0
1		.030	1652	1
Average		$\sqrt{\Delta P}$= 0.1998	T_s= 1656.4	∠=
		5B	5B	

Side View

See R-1

Top View

See R-1

PARTICULATE FIELD DATA

PLANT Simi Valley LF
DATE 9-18-03
LOCATION Simi Valley CA
OPERATOR SB, TW
SOURCE Flare #1 Outlet
RUN NO. 3
SAMPLE BOX NO. C7
TIME START 1230

METER BOX NO. 5
METER ΔH @ 1.6866
Y= 0.9851
PROBE I.D. NO. 5
NOZZLE DIAMETER, in. NA
STACK DIAMETER, in. NA
PROBE HEATER SETTING NA
HEATER BOX SETTING NA
Δ Cp FACTOR NA
FILTER NO. NA

ASSUMED MOISTURE, % NA
AMBIENT TEMPERATURE 80°F
BARO. PRESS. 29.99
STATIC PRESS. NA
NOMAGRAPH INDEX NA

PRE TEST LEAK CHECKS
METER 0.005 @ 12 in. Hg
PITOTS NA @ ____ in. Hg
ORSAT NA

P#	TIME	T_s °F	Δ P in H_2O	√Δ P	Δ H in H_2O	Vm ft^3	$T_{m\ IN}$ °F	T_m OUT °F	OVEN °F	IMP. OUT °F	VAC. (in Hg)
Single	00	NA	NA	NA	1.7	392.342	91	90	NA	59	3
	05				1.7	396.3	96	91		58	3
	10				1.7	400.5	98	91		58	3
	15				1.7	404.1	99	92		57	3
	20				1.7	408.1	100	92		58	3
	25				1.7	412.0	101	93		58	3
	30				1.7	416.098	95	94		57	3
	35				1.7	419.9	100	94		58	3
	40				1.7	423.9	102	95		56	3
	45				1.7	427.9	103	95		57	3
	50				1.7	431.8	104	95			
	55				1.7	435.8	105	96			
	60					439.824					
Avg.					1.70	47.482		96.3			

TIME END = 1337

SB SB SB

Volume of Liquid Water Collected	Impinger Volume 1	2	3	4	Silica Gel Wght. 5
Final	152	126	6		276
Initial	100	100	0		270
Liquid Collected	52	26	6		6
Total Vol. Collected					70

SB

POST TEST LEAK CHECKS
Meter 0.000 @ 8 in. Hg
Pitots NA @ ____ in. Hg
Orsat NA

Orsat Meas.	Time	CO_2	O_2	CO	N_2
1					
2					
3					

Nozzle Cal	D_1	D_2	D_3	Average

SCAQMD METHOD 25
FIELD SAMPLING DATA SHEET

Job #: W04-036 **Control Device:** Flare #1

Facility: Simi Valley L.F. **Sample Location:** INLET R1 & R2

Location: Simi Valley, CA **Ambient Temp.:** 70°F

Date: 09/18/03 **Baro. Pressure:** 28.90

Operator: SB

SAMPLE A (R1)

Tank #: SB D **Trap #:** M

Initial Vacuum: ~~29~~" / 0.5 bar

Final Vacuum: 10"

Start Time: 0834 / END: 0934

TIME (min.)	VACUUM ("Hg)	FLOW (cc/min)
00	29	160
05	27.5	
10	26	
15	24	
20	22.5	
25	21	
30	19.5	
35	18	
40	16.5	
45	15	
50	13	
55	11.5	
60	10	

SAMPLE B (R2)

Tank #: ~~SB~~ T **Trap #:** M

Initial Vacuum: ~~29~~" / 0.5 bar

Final Vacuum: 10"

Start ~~End~~ Time: 1045 / END: 1145

TIME (min.)	VACUUM ("Hg)	FLOW (cc/min)
00	29	160
05	27.5	
10	26	
15	24	
20	22.5	
25	21	
30	19.5	
35	18	
40	16.5	
45	15	
50	13	
55	11.5	
60	10	

LEAK RATE

Pre Test : ✓ ✓

Post Test: ✓ SB

TOTAL COMBUSTION ANALYSIS
SCAQMD METHOD 25
FIELD SAMPLING DATA SHEET

Job #: W07-036
Facility: Simi Valley L.F.
Location: Simi Valley, CA
Date: 09/18/03
Operator: TW / SB

Control Device: Flare #1
Sample Location: ~~INLET~~ OUTLET
Ambient Temp.: 75°F ① / 79°F ②
Baro. Pressure: 29.90

SAMPLE A (R1)

Tank #: 17 **Trap #:** NA
Initial Vacuum: 30 1.5 torr
Final Vacuum: 10"

SAMPLE B (R2)

Tank #: 18 **Trap #:** NA
Initial Vacuum: 30" / 1.5 torr
Final Vacuum: 10"

Start Time:

TIME (min.)	VACUUM ("Hg)	FLOW (cc/min)
00	30	~160
05	28½	
10	27	
15	25	
20	23½	
25	22	
30	20½	
35	19	
40	17½	
45	16	
50	14	
55	12	
60	10	

End Time:

TIME (min.)	VACUUM ("Hg)	FLOW (cc/min)
00	30	~160
05	28½	
10	27	
15	25½	
20	24	
25	21½	
30	20	
35	16½	
40	17	
45	15½	
50	14	
55	12	
60	10	

LEAK RATE

Pre Test : √ TW
Post Test: √ TW

SCAQMD METHOD 25
FIELD SAMPLING DATA SHEET

Job #: W07.036 **Control Device:** Flare #1

Facility: Simi Valley L.F. **Sample Location:** INLET R-3

Location: Simi Valley, CA **Ambient Temp.:** 80°F

Date: 09/18/03 **Baro. Pressure:** 28.90

Operator: S.B.

SAMPLE A (R-3)

Tank #: SB U **Trap #:** N

Initial Vacuum: 0.0 bar

Final Vacuum: 10"

Start Time: 1230 Stop 1330

TIME (min.)	VACUUM ("Hg)	FLOW (cc/min)
00	29	160
05	27.5	
10	26	
15	25	
20	23	
25	22	
30	20.5	
35	19	
40	17.5	
45	16	
50	15	
55	13.5	
60	12	

SAMPLE B

Tank #: N **Trap #:** —

Initial Vacuum: —

Final Vacuum: —

~~End Time:~~

TIME (min.)	VACUUM ("Hg)	FLOW (cc/min)
00		
05		
10		
15		
20		
25		
30		
35		
40		
45		
50		
55		
60		

LEAK RATE

Pre Test : ✓ TW

Post Test: ✓ SB

TOTAL COMBUSTION ANALYSIS
SCAQMD METHOD 25
FIELD SAMPLING DATA SHEET

Job #: W07-036 **Control Device:** Flare #1

Facility: Simi Valley L.F. **Sample Location:** OUTLET R-3

Location: Simi Valley, CA **Ambient Temp.:** 92° F

Date: 9/18/03 **Baro. Pressure:** 29.90

Operator: JW

SAMPLE A R-3

Tank #: 39 **Trap #:** N/A

Initial Vacuum: 30" / Ambient

Final Vacuum: 10"

SAMPLE B

Tank #: ~~—~~ **Trap #:** ~~—~~

Initial Vacuum: ~~—~~ / ~~—~~

Final Vacuum: ~~—~~

Start Time: —

TIME (min.)	VACUUM ("Hg)	FLOW (cc/min)
00	30	~160
05	28	
10	26	
15	24½	
20	23	
25	21½	
30	20	
35	18½	
40	17	
45	15½	
50	14	
55	12	
60	10	

End Time: —

TIME (min.)	VACUUM ("Hg)	FLOW (cc/min)
00		
05		
10		
15		
20		
25		
30		
35		
40		
45		
50		
55		
60		

LEAK RATE

Pre Test : ✓ JW

Post Test: _____

APPENDIX E - Operating Data

Flare #1 **CALCULATION DATA SHEET** W07-036

Moisture Corrections for Inlet Flows

Run #1

$$1353.3 \text{ scf} \times \left(\frac{100 - 9.0}{100}\right) = \underline{1231.5 \text{ DSCF}}$$

Run #2

$$1352.0 \text{ scf} \times \left(\frac{100 - 9.1}{100}\right) = \underline{1228.0 \text{ DSCF}}$$

Run #3

$$1365.3 \text{ scf} \times \left(\frac{100 - 9.1}{100}\right) = \underline{1241.1 \text{ DSCF}}$$

OPERATING DATA
FOR LANDFILL FLARES

Facility: Simi Valley Landfill Date: 9/18/03

Job No.: W07-086 Run #: 1, 2

Source: Flare #1 (McGill)

Time Run#1	Landfill Gas Flow (SCFM)	Condensate Injection ( )	Flare Temerature (°F)	Fuel Pressure ( )	Fuel Temp (°F)
0840	1341	NA	1820	NA	NA
0850	1360		1797		
0900	1369		1752		
0925	1354		1817		
0935	1348		1856		
0945	1347		1869		
Average	1353.3		1818.5		
Run#2	-		-		
1050	1348		1911		
1100	1332		1923		
1110	1341		1881		
1130	1344		1898		
1140	1381		1804		
1150	1366		1805		
Avg.	1352.0		1870.3		

Run #1 Wet Bulb 119 °F
Dry Bulb 141 °F
9.0

Horizon Air Measurement Services, Inc.
H:\WPDOCS\FORMS\Fuel Gas Flow Rate For Landfill Flares

Run #2 Wet Bulb 120 °F
Dry Bulb 141 °F
9.1 %

OPERATING DATA
FOR LANDFILL FLARES

Facility: Simi Valley LF Date: 9/18/03

Job No.: W07-036 Run #: 3

Source: Flare #1 McGill

Time Run#3	Landfill Gas Flow (SCFM)	Condensate Injection ( )	Flare Temerature (°F)	Fuel Pressure ( )	Fuel Temp (°F)
1235	1363	NA	1790	NA	NA
1245	1371		1815		
1255	1375		1797		
1310	1360		1797		
1320	1357		1798		
1330	1366		1809		
Avg.	1365.3		1801.0		

Run #3 Wet Bulb 120°F

Dry Bulb 142°F

9.1

APPENDIX F - Correspondences

Ventura County Air Pollution Control District

669 County Square Drive
Ventura, California 93003

tel 805/645-1400
fax 805/645-1444
www.vcapcd.org

Michael Villegas
Air Pollution Control Officer

September 11, 2003

Horizon Air Measurement Services, Incorporated
Attn: Lori M. Gillum, Office Manager
996 Lawrence Drive, Suite 108
Newbury Park, CA 91320

Subject: Source Test Protocol Approval

Dear Ms. Gillum:

We have reviewed the source test protocol for Waste Management, Incorporated's 44 MMBTU/hr McGill Environmental System and 75 MMBTU/hr John Zink landfill gas flares located at the Simi Valley Landfill and Recycling Center, 2801 Madera Road, Simi Valley, CA 93065. We find that the protocol is acceptable. You are authorized to conduct the source tests on September 17 and 18, 2003. Please contact us 2 working days prior to this date to confirm the test date, so that we can arrange to observe the tests.

Thank you for your cooperation in this matter. If you have any questions, please contact air quality engineer Lyle Olson at 805/645-1413.

Sincerely,

Keith Duval, Manager
Compliance and Employer Transportation Program Division

c. Scott Tignac, District Manger, Waste Management, Incorporated
James Riley, Environmental Engineer, Waste Management, Incorporated

STP01395

APPENDIX G - Calibration Data

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

CERTIFICATE OF ANALYSIS

CUSTOMER HORIZON AIR

DATE 03/19/03

P.O NUMBER

REF. NUMBER 82300200

REQUESTED COMPOSITION

GAS	CONCENTRATION
NITROGEN DIOXIDE (AS NOX)	19 ppm
NITROGEN	BALANCE
ANALYTICAL ACCURACY ± 2 %	
NITRIC OXIDE	

ANALYTICAL METHOD

INSTRUMENT	ANALYTICAL PRINCIPLE
Thermo Env. 42H S/N 42H-44979-273	Chemiluminescence

VALUES NOT VALID BELOW 150 PSIG.
CONC. OF NO2 LAST ASSAYED ON 06/24/02 WAS 19.2 ppm.

THIS CYLINDER NO.	CC 115548
CYLINDER PRESSURE	750 **PSIG**
EXPIRATION DATE	09/19/03
CLASSIFICATION	PRIMARY STANDARD
BATCH NUMBER	N/A
LOT NUMBER	109106510
PART NUMBER	EV NINX19MP-AS
CYLINDER SIZE	AS **CGA** 660 55 **CFT**

CERTIFIED CONCENTRATION

NITROGEN DIOXIDE (AS NOX)	19.2 ppm
NITROGEN	BALANCE
ANALYTICAL ACCURACY ± 2 %	
NITRIC OXIDE	0.6 ppm

ANALYZED BY JOSEPH CHARLES

CERTIFIED BY DOUG GRANT

PRAXAIR

Praxair
5700 South Alameda Street .
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER HORIZON AIR MEASUREMENTS **P.O NUMBER** 8181

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
NITRIC OXIDE	vs.SRM#2628	CC 137315	9.50 ppm

ANALYZER READINGS

R=REFERENCE STANDARD *Z=ZERO GAS* *C=GAS CANDIDATE*

1. **COMPONENT** NITRIC OXIDE **ANALYZER MAKE-MODEL-S/N** Thermo Env. 42H S/N 42H-44979-273

ANALYTICAL PRINCIPLE CHEMILUMINESCENCE **LAST CALIBRATION DATE** 05/02/03

FIRST ANALYSIS DATE 10/29/02 **SECOND ANALYSIS DATE** 05/05/03

Z	-0.09	R	10.06	C	10.35	CONC.	10.1	Z	-0.03	R	10.74	C	11.38	CONC.	10.1
R	10.04	Z	-0.09	C	10.42	CONC.	10.1	R	10.72	Z	-0.03	C	11.40	CONC.	10.1
Z	-0.08	C	10.45	R	10.09	CONC.	10.1	Z	-0.03	C	11.39	R	10.73	CONC.	10.1
U/M	ppm			MEAN TEST ASSAY			10.1	U/M	ppm			MEAN TEST ASSAY			10.1

[NOx] = 10.1 ppm (For reference only).
All values not valid below 150 psig.
NO: first analysis on 10/29/02 was against GMIS 9.77 ppm NO/N2.

THIS CYLINDER NO. SA 4275 **CERTIFIED CONCENTRATION**
HAS BEEN CERTIFIED ACCORDING TO SECTION EPA-600/R97/121 NITRIC OXIDE 10.1 ppm
OF TRACEABILITY PROTOCOL NO. Rev. 9/97 NITROGEN BALANCE
PROCEDURE G1
CERTIFIED ACCURACY ± 1 **% NIST TRACEABLE**
CYLINDER PRESSURE 2000 **PSIG**
CERTIFICATION DATE 05/05/03
EXPIRATION DATE 05/05/05 **TERM** 24 MONTHS

ANALYZED BY JOSEPH CHARLES **CERTIFIED BY** MICHAEL TSANG

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER HORIZON AIR **P.O NUMBER**

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
NITRIC OXIDE GMIS	vs.SRM#1683	CC 95448	22.4 ppm

ANALYZER READINGS

R=REFERENCE STANDARD *Z=ZERO GAS* *C=GAS CANDIDATE*

1. **COMPONENT** NITRIC OXIDE GMIS **ANALYZER MAKE-MODEL-S/N** Thermo Env. 42H S/N 42H-44979-273

ANALYTICAL PRINCIPLE Chemiluminescence **LAST CALIBRATION DATE** 08/09/02

FIRST ANALYSIS DATE 08-20-02 **SECOND ANALYSIS DATE** 08-27-02

Z 0	**R** 22.6	**C** 21.0	**CONC.** 20.8		**Z** 0.0	**R** 22.66	**C** 21.02	**CONC.** 20.8			
R 22.5	**Z** 0	**C** 21.0	**CONC.** 20.9		**R** 22.65	**Z** 0.0	**C** 21.03	**CONC.** 20.8			
Z 0	**C** 21.1	**R** 22.7	**CONC.** 20.8		**Z** 0.0	**C** 21.03	**R** 22.67	**CONC.** 20.8			
U/M ppm		**MEAN TEST ASSAY** 20.8			**U/M** ppm		**MEAN TEST ASSAY** 20.8				

NOx values for reference only.
All values not valid below 150 psig.

THIS CYLINDER NO. SA 7833
HAS BEEN CERTIFIED ACCORDING TO SECTION EPA-600/R97/121
OF TRACEABILITY PROTOCOL NO. Rev. 9/97
PROCEDURE G1
CERTIFIED ACCURACY ± 1 **% NIST TRACEABLE**
CYLINDER PRESSURE 2000 **PSIG**
CERTIFICATION DATE 08/27/02
EXPIRATION DATE 08/27/04 **TERM** 24 MONTHS

CERTIFIED CONCENTRATION

NITRIC OXIDE	20.8 ppm
NITROGEN	BALANCE
NOx	21.0 ppm

ANALYZED BY PHU TIEN NGUYEN ***CERTIFIED BY*** MICHAEL TSANG

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

CERTIFICATE OF ANALYSIS

CUSTOMER HORIZON AIR MEASUREMENTS

DATE 08/06/03

P.O NUMBER

REF. NUMBER 22593800

REQUESTED COMPOSITION

GAS	CONCENTRATION
CARBON DIOXIDE	7 %
OXYGEN	12 %
NITROGEN	BALANCE
ANALYTICAL ACCURACY	±1 %

ANALYTICAL METHOD

INSTRUMENT	ANALYTICAL PRINCIPLE
METTLER ID5, S/N:1865166	GRAVIMETRIC
METTLER ID5, S/N:1865166	GRAVIMETRIC

Values not valid below 150 psig.

THIS CYLINDER NO.	CC 168083
CYLINDER PRESSURE	2000 **PSIG**
EXPIRATION DATE	12/31/06
CLASSIFICATION	PRIMARY STANDARD
BATCH NUMBER	N/A
LOT NUMBER	109311104
PART NUMBER	EV NICDOXP1-AS
CYLINDER SIZE	AS **CGA** 590 148 **CFT**

CERTIFIED CONCENTRATION

CARBON DIOXIDE	7.00 %
OXYGEN	12.01 %
NITROGEN	BALANCE
ANALYTICAL ACCURACY	±1 %

ANALYZED BY JACK FU

CERTIFIED BY TY TRIPLETT

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

CERTIFICATE OF ANALYSIS

CUSTOMER HORIZON AIR

DATE 08/27/02

P.O NUMBER

REF. NUMBER 00874800

REQUESTED COMPOSITION

GAS	CONCENTRATION
CARBON DIOXIDE	12 %
NITROGEN	BALANCE
ANALYTICAL ACCURACY ±1 %	

ANALYTICAL METHOD

INSTRUMENT	ANALYTICAL PRINCIPLE
METTLER IDS, S/N:1865166	GRAVIMETRIC

VALUE NOT VALID BELOW 150 PSIG.

THIS CYLINDER NO.	SA 2515
CYLINDER PRESSURE	2000 **PSIG**
EXPIRATION DATE	08/27/05
CLASSIFICATION	PRIMARY STANDARD
BATCH NUMBER	N/A
LOT NUMBER	109223508
PART NUMBER	EV NICD12P-AS
CYLINDER SIZE	AS **CGA** 580 143 **CFT**

CERTIFIED CONCENTRATION

CARBON DIOXIDE	12.01 %
NITROGEN	BALANCE
ANALYTICAL ACCURACY ±1 %	

ANALYZED BY JOSEPH CHARLES

CERTIFIED BY TY TRIPLETT

5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER HORIZON AIR MEASUREMENTS **P.O NUMBER** 8181

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
CARBON MONOXIDE GMIS	vs. 2636a	CC 117260	250 ppm

ANALYZER READINGS

R=REFERENCE STANDARD *Z=ZERO GAS* *C=GAS CANDIDATE*

1. **COMPONENT** CARBON MONOXIDE GMIS **ANALYZER MAKE-MODEL-S/N** Siemens Ultramat 5E S/N A12-729

ANALYTICAL PRINCIPLE NDIR **LAST CALIBRATION DATE** 04/03/03

FIRST ANALYSIS DATE 12/20/02 **SECOND ANALYSIS DATE** 04/30/03

Z 0	R 250.0	C 200.0	CONC. 200		Z 0	R 250.0	C 200.0	CONC. 200	
R 250.0	Z 0	C 201.0	CONC. 201		R 250.0	Z 0	C 200.0	CONC. 200	
Z 0	C 201.0	R 250.0	CONC. 201		Z 0	C 200.0	R 250.0	CONC. 200	
U/M ppm		MEAN TEST ASSAY	201		U/M ppm		MEAN TEST ASSAY	200	

Values not valid below 150 psig

THIS CYLINDER NO. SA 20048 **CERTIFIED CONCENTRATION**

HAS BEEN CERTIFIED ACCORDING TO SECTION EPA-600/R97/121 CARBON MONOXIDE 200 ppm

OF TRACEABILITY PROTOCOL NO. Rev. 9/97 NITROGEN BALANCE

PROCEDURE G1

CERTIFIED ACCURACY ± 1 **% NIST TRACEABLE**

CYLINDER PRESSURE 2000 **PSIG**

CERTIFICATION DATE 04/30/03

EXPIRATION DATE 04/30/06 **TERM** 36 MONTHS

ANALYZED BY PHU TIEN NGUYEN ***CERTIFIED BY*** THANH TRUC NGOC NGUYEN

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER HORIZON AIR MEASUREMENTS **P.O NUMBER** 8180

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
CARBON MONOXIDE GMIS	vs.SRM#1680	CC 86522	500 ppm

ANALYZER READINGS

R=REFERENCE STANDARD *Z=ZERO GAS* *C=GAS CANDIDATE*

1. **COMPONENT** CARBON MONOXIDE GMIS **ANALYZER MAKE-MODEL-S/N** Siemens Ultramat 5E S/N A12-729

ANALYTICAL PRINCIPLE NDIR **LAST CALIBRATION DATE** 05/03/03

FIRST ANALYSIS DATE 04/28/03 **SECOND ANALYSIS DATE** 05/05/03

Z 0	**R** 500.0	**C** 397.5	**CONC.** 398		**Z** 0	**R** 500.0	**C** 398.0	**CONC.** 398	
R 500.0	**Z** 0	**C** 387.5	**CONC.** 398		**R** 500.0	**Z** 0	**C** 398.0	**CONC.** 398	
Z 0	**C** 397.5	**R** 500.0	**CONC.** 398		**Z** 0	**C** 398.0	**R** 500.0	**CONC.** 398	
U/M ppm		**MEAN TEST ASSAY** 398			**U/M** ppm		**MEAN TEST ASSAY** 398		

Values not valid below 150 psig

THIS CYLINDER NO. SGAL 2116
HAS BEEN CERTIFIED ACCORDING TO SECTION EPA-600/R97/121
OF TRACEABILITY PROTOCOL NO. Rev. 9/97
PROCEDURE G1
CERTIFIED ACCURACY ± 1 **% NIST TRACEABLE**
CYLINDER PRESSURE 2000 **PSIG**
CERTIFICATION DATE 05/05/03
EXPIRATION DATE 05/05/06 **TERM** 36 MONTHS

CERTIFIED CONCENTRATION

CARBON MONOXIDE	398 ppm
NITROGEN	BALANCE

ANALYZED BY THANH TRUC NGOC NGUYEN

CERTIFIED BY PHU TIEN NGUYEN

CC7

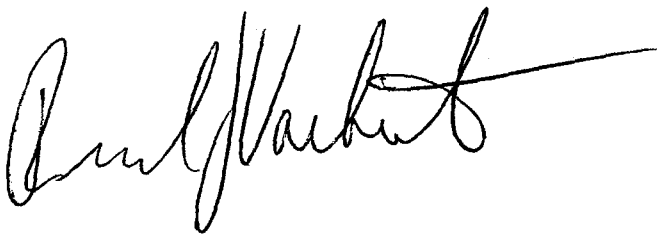
Control Box Calibration Data

Date: 02/05/03 **Calibrated by:** FJOTorres

Meter Box Number: 5 **Barometric Pressure:** 29.30

Wet Test Meter Cf: 1.0013

Orifice setting (H)	Gas Volumes: Wet Test (cu.ft)	Gas Volumes: Dry Gas Initial (cu.ft)	Gas Volumes: Dry Gas Final (cu.ft)	Temperatures: DGM Initial (°F)	Temperatures: DGM final (°F)	Temperatures: WTM (°F)	Time (min)	Y	H@
0.5	7.054	436.875	444.083	67	76	65	17	0.9903	1.6258
1.0	19.763	504.138	524.342	69	77	66	34	0.9891	1.6595
1.5	13.236	524.559	538.157	77	80	67	19	0.9913	1.7218
2.0	16.216	474.603	491.257	73	79	66	20	0.9876	1.6962
3.0	11.951	461.997	474.270	71	78	66	12	0.9829	1.69
4.0	16.120	445.166	461.642	69	77	66	14	0.9824	1.6908
						AVERAGE		0.9873	1.6807

Reviewed by: 

Magnehelic Gauge Calibration Data

Range: 0.0-0.25

Date: 07/02/03 **Calibrated by:** Ferodie Jesus Orara Torres

BAROMETRIC PRESURE: 29.30 **Reference:** 0.0-0.25" MANOMETER

SYSTEM LEAK CHECKS (Y/N): Y

POINT LEAK CHECK (Y/N): Y

Magnahelic Box # 2

Serial # R2001212AN7

MAG	MAN R1	MAN R2	MAN R3	MEAN	MEAN/MAG
0.05	0.05	0.05	0.05	0.050	1.000
0.10	0.10	0.10	0.10	0.100	1.003
0.15	0.15	0.15	0.15	0.149	0.996
0.20	0.20	0.20	0.20	0.201	1.003
0.25	0.25	0.25	0.25	0.249	0.997

Correction Factor: 0.9999

Date: 7/2/03

Checked by:

009

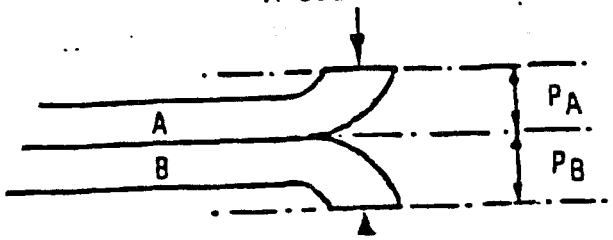
TYPE S PITOT TUBE INSPECTION DATA FORM

Tubing diameter, D_t 0.355 in.

Pitot Tube Assembly Level? (Yes) / No

Pitot Tube Openings Damaged? Yes / (No)

A-SIDE PLANE



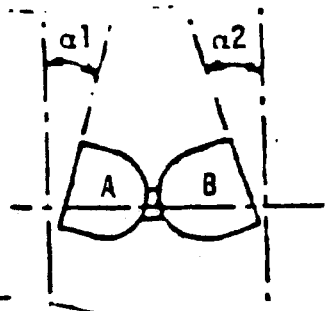
NOTE: 0.983

$\{1.05\ D_t < P < 1.50\ D_t$

$P_A = P_B$

P_A = 0.492 in.

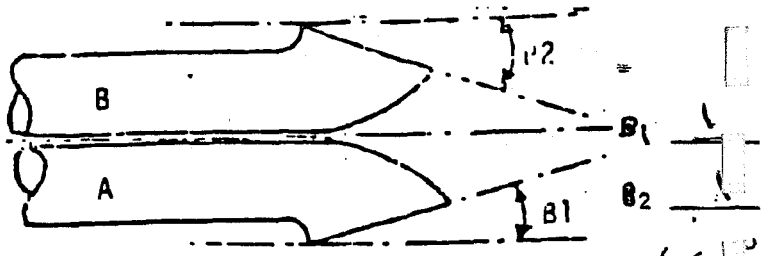
P_B = 0.492 in.



α_1 = 1 °

α_2 = 1 °

(<10°)



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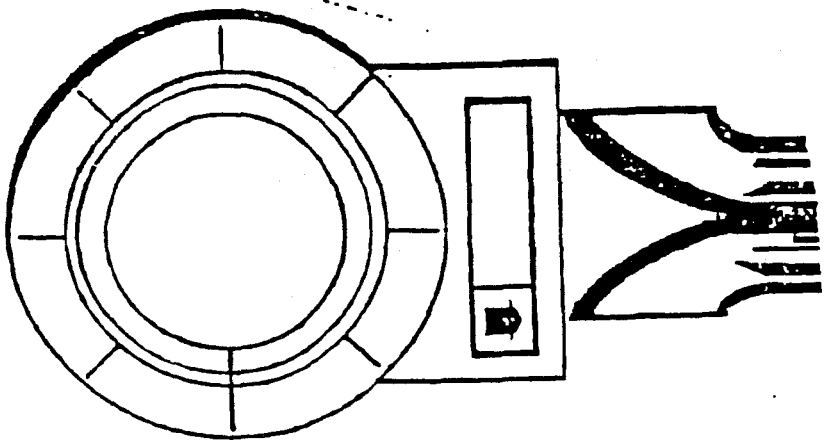
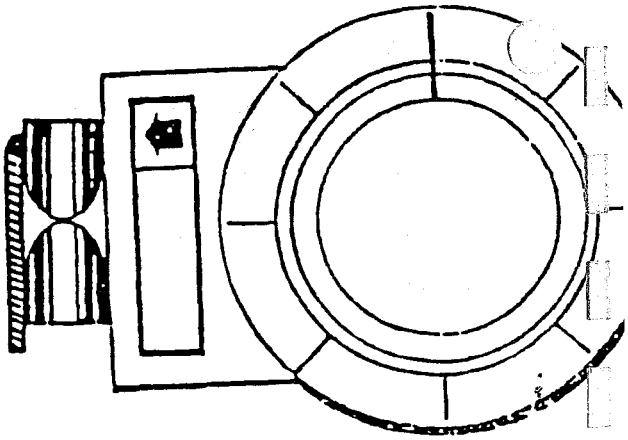




Level Position to Find γ = 0 °

Z = A sin γ = 0.000 in. (< 1/8 in.)

Level Position to find θ = 1 °

W = A sin θ = 0.0172 in. (< 1/3

Comments _____

Checked by: TW DATE: 01/30/03

Calibration Required? NO

STACK TEMPERATURE SENSOR CALIBRATION DATA- APEX PROBE ASSEMBLIES

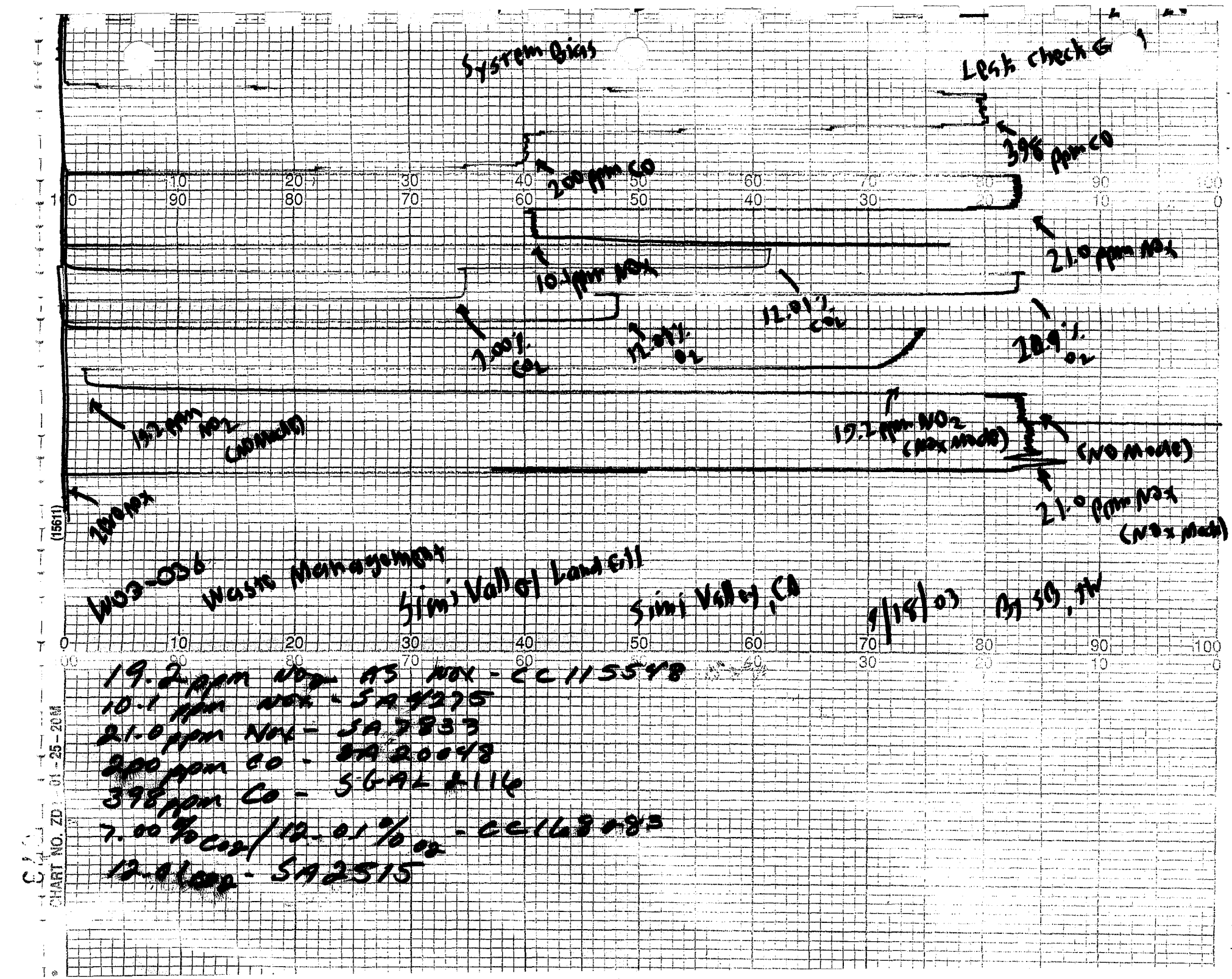
Date: 01/30/03
Calibrated by: Travis Williams

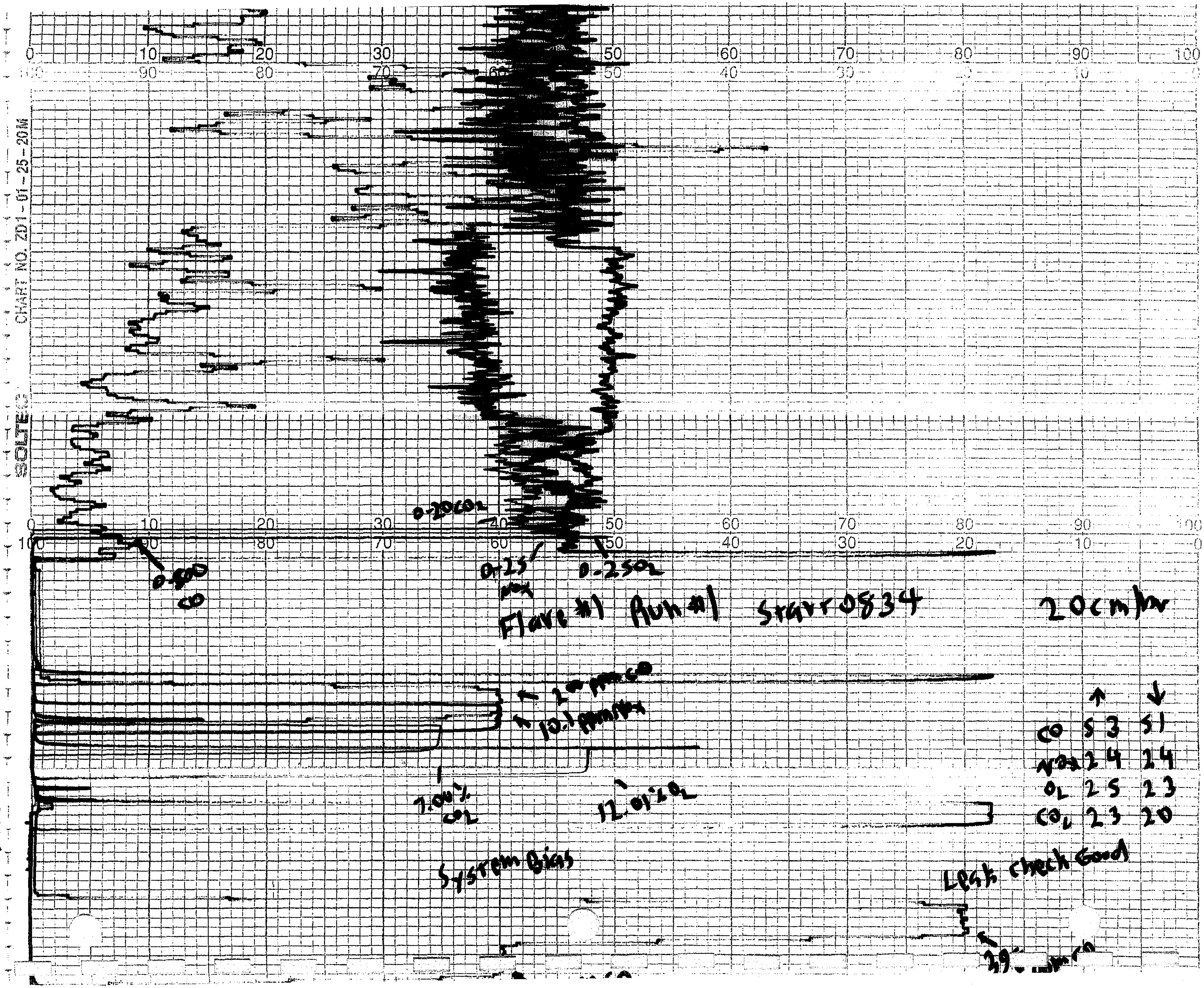
THERMOCOUPLE ID:

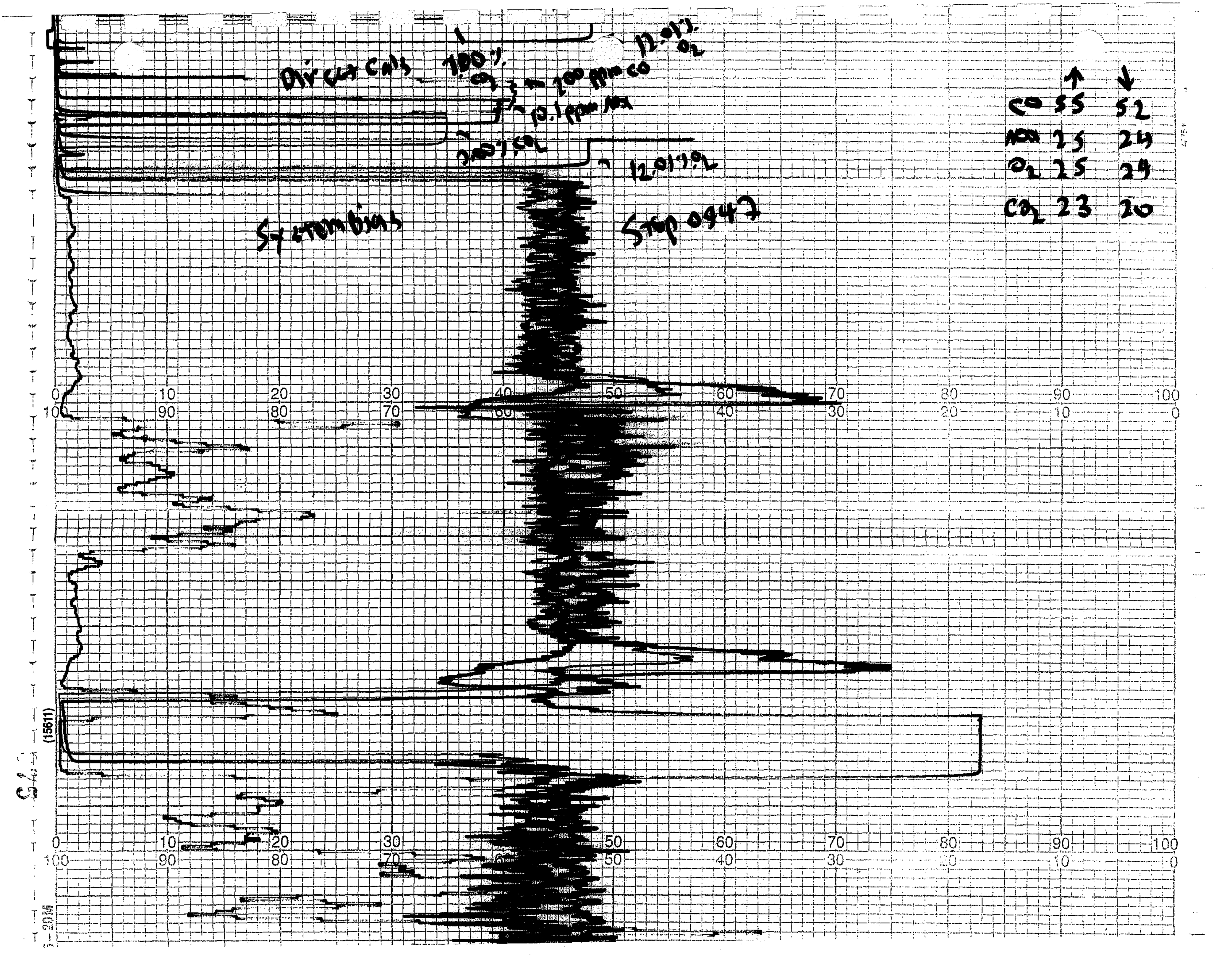
	ICE WATER						ABSOLUTE T DIFF., %			BOILING WATER						ABSOLUTE T DIFF., %			BOILING OIL						ABSOLUTE T DIFF., %		
	REF			TC						REF			TC						REF			TC					
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Stainless Steel Probes																											
4-2	32	32	32	32	32	31	0.0	0.0	0.2	212	212	212	212	212	213	0.0	0.0	-0.1	539	539	538	540	540	539	-0.1	-0.1	-0.1
4-3	32	32	32	32	32	33	0.0	0.0	-0.2	212	211	211	211	211	211	0.1	0.0	0.0	369	369	369	369	369	369	0.0	0.0	0.0
6-2	32	32	32	33	33	32	-0.2	-0.2	0.0	211	212	212	212	212	212	-0.1	0.0	0.0	370	370	370	370	369	370	0.0	0.1	0.0
6-3	32	32	32	33	32	32	-0.2	0.0	0.0	212	212	212	213	213	213	-0.1	-0.1	-0.1	536	536	536	536	536	537	0.0	0.0	-0.1
6-4	32	32	32	32	32	32	0.0	0.0	0.0	211	212	212	211	212	212	0.2	0.0	0.0	369	369	369	369	369	370	0.0	0.0	-0.1
A8-5	32	32	32	32	33	33	0.0	-0.2	-0.2	212	212	212	212	212	213	0.0	0.0	-0.1	535	535	535	534	535	535	0.1	0.0	0.0
A8-1	32	32	32	33	33	32	-0.2	-0.2	0.0	212	212	212	213	213	213	-0.1	-0.1	-0.1	540	540	540	540	540	540	0.0	0.0	0.0
A8-2	32	32	32	33	33	32	-0.2	-0.2	0.0	212	212	212	212	212	213	0.0	0.0	-0.1	541	542	542	541	542	541	0.0	0.0	0.1
10-1	32	32	32	32	32	32	0.0	0.0	0.0	212	212	212	212	212	212	0.0	0.0	0.0	540	539	539	540	540	539	0.0	-0.1	0.0
Inconel																											
10-2 Inc	32	32	32	33	33	33	-0.2	-0.2	-0.2	212	212	212	213	213	213	-0.1	-0.1	-0.1	542	542	542	541	541	542	0.1	0.1	0.0
6-1 Inc	32	32	32	33	33	32	-0.2	-0.2	0.0	212	212	212	213	213	213	-0.1	-0.1	-0.1	541	541	540	541	541	540	0.0	0.0	0.0
Loose Thermocouple																											
6-5L	32	32	32	33	32	32	-0.2	0.0	0.0	212	212	212	212	212	213	0.0	0.0	-0.1	540	540	540	539	540	541	0.1	0.0	-0.1
7-1L	32	32	32	32	31	32	0.0	0.2	0.0	212	212	212	212	213	213	0.0	-0.1	-0.1	540	540	540	539	539	539	0.1	0.1	0.1
M17-1	32	32	32	33	33	32	-0.2	-0.2	0.0	212	212	212	211	212	212	0.1	0.0	0.0	370	370	369	369	369	369	0.1	0.1	0.0
3-1	32	32	32	32	32	32	0.0	0.0	0.0	212	212	212	212	213	212	0.0	-0.1	0.0	540	540	540	539	540	540	0.1	0.0	0.0
5-1	32	32	32	32	32	32	0.0	0.0	0.0	212	212	212	213	213	212	-0.1	-0.1	0.0	540	540	540	540	540	541	0.0	0.0	-0.1
7-2	32	32	32	31	31	32	0.2	0.2	0.0	212	212	212	211	211	211	0.1	0.1	0.1	524	524	525	525	525	526	-0.1	-0.1	-0.1
6-7	32	32	32	32	32	32	0.0	0.0	0.0	212	212	212	212	212	212	0.0	0.0	0.0	535	535	535	535	534	535	0.0	0.1	0.0
6-8	32	32	32	32	32	31	0.0	0.0	0.2	212	212	212	212	212	213	0.0	0.0	-0.1	521	521	521	520	520	521	0.1	0.1	0.0
8-3	32	32	32	32	32	31	0.0	0.0	0.2	212	212	212	211	211	212	0.1	0.1	0.0	514	514	514	514	514	513	0.0	0.0	0.1

Note: If absolute temperature values of the reference thermometer being calibrated and the stack temperature sensors agree within 1.5 percent at each of the three calibration points, no correction is needed.

APPENDIX H - Strip Charts

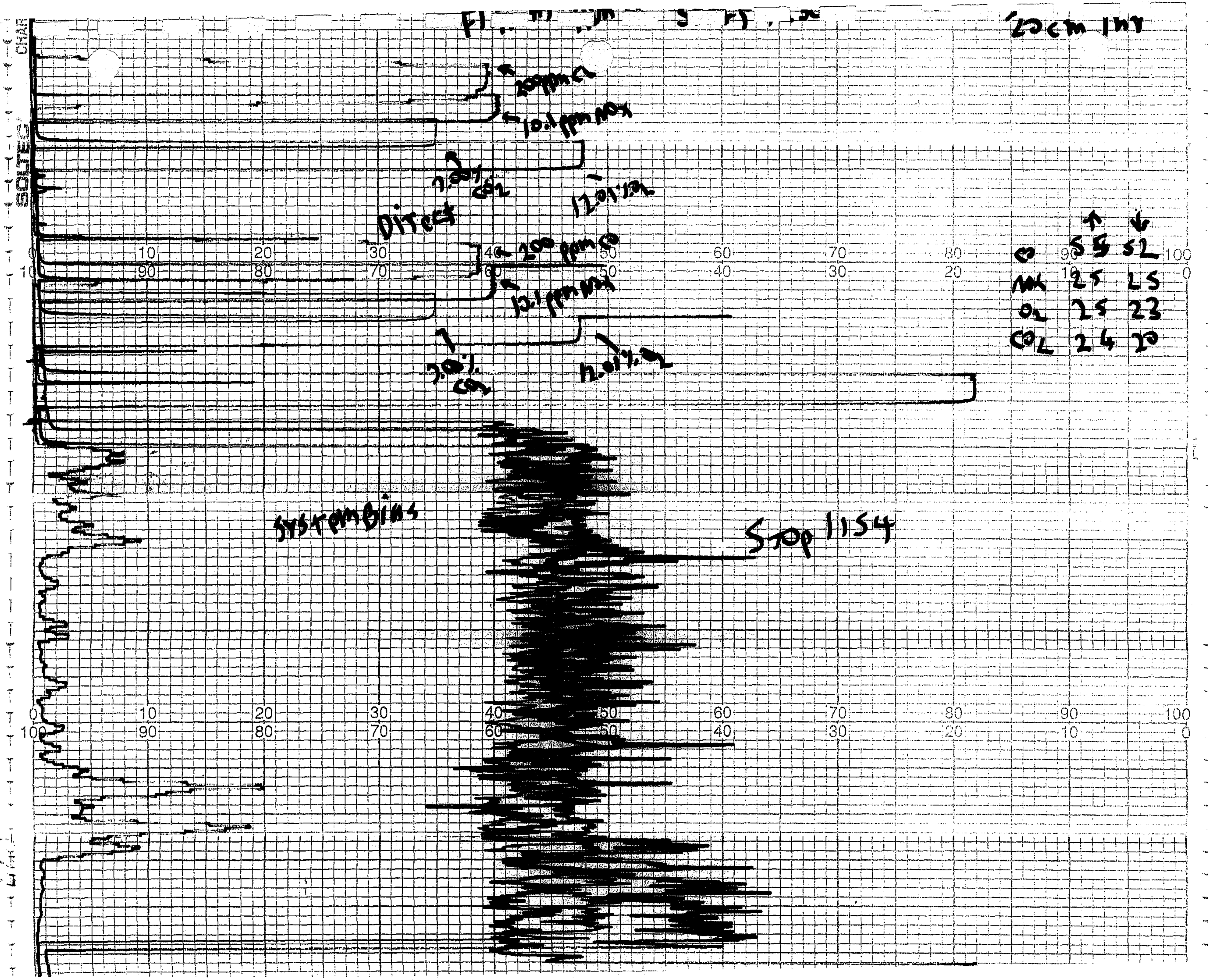

System Bias
Leak check
396 ppm CO
200 ppm CO
21.0 ppm NOx
10.1 ppm NOx
12.9% O2
7.00% CO2
12.0% O2
20.9% O2
19.2 ppm NOx (corrected)
17.2 ppm NO2 (NOx mode)
(NO mode)
21.0 ppm NOx (NOx mode)
200 ppm NOx
(15611)
LW03-036
Waste Management
Simi Valley Landfill
Simi Valley, CA
9/18/03
By SO, TW
19.2 ppm NOx - 93 NOx - CC115548
10.1 ppm NOx - SA93275
21.0 ppm NOx - SA93833
200 ppm CO - SA20048
396 ppm CO - 5-6AL-116
7.00% CO2/12.0% O2 - CC168483
12.0 O2 - SA92515
CHART NO. ZD 01-25-2006


SOLTEC
CHART NO. ZD1-01-25-20M
0-20 CO2
0-800 CO
0-25 NOx
0-25 O2
Flare #1 Run #1 Start 0834
2.0 cm/hr
20 ppm CO
10.1 ppm NOx
7.00% CO2
12.01% O2
CO 53 51
NOx 24 24
O2 25 23
CO2 23 20
System Bias
Leak check Good



Direct Cals
100% CO_2
~ 200 ppm CO
~ 10.1 ppm NOx
12.01% O_2
20.0% CO_2
12.01% O_2
System bias
Stop 0947
↑ ↓
CO 55 52
NOx 25 24
O_2 25 24
CO_2 23 20
(15611)

CHART NO. ZD1-01-25-20M
SOLTEC
(15611)



20cm Inj
10.1 ppm NOx
Direct
200 ppm CO
12.1 ppm NOx
system bias
Stop 1154
CO 55 52
NOx 25 25
O2 25 23
CO2 24 20
SOLTEC

2cm/hr
Flare #3 starts 17:33
CHART NO. ZD1-01-25-20M
(15611)

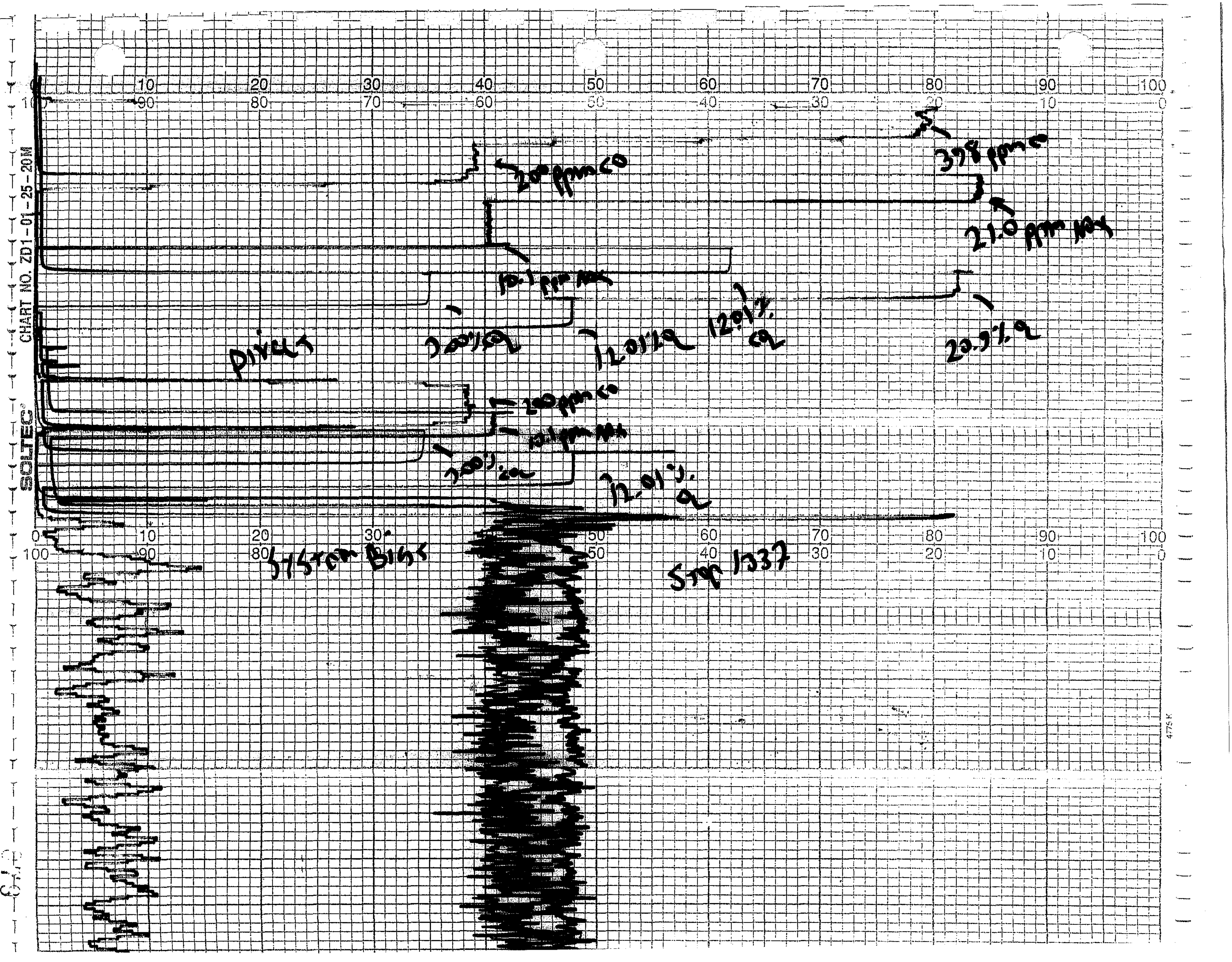


CHART NO. ZD1-01-25-20M
SOLTEC
378 ppm CO
200 ppm CO
21.0 ppm NOx
10.1 ppm NOx
20.9% O2
0.00% O2
12.01% O2
12.01% CO2
Direct
200 ppm CO
10.1 ppm NOx
0.00% CO2
12.01% O2
System Bias
Stop 1337
4775 K