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915066

E-Killam Inc.
3 environmental services

WESTINGHOUSE PLANT
BUFFALO AIRPORT CENTER
SOIL REMEDIATION
PROJECT TEST REPORT

Operable Unit #1

Soil Remediation Unit

TPS Technologies Inc.
By E_3-Killam, Inc.

Test Date: October 25, 1999

E_3-Killam Project No. 99023.0001

December 9, 1999

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E_3-Killam, Inc.
80 Curtwright Drive, Suite #1
Buffalo, NY 14221-7072

A subsidiary of
Randers - Killam
Engineering Group
Muskegon, Michigan

Other offices

Florida
Massachusetts
New Jersey
Ohio
Pennsylvania
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TEST REPORT

EMISSION TESTING
WESTINGHOUSE PLANT
Buffalo Airport Site
SOIL REMEDIATION PROJECT

TPS Technologies Inc.

Cheektowaga, NY

Test Date: October 25, 1999

Project No. 99023.0001

December 9, 1999

PREPARED BY

E_3-KILLAM, INC.
80 CURTWRIGHT DRIVE, SUITE #1
BUFFALO, NY 14221-7072

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1. INTRODUCTION

1.1 Test Program Description

TPS Technologies Inc. (TPST) has contracted E_3-Killam, Inc. (E_3-Killam) to conduct emission testing on a Mobile Soil Remediation Unit (MSRU) transported to the Westinghouse Plant located next to the Buffalo Airport in Cheektowaga, New York. Testing was performed October 25, 1999.

The primary contact for TPST is Mr. Blair Dominiak. Mr. Dominiak is the Manager of Regulatory Compliance for TPST, and can be reached at (407) 886-2000, or by fax at (407) 886-8300. The primary contact at E_3-Killam is Mr. Michael D. Hamilton. Mr. Hamilton is a Project Manager with E_3-Killam, and can be reached at (716) 631-5858, or by fax at (716) 631-5864.

1.2 Objectives

The objective of this Demonstration Test was to determine the emissions from the MSRU for particulate matter (PM), carbon monoxide (CO), total gaseous organic compounds (as THC), toluene and trichloroethylene. The exhaust gas was also monitored for percent oxygen ($\%O_2$) and percent carbon dioxide ($\%CO_2$). Samples of both pre-treated and post-treated soil were collected and analyzed for toluene and trichloroethylene (the two constituents of concern), as well as 1,1,1-trichloroethane, xylene and ethylbenzene (the three remaining target compounds).

Emission tests were conducted in accordance with United States Environmental Protection Agency (USEPA) reference methods outlined in the Code of Federal Regulations, Title 40, Part 60 (40 CFR 60) Appendix A. Soil samples were collected in accordance with USEPA Reference Method 8260B as presented in SW846, "Test Methods for Evaluating Solid Waste". A summary of the sampling and analytical methods is presented in Table 1-1.

Table 1-1: Summary of Sampling and Analytical Procedures

Demonstration Testing on MSRU
Westinghouse Plant – Buffalo Airport Site
Soil Remediation Project
TPS Technologies Inc.
Cheektowaga, NY

PARAMETER	SAMPLING METHOD	ANALYTICAL METHOD
Stack Flow	EPA Methods 1 & 2	Pitot & Manometer
O_2/CO_2	EPA Method 3A	CFM-NDIR[1]/ Magnetopneumatic
Stack Moisture	EPA Method 4	Volumetric/Gravimetric
Particulate Matter	EPA Method 5	Gravimetric
CO	EPA Method 10	GFC-NDIR[2]
Volatiles in Emissions Tichloroethylene And Toluene	EPA Method 18	Gas Chromatography
Total Gaseous Organic Compounds (as THC)	EPA Method 25A	Flame Ionization
Volatiles in Soil trichloroethylene toluene 1,1,1-trichloroethane ethylbenzene total xylenes	EPA SW846 Method 8260B	Gas Chromatography/ Mass Spectrometry

[1] Cross-Flow Modulated- Non Dispersive Infrared
[2] Gas Filter Correlated- Non Dispersive Infrared

2. RESULTS

2.1 Discussion of Results

Run 1 of the demonstration test program was stopped and subsequently discarded approximately twenty minutes into it. This was due to erratic Δp readings. The differential pressure readings noted during the test differed greatly from those previously recorded during the equipment setup. Some adjustments were made to the sampling equipment, and testing continued with sample runs 2-4 being completed without incident.

The stack temperatures recorded during the test program were approximately 200°F lower than those being recorded by SoilPure, Inc. The temperature readings recorded during the testing by E_3-Killam were taken in the stack, approximately 7.5 feet from the exit. SoilPure's thermocouple was located in the thermal-oxidizing chamber. There were strong, gusting winds on the day of the test, which may have had a cooling effect on the stack, subsequently affecting the temperatures being recorded at the sample location. To rule out faulty sampling equipment as the cause, the thermocouple used during the test program was checked back at the E_3-Killam laboratory. . The thermocouple was heated with a torch at its tip to roughly simulate the temperatures encountered during the test program. After the temperature leveled out, the heat source was slowly moved down the length of the thermocouple. As the heat source moved, the temperature being monitored eventually began to decrease, as expected. This is because a thermocouple measures temperature only at its tip (where the two wires of which it is comprised are touching). Had there been another point along the length of the thermocouple where the wires were touching, an increase in the temperature would have occurred again, and a sort of averaging would have taken affect between the temperature being measured at that point and the temperature at the tip. During this experiment, the only place that an increase in temperature was evident was at its tip. Calibration data for the thermocouple is included in Appendix C.

The sampling system behind the thermocouple (umbilical, and meter-box) was also checked to insure proper operation and each component checked out okay. An electronic signal was sent to the digital display of the metering system with E_3-Killams CAL-PAL (electronic calibration instrument), through the umbilical (used during the test), and readings were within 1-2 degrees from those temperatures electronically sent.

2.2 Summary of Results

Table 2-1 summarizes the demonstration test program results. The results of the EPA Reference Method 18 tests indicate that the concentrations of trichloroethylene and toluene (the two "constituents of concern") were both less than the detection limit of 10µg for each of the three samples collected. As a result of these "non-detects", a determination of the percent destruction efficiency (%DE) for each "constituent of concern" was not required, and are not included in this report. The recovery study results for the EPA Reference Method 18 sampling were all approximately 100%. Copies of the laboratory reports for the EPA Reference Method 18 samples and recovery study are included in Appendix E-1. It should also be noted that the EPA Reference Method 25A samples for "total gaseous organic compounds", resulted in insignificant concentrations of THC. As a result, continuous monitoring for THC would not be required.

Table 2-1: Summary of Results
Westinghouse Plant – Buffalo Airport Site
Soil Remediation Project
TPS Technologies Inc.
Cheektowaga, NY

Test Date / Run No.	10/25/99 1, Aborted	10/25/99 2	10/25/99 3	10/25/99 4	Avg.
t_s - Stack Temperature, °F		1489	1470	1469	1476
P_s - Stack Absolute Pressure, In. Hg.		29.56	29.53	29.50	29.53
V_s - Stack Velocity, ft/sec.		77.29	81.77	85.85	81.64
Q_a - Volumetric Flow Rate/Actual Conditions, ACFM		58275	61653	64730	61553
Q_s - Volumetric Flow Rate/Dry Standard Conditions, DSCFM		12150	12853	13858	12954
CO_2 , % (drift corrected)		8.6	10.1	9.3	9.3
O_2 , % (drift corrected)		5.1	3.5	4.7	4.4
CO, %		0.0	0.0	0.0	0.0
N_2 , %		86.3	86.4	86.0	86.2
M_d - Dry Molecular Weight, lb/lb-mole		29.58	29.76	29.68	29.67
M_s - Wet Molecular Weight, lb/lb-mole		27.02	27.08	27.26	27.12
$V_{m(std)}$ - Sample Volume - Dry Standard Conditions, DSCF		30.871	32.323	35.325	32.840
Stack Moisture Content, %		22.10	22.80	20.70	21.87
Isokinetic, %		93.5	94.3	95.6	94.5

SUMMARY OF PARTICULATE EMISSIONS

P_{mrf} - Pollutant Mass Rate, Front Half, lb/hr.		0.48	0.56	0.64	0.56
C_{sf} - Conc., Front Half, gr/DSCF		0.0046	0.0051	0.0054	0.0050
C_{sfO2} - Conc., Front Half Corrected to 7% O_2 , gr/DSCF		0.0040	0.0041	0.0046	0.0042

SUMMARY OF CARBON MONOXIDE (drift corrected)

ppmvd		0.5	1.6	2.2	1.4
ppmvd @ 7% O_2		0.4	1.3	1.9	1.2
lb/hr		0.03	0.09	0.13	0.08

SUMMARY OF TOTAL HYDROCARBONS (THC as Methane)

ppmvw		1.1	0.4	0.9	0.8
ppmvd		1.4	0.5	1.2	1.0
ppmvd @ 7% O_2		1.2	0.4	1.0	0.9
lb/hr		0.04	0.02	0.04	0.03

SUMMARY OF EPA REFERENCE METHOD 18 SAMPLES

Toluene	ug	< 10.0	< 10.0	< 10.0	< 10.0
Trichloroethylene	ug	< 10.0	< 10.0	< 10.0	< 10.0
Toluene	mg/M3	< 0.813	< 0.813	< 0.813	< 0.813
Trichloroethylene	mg/M3	< 0.813	< 0.813	< 0.813	< 0.813

SUMMARY OF EPA REFERENCE METHOD 18 RECOVERY STUDY (100ug spike each)

Toluene - Front-half (ug)	99	99	99	99
Back-half (ug)	< 1.0	< 1.0	< 1.1	< 1.0
Trichloroethylene - Front-half (ug)	104	109	97	103
Back-half (ug)	< 4.5	< 4.5	< 4.6	< 4.5

3. SAMPLING AND ANALYTICAL PROCEDURES

3.1 EPA Reference Method 1: Sample Location

The stack on the MSRU is a round duct with an inside diameter of 48". The overall stack height (above ground level) is 37.5 feet. Two four-inch test ports are located 90° apart. The ports are located 7.5 feet from the top of the stack. The overall dimensions of the stack do not provide enough straight run to meet the "ideal" 8 and 2 diameter criteria for a sample location. As a result, the maximum number of sample points was used during all "isokinetic" sampling. A total of 24 points was sampled, 12 per traverse. Sampling was performed starting at the furthest sample point in and working outwards towards the test port. The distances from the stack wall (in inches) to each sample point was as follows:

Point #	Distance in inches	Point #	Distance in inches
12	1.0	6	30.9
11	3.2	5	36.0
10	5.7	4	39.5
9	8.5	3	42.3
8	12.0	2	44.8
7	17.1	1	47.0

Representative measurements of pollutant emissions and the volumetric flow rate from a stationary source requires a measurement site where the effluent stream is flowing in a known direction and "cyclonic" flow is not present. A "cyclonic" flow determination was performed prior to the performance test, and is included in Appendix F.

3.2 EPA Reference Method 2: Determination of Stack Gas Velocity & Volumetric Flow Rate

The gas velocity in the stack was determined from the measurement of an average velocity head, gas density, stack temperature and stack pressure following the procedures of EPA Reference Method 2. The average velocity head was determined by using an inclined manometer, and a type S pitot tube with a known coefficient of 0.84 which was determined geometrically by standards set forth in EPA Reference Method 2. Stack temperatures were taken at each traverse point using a type K thermocouple. Static pressure was determined by using a straight tap and an inclined manometer. The E_3-Killam field procedure for Method 2 is included in Appendix B.

3.3 EPA Reference Method 3A: Gas Analysis for Carbon Dioxide, Oxygen and Dry Molecular Weight

A gas sample was continuously extracted from the effluent stream (consistent with Reference Methods 3A). A portion of the sample stream was conveyed to instrumental analyzers for determination of O_2 and CO_2 concentrations. A Horiba MPA-510 magnetopneumatic O_2 analyzer operating on the 0-25% (dry) range was utilized in determining oxygen concentrations. Carbon dioxide concentrations were determined using a Horiba Model VIA510 (CFM-NDIR) analyzer with an operational range of 0-20% volume (dry). Data was recorded on a data acquisition system (DAS) at one-minute intervals. The E_3-Killam field procedure for EPA Reference Method 3A is included in Appendix B.

3.4 EPA Reference Method 4: Moisture Determination

The moisture content at the test location was measured according to the procedures in EPA Reference Method 4. Moisture gain was determined from the EPA Reference Method 5 sample train. The E_3-Killam field procedure for EPA Reference Method 4 is included in Appendix B.

3.5 EPA Reference Method 5: Determination of Particulate Matter (PM) Emissions from Stationary Sources

The PM concentration of the exhaust gas stream was measured "isokinetically" according to the procedures outlined in EPA Reference Method 5. This method incorporates gas velocity and volumetric flow measurements (EPA Reference Method 2), and percent moisture determinations (EPA Reference Method 4). Three 1-hour samples were collected for PM determination. The E_3-Killam field procedure for EPA Reference Method 5 is included in Appendix B.

3.6 EPA Reference Method 10: Determination of Carbon Monoxide (CO) Emissions from Stationary Sources

EPA Reference Method 10 was used to determine the concentration of CO from the exhaust gas. Analysis was performed continuously on a TECO Model 10H gas filter correlation non-dispersive infrared (CFM-NDIR) CO analyzer. The analyzer's output was recorded at 1-minute intervals on a data acquisition system (DAS). The analyzer was set on the 0-100 ppm range.

Instrument calibrations are documented and were performed with certified gases prepared via EPA Protocol #1 at concentrations of zero, approximately 30% and 60% of span, and a known concentration near the span limit. Three 1-hour continuous CO determinations were performed during this performance test program. The E_3-Killam field procedure for EPA Reference Method 10 is included in Appendix B.

3.7 EPA Reference Method 18: Determination of Gaseous Organic (Volatiles) Compounds by Gas Chromatography

3.7.1 General

The concentrations of toluene and trichloroethylene, the "two constituents of concern" for this demonstration test plan, were measured according to the procedures outlined in EPA Reference Method 18. Stack gas was drawn through sorbent tubes and returned to the laboratory. During analysis, the two "constituents of concern" were separated by a gas chromatograph (GC), and individually quantified by flame ionization, photo-ionization, electron capture, or other appropriate detection principle.

3.7.2 Performance Test

The performance test for EPA Reference Method 18 consisted of three 60-minute samples.

3.7.2.1 Sampling Equipment

The collection system used for sampling consisted of a length of "unheated" stainless steel tubing. The probe was not heated for this test program, due to the elevated temperature of the stack (approximately 1450°F). Connected to the probe was a short length of Teflon™ tubing. The tubing connected the probe to three 1040/260 mg silica gel tubes (in series) which in turn were attached to three 800/200 mg charcoal tubes (also in series). Silica gel tubes were used to remove moisture from the exhaust gas. All tubes were kept in a vertical position during sampling. A length of flexible tubing connected the tubes to a calibrated sampling pump. Each pump was calibrated to 0.2 liters/minute. See Figure 3-1 for a diagram of the EPA Reference Method 18 sample train.

3.7.2.2 Sampling

The probe was placed at or near the centroid of the stack. The tubes were connected in series, with the ends of each tube freshly broken. The silica gel tubes preceded the charcoal tubes. As mentioned earlier, the silica gel tubes were placed in-line to prevent moisture from the exhaust gas from entering the charcoal tubes. The sample pumps were turned on, with both start and stop times being recorded. The total duration of the sample was sixty minutes. Barometric pressure and ambient temperature readings were also recorded.

After sampling was complete, the charcoal tubes were labeled and sealed for transport to the laboratory. The silica gel tubes were discarded. Laboratory results for the EPA Reference Method 18 test results are included in Appendix E.1.

3.7.3 EPA Reference Method 18: Recovery Study Requirement

The recovery study discussed in section 7.6.3 of the method was performed. A second sampling train identical to the one described above was placed next to the Method 18 sample train in the stack. This "recovery study" train had 100µg spikes each of toluene and trichloroethylene (TCE) in the first charcoal tube in series. A separate "recovery study" train was sampled during each of the three 60-minute EPA Method 18 test runs. The spiked charcoal tube from each "recovery study" train was analyzed along with the "non-spiked" charcoal tube from the EPA Method 18 sample train. All spiked tubes showed approximately 100% recovery. Laboratory reports for the recovery study are included in Appendix E.1.

3.8 EPA Reference Method 25A: Determination of Total Gaseous Organic (Volatiles) Compounds by Flame Ionization Analyzer

Volatile organic compound (VOC) concentrations were measured according to Reference Method 25A. A J.U.M. Model VE-7 hydrocarbon analyzer was used to measure VOCs as total hydrocarbons (THC). THC analysis was continuous with 1-minute average concentrations

recorded on a data acquisition system (DAS). The analyzer's THC operating range was 0-100 ppm. The E_3-Killam field procedure for RM-25A is included in Appendix B.

A Horiba Gas Divider (GDS) model SGD-710 was used to generate appropriate calibration gas concentrations from zero grade nitrogen and USEPA Protocol gas. The protocol gas had a certified concentration of 90.5-ppm methane in air.

3.9 EPA Method 8260B: Soil Sample Collection

The soil chosen for the demonstration test program, was not contaminated as much as was originally thought. Because of this, it was desired by the New York State DEC that the "pre-treated" soil be spiked. Gasoline was chosen as the spiking media and was applied to the test soil at a rate of 1.02 gallons/wet ton of soil. At this rate, the expected concentration of toluene was 70.0 ppm. So as not to exceed the 4.0 lb/hr HCl emission limit, the blended soil to be processed would not contain more than 60 ppm (corresponding to a production rate of 40 TPH) of 1,1,1-trichloroethane and trichloroethylene combined.

During the performance test, discreet sampling of the soil was performed. Soil samples were collected from both pre-processed soil and processed soil. Pre-processed samples were taken as safely as possible before the soil entered the MSRU. Specifically, this sampling occurred on the MSRU weigh belt conveyor just after the weigh scale and prior to entering the MSRU dryer kiln. Processed sampling occurred from within the processed soil pile (a minimum of six inches deep into the side of the pile), as soon as possible after treatment. As soon as possible meant immediately upon sufficient cool down to allow sampling to occur.

A stainless steel scoop was utilized in the collecting of samples. Following each sample, the scoop was rinsed with soapy water, followed by deionized water, followed by isopropanol, followed by air-drying, and finally wrapped in aluminum foil. All samples collected were placed in airtight 40-ml glass sample jars. All jars were filled to the top (no head-space). All samples

collected were then labeled, documented and stored in a cooler maintained at 4°C. The samples remained in the cooler until their arrival at a New York State certified laboratory, Severn Trent Laboratories located in Newburgh, New York, for analysis.

During each 1-hour EPA Reference Method 18 test, three samples of pre-processed soil and three samples of post-processed soil were collected (processed soil was collected 10-minutes following the collection of the pre-processed soil due to a residence time of approximately 7-10 minutes in the MSRU). Samples were analyzed for the compounds listed in Table 1-1. Analysis was in accordance with the procedures stated in EPA Method 8260B, Gas Chromatography/Mass Spectrometry.

3.10 Process Parameters

During the demonstration test, the afterburner was set at 1650°F as indicated in the MSRU Control Room. The processed soil was treated to a minimum temperature of 488°F. The production feed rate ranged from 39.38 tons/hour for Test Run 2, to 41.08 tons/hour for Test Run 4. During the operation of the unit, a Process Data Log Sheet was filled out at fifteen-minute intervals for each Test Run. Additional items that were recorded during the demonstration test included a log of the amount of treated soil (no soil required retreatment), soil sampling events, downtimes and operational any problems. Copies of these process log data sheets are included in Appendix D.

3.11 Soil Cleanup Standards

Each target compound has an associated soil cleanup standard as stated in the Record of Decision (March 1995). They are as follows:

trichloroethylene – 1.05 mg/kg
1,1,1-trichloroethane – 1.14 mg/kg
toluene – 2.25 mg/kg

ethylbenzene – 8.25 mg/kg
total xylenes – 1.8 mg/kg

All required soil cleanup standards were met during the performance test. Laboratory reports for all soil samples collected are included in Appendix E, and are presented as follows:

Appendix E-1 – Laboratory Reports for the EPA Reference Method 18 samples.

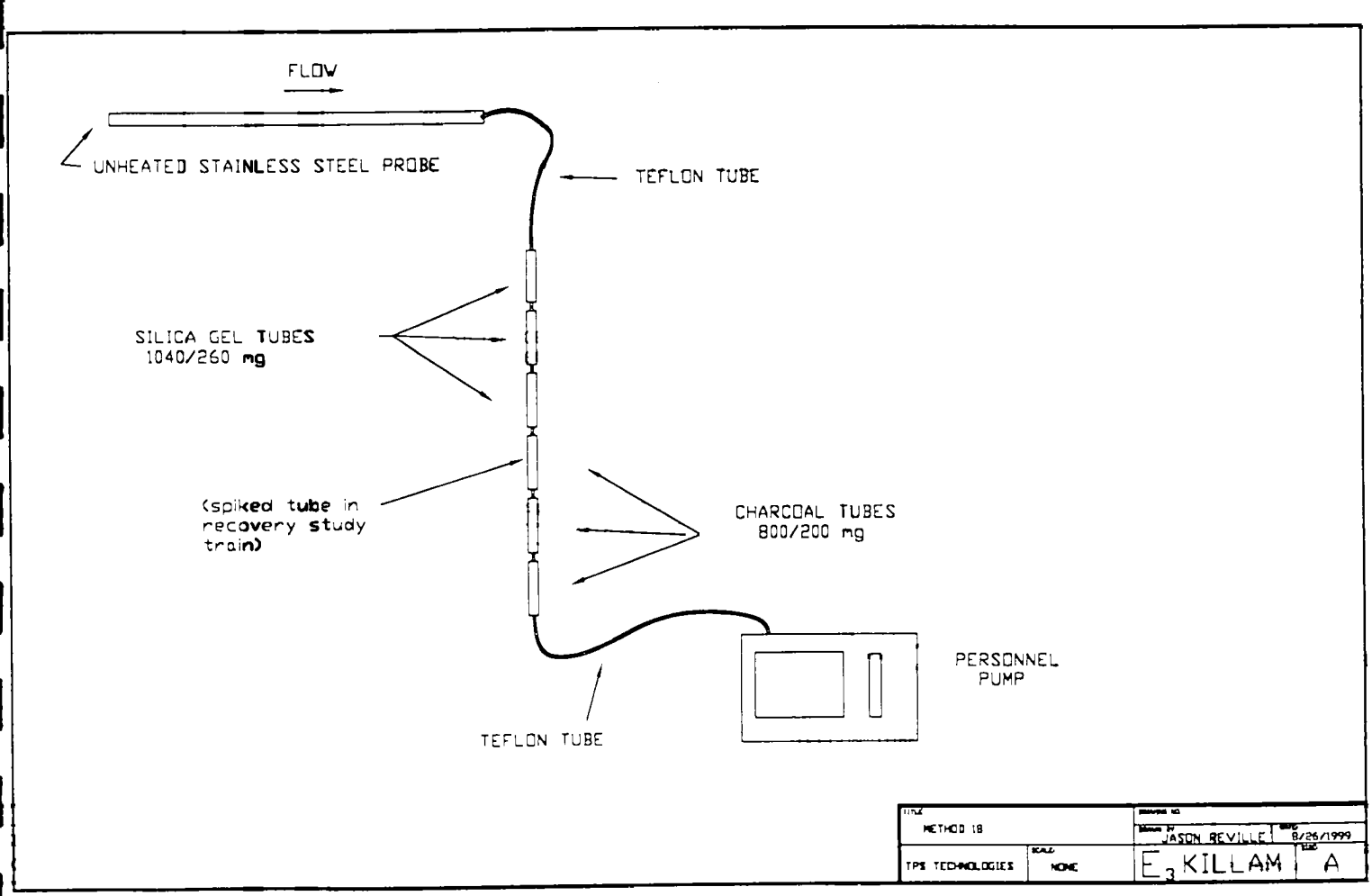
Appendix E-2 – Summary of Soil Sampling Analytical Results (pre-processed and processed).

Appendix E-3 – Laboratory Reports for the Pre-Processed Soil Samples.

Appendix E-4 – Laboratory Reports for the Processed Soil Samples.

Figure 3-1: Method 18 Sample Train Configuration

Demonstration Testing on MSRU
Westinghouse Plant – Buffalo Airport Site
Soil Remediation Project
TPS Technologies Inc.
Cheektowaga, NY



4. QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

Sampling equipment was cleaned, checked and calibrated according to the QA/QC procedures outlined in each appropriate reference method and the "Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III, Stationary Source-Specific Methods" (EPA/600/R-94/038c). This section outlines the QA/QC procedures performed prior to, during and after field sampling activities.

Copies of calibration and certification sheets for all equipment used during the demonstration test program are included in Appendix C.

4.1 EPA Reference Method 5: QA/QC Specifics

Prior to field use and sample recovery, glassware was cleaned according to a five-step procedure. Leak checks were performed before and after each sample run on all train components including vacuum sample trains and pitot lines. The pre-test and post-test leak checks for all tests were within their respective acceptable criteria.

4.2 EPA Reference Method 18: QA/QC Specifics

The recovery efficiency of each target compound was determined. The primary and backup portions of the charcoal tubes were analyzed separately to determine this. According to Section 7.4.4.2 of EPA Reference Method 18, the backup portion cannot exceed 10% of the total amount (primary portion + backup portion). The recovery studies were all within the acceptable limits.

All pumps were calibrated before and after the test series. The pre and post calibrations for each pump were within +/- 5% of the target sample rate. As a result, an average sample rate was

determined from the pre and post calibrations and subsequently used for all sample volume determinations.

4.3 Calculations

Various spreadsheets are used by E_3-Killam in determining emission rates from data collected during the test program. Copies of these spreadsheets are included in Appendix A. Also included in the appendix are copies of the field data sheets.

A. FIELD DATA SHEETS

A.1 EPA Reference Method 5

E$_3$-Killam$_{Inc.}$

GENERAL TEST INFORMATION

Client:	TPS	Stack Dia. or D_e., (in.):	48.00	Area of Stack (ft^2):	12.5664
Project No.:	99023.0001	No. of Ports:	2	Port Location from	
Site:	Westinghouse Demo	Points/Port:	12	Upstream Disturbance (D_e):	0.00
Address:		Runs/Test:	3	Port Location from	
City/State:	Buffalo, NY			Dnstream Disturbance (D_e):	0.00
Test Of:	PM				

Source Type:	Soil Remediation Unit	t_{std} (°F) :	68	Rectangular Ducts	
Control Equip.:		T_{std} (°R) :	528	Length (in.):	0.00
Test Location:	Outlet			Width (in.):	0.00

SUMMARY OF STACK PARAMETERS

Test Date	10/25/99	10/25/99	10/25/99	10/25/99	
Run No.	1, Aborted	2	3	4	Avg.
t_s - Stack Temperature, °F		1489.3	1469.9	1468.5	**1475.9**
P_s - Stack Absolute Pressure, in. Hg.		29.56	29.53	29.50	**29.53**
V_s - Stack Velocity, ft/sec.		77.29	81.77	85.85	**81.64**
Q_a - Volumetric Flow Rate/Actual Conditions, ACFM		58275	61653	64730	**61553**
Q_s - Volumetric Flow Rate/Dry Standard Conditions, DSCFM		12150	12853	13858	**12954**
CO_2 , %		8.60	10.10	9.30	**9.33**
O_2 , %		5.10	3.50	4.70	**4.43**
CO, %		0.00	0.00	0.00	**0.00**
N_2 , %		86.30	86.40	86.00	**86.23**
M_d - Dry Molecular Weight, lb/lb-mole		29.58	29.76	29.68	**29.67**
M_s - Wet Molecular Weight, lb/lb-mole		27.02	27.08	27.26	**27.12**
$V_{m(std)}$ - Sample Volume - Dry Standard Conditions, DSCF		30.871	32.323	35.325	**32.840**
Stack Moisture Content, %		22.10	22.80	20.70	**21.87**
Isokinetic, %		93.5	94.3	95.6	**94.5**

SUMMARY OF PARTICULATE EMISSIONS

P_{mrf} - Pollutant Mass Rate, Front Half, lb/hr.	0.48	0.56	0.64	**0.56**
C_{sf} - Conc., Front Half, gr/DSCF	0.0046	0.0051	0.0054	**0.0050**
C_{sf02} - Conc., Front Half Corrected to 7% O_2, gr/DSCF	0.0040	0.0041	0.0046	**0.0042**

E_3-Killam inc.

SPECIFIC RUN INFORMATION

Project: 99023.0001 | **Location:** Outlet | **Operator:** MJT

Run: 2 | **Test Of:** PM

Test Date: 10/25/99 | **Runs/Test:** 3

Isokinetic Sampling - Data Summary

Amb. Temp. (°F):	53	Filter I.D. No.:	Q-608A	Meter Box I.D. No.:	E-1	%CO_2 :	8.60
Pbar. (in. Hg.):	29.60	Thimble I.D. No.:	n/a	Meter Y:	0.995	%O_2 :	5.10
Pstatic (in. H_2O):	-0.51	Pitot I.D. No.:	7IP-2	ΔH @:	1.8549	%CO :	0.00
Dn :	0.3230	T-Couple I.D. No.:	7IT-2	Time/Point:	0:02:30	%N_2 :	86.30
Cp :	0.84	Nozzle I.D. No.:	TPQ-1	Total Time (Θ):	60		

Leak Checks	Meter Pre:	0	cfm @	15.0	in. Hg.	Pitot(-):	ok	@	5.2	in. H_2O
	Meter Post:	0	cfm @	5.0	in. Hg.	Pitot(+):	ok	@	7.2	in. H_2O

Trvs. Pt. No.	Time (24Hr.)	ΔP (in. H_2O)	ΔH (in. H_2O)	Meter Vm(cf)	Temperatures (°F) Stack	Meter In	Meter Out	Filter	Probe	Exit	Vac. (in. Hg.)
A1	13:45:00	0.54	0.97	406.123	1600	57	57	251	n/a	51	2.0
2	13:47:30	0.42	0.75	407.500	1608	57	57	248	n/a	50	2.0
3	13:50:00	0.42	0.75	408.600	1602	57	57	241	n/a	50	2.0
4	13:52:30	0.45	0.82	409.900	1564	57	57	240	n/a	48	2.0
5	13:55:00	0.60	1.13	411.200	1503	58	58	235	n/a	47	3.0
6	13:57:30	0.50	0.95	412.500	1489	58	58	246	n/a	46	3.0
7	14:00:00	0.45	0.88	413.900	1444	59	57	252	n/a	46	3.0
8	14:02:30	0.45	0.88	415.000	1438	60	57	234	n/a	47	3.0
9	14:05:00	0.61	1.23	416.400	1390	60	60	238	n/a	46	3.0
10	14:07:30	0.61	1.21	417.800	1411	61	58	241	n/a	47	3.0
11	14:10:00	0.56	1.13	419.300	1391	62	58	232	n/a	47	3.0
12	14:12:30	0.52	1.02	420.700	1440	62	58	239	n/a	47	3.0
	14:15:00			422.030							
B1	14:32:00	0.30	0.54	422.030	1604	59	59	225	n/a	50	2.0
2	14:34:30	0.49	0.88	423.100	1616	60	60	237	n/a	50	2.0
3	14:37:00	0.48	0.87	424.200	1601	60	60	236	n/a	50	2.0
4	14:39:30	0.55	1.02	425.500	1546	61	60	230	n/a	50	2.0
5	14:42:00	0.57	1.08	427.000	1498	61	59	255	n/a	51	3.0
6	14:44:30	0.48	0.91	428.400	1497	62	59	249	n/a	51	3.0
7	14:47:00	0.51	1.01	429.500	1423	63	59	234	n/a	52	3.0
8	14:49:30	0.59	1.19	430.800	1364	63	59	235	n/a	52	3.0
9	14:52:00	0.47	0.94	432.300	1408	64	59	225	n/a	54	3.0
10	14:54:30	0.35	0.70	433.800	1404	65	59	226	n/a	55	3.0
11	14:57:00	0.34	0.67	434.800	1427	65	59	227	n/a	55	3.0
12	14:59:30	0.25	0.49	436.000	1455	65	59	219	n/a	55	3.0
	15:02:00			436.915							

Avg.	Avg.	Sum	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.
0.48	0.92	30.792	1489.3	60.7	58.5	237.3	#DIV/0!	50.0	2.7
Avg. Sqrt.					Avg. Tm				Max.
0.689					59.6				3.0

E3-Killam Inc.
SPECIFIC RUN INFORMATION

Project: 99023.0001
Run: 2

Test Of: PM
Location: Outlet

Analytical Information

Moisture Determination - Data Summary

		Imp. 1	Imp. 2	Imp. 3	Imp. 4	Imp. 5	Imp. 5	Imp. 6	Silica Gel or Train	
Final	(ml)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(g)	3696.0
Initial	(ml)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(g)	3510.0
Gain	(ml)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(g)	186.0
									ts	1489
									SVP	29.9200

Blank Correction - Data Summary

Reagent		Acetone
Blank Volume	(ml)	100.0
Gross Wt.	(g)	105.6213
Tare Wt.	(g)	105.6194
Blank Weight Gain	(g)	0.0019
Blank Concentration	(g/ml)	1.90E-05

Blank Weight Gain = Gross Wt. - Tare Wt.

Blank Concentration = Blank Weight Gain / Blank Volume

Particulate Weight Determination - Data Summary

Front Half

Back Half

		Filter	Acetone	Total Gain		Total Gain
	I.D.	Q-608A	B-705			
Beaker Vol.	(ml)	n/a	100.0			
Gross Wt.	(g)	0.3576	105.5914			
Tare Wt.	(g)	0.3549	105.5829			
Blank Corr.	(g)	0.0000	0.0019			
Gain	(g)	0.0027	0.0066	0.0093		0.0000

Blank Correction = Beaker Volume x Blank Concentration

E$_3$-Killam Inc.

SPECIFIC RUN INFORMATION

Project: 99023.0001
Run: 2

Test Of: PM
Location: Outlet

Reference Method No. 2 Calculations

Average Stack Velocity	$V_s = K_p\ C_p\ SQRT\ \Delta P_{avg}\ SQRT\ (T_s / (P_s\ M_s))$	V_s=	77.29	ft/sec.
Average Stack Volumetric Flow Rate	$Q_a = 60\ V_s\ A_s$	Q_a=	58275.4	ACFM
Average Stack Volumetric Flow Rate	$Q_s = 60\ V_s\ A_s\ (1-B_{ws})\ ((T_{std}\ P_s) / (P_{std}\ T_s))$	Q_s=	12149.5	DSCFM

Reference Method No. 3 Calculations

Molecular Weight, Dry	$M_d = 0.44\ \%CO_2 + 0.32\ \%O_2 + 0.28\ (\%CO + N_2)$	M_d=	29.58	lb/lb-mole
Molecular Weight, Wet	$M_s = M_d\ (1-B_{ws}) + 18\ B_{ws}$	M_s=	27.02	lb/lb-mole

Reference Method No. 4 Calculations

Sample Volume, Standard Conditions	$V_{m(std)} = V_m\ Y\ ((T_{std}\ P_m) / (T_m\ P_{std}))$	$V_{m(std)}$=	30.871	DSCF
Water Vapor Volume Collected	$V_{wc(std)} = .04707\ (V_f - V_i)$	$V_{wc(std)}$=	0.000	ft^3/ml
Water Vapor Volume Collected	$V_{wsg(std)} = .04715\ (W_f - W_i)$	$V_{wsg(std)}$=	8.770	ft^3/g
Moisture Volume Fraction of Stack Gas	$B_{ws} = (V_{wc(std)} + V_{wsg(std)}) / (V_{wc(std)} + V_{wsg(std)} + V_{m(std)})$	B_{ws}=	0.221	
Vapor Pressure of Stack H_2O	$VP = SVP - .000367\ (P_s)\ (1+(ts-32/1571))$	VP=	29.899	
Bws VP	$B_{ws}VP = VP / P_s$	$B_{ws}VP$=	1.011	
Min B_{ws} or B_{ws} VP	If $B_{ws} > B_{ws}VP$, then $B_{ws}VP$	MIN B_{ws} or $B_{ws}VP$=	0.221	

Reference Method No. 5 Calculations

Percent Isokinetic	$\%I = ((T_s\ V_{m(std)}\ P_{std}) / (1-B_{ws}) / (A_n \Theta\ V_s\ P_s\ T_{std}\ 60))\ 100$	%I=	93.5	
Mass Emissions Rate - Front Half	$p_{mrf} = (m_f / V_{m(std)})\ Q_s\ 0.13216$	P_{mrf}=	0.4837	lbs/hr.
Mass Emissions Rate - Total (Front+Back Half)	$p_{mrt} = (m_t / V_{m(std)})\ Q_s\ 0.13216$	P_{mrt}=	0.4837	lbs/hr.
Stack Concentration - Front Half	$C_{sf} = 15.43\ m_f / Vm_{(std)}$	C_{sf}=	0.0046	gr/DSCF
Stack Concentration - Total (Front+Back Half)	$C_{st} = 15.43\ m_t / Vm_{(std)}$	C_{st}=	0.0046	gr/DSCF
Stack Concentration - Front Half Corrected to 7% O_2	$C_{sfO2} = C_{sf}\ (20.9 - 7.0) / (20.9 - \%O_2)$	C_{sfO2}=	0.0040	gr/DSCF @7%O_2
Stack Concentration - Total (Front+Back Half) Corrected to 7% O_2	$C_{stO2} = C_{st}\ (20.9 - 7.0) / (20.9 - \%O_2)$	C_{stO2}=	0.0040	gr/DSCF @7%O_2

E_3-Killam Inc.
SPECIFIC RUN INFORMATION

Project: 99023.0001 | **Location:** Outlet | **Operator:** MJT
Run: 3 | **Test Of:** PM
Test Date: 10/25/99 | **Runs/Test:** 3

Isokinetic Sampling - Data Summary

Amb. Temp. (°F):	58	Filter I.D. No.:	Q-679A	Meter Box I.D. No.:	E-1	$\%CO_2$:	10.10
Pbar. (in. Hg.):	29.57	Thimble I.D. No.:	n/a	Meter Y:	0.995	$\%O_2$:	3.50
Pstatic (in. H_2O):	-0.51	Pitot I.D. No.:	7IP-2	ΔH @:	1.8549	%CO :	0.00
Dn :	0.3200	T-Couple I.D. No.:	7IT-2	Time/Point:	0:02:30	$\%N_2$:	86.40
Cp :	0.84	Nozzle I.D. No.:	TPQ-3	Total Time (Θ):	60		

Leak Checks	Meter Pre:	0.015	cfm @	15.0	in. Hg.	Pitot(-):	ok	@	6.9	in. H_2O
	Meter Post:	0.018	cfm @	5.0	in. Hg.	Pitot(+):	ok	@	5.7	in. H_2O

Trvs. Pt. No.	Time (24Hr.)	ΔP (in. H_2O)	ΔH (in. H_2O)	Meter Vm(cf)	Temperatures (°F) Stack	Meter In	Meter Out	Filter	Probe	Exit	Vac. (In. Hg.)
B1	15:52:00	0.25	0.44	438.085	1573	60	60	224	n/a	55	2.0
2	15:54:30	0.64	1.13	439.000	1578	61	61	244	n/a	54	2.0
3	15:57:00	0.49	0.87	440.400	1560	61	61	241	n/a	54	2.0
4	15:59:30	0.48	0.87	441.600	1527	62	61	248	n/a	54	2.0
5	16:02:00	0.52	0.94	443.000	1519	62	60	252	n/a	54	2.0
6	16:04:30	0.60	1.14	444.300	1440	63	60	236	n/a	53	2.0
7	16:07:00	0.63	1.23	445.400	1383	64	61	234	n/a	53	3.0
8	16:09:30	0.52	1.01	447.200	1394	65	61	235	n/a	53	3.0
9	16:12:00	0.52	1.01	448.400	1400	65	61	237	n/a	53	3.0
10	16:14:30	0.62	1.19	450.000	1413	66	60	244	n/a	55	3.0
11	16:17:00	0.48	0.93	451.400	1407	66	61	225	n/a	55	3.0
12	16:19:30	0.55	1.05	452.600	1435	66	61	234	n/a	56	3.0
	16:22:00			454.097							
A1	16:38:00	0.47	0.82	454.097	1602	61	61	247	n/a	54	2.0
2	16:40:30	0.42	0.73	455.200	1604	63	61	243	n/a	52	2.0
3	16:43:00	0.46	0.82	456.400	1556	63	61	246	n/a	52	2.0
4	16:45:30	0.69	1.26	457.600	1516	63	61	246	n/a	52	3.0
5	16:48:00	0.60	1.09	459.100	1530	64	61	249	n/a	51	3.0
6	16:50:30	0.52	0.97	460.700	1479	65	61	256	n/a	51	3.0
7	16:53:00	0.65	1.27	461.900	1392	66	61	252	n/a	52	3.0
8	16:55:30	0.59	1.16	463.300	1379	66	61	238	n/a	52	3.0
9	16:58:00	0.63	1.24	464.900	1382	67	61	249	n/a	54	3.0
10	17:00:30	0.59	1.13	466.300	1427	67	61	251	n/a	54	3.0
11	17:03:00	0.55	1.06	467.700	1412	68	61	246	n/a	55	3.0
12	17:05:30	0.55	1.09	469.100	1369	68	62	248	n/a	57	3.0
	17:08:00			470.536							

Avg.	Avg.	Sum	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.
0.54	1.02	32.451	1469.9	64.3	60.9	242.8	#DIV/0!	53.6	2.6
Avg. Sqrt.					Avg. Tm				Max.
0.733					62.6				3.0

Analytical Information

Moisture Determination - Data Summary

		Imp. 1	Imp. 2	Imp. 3	Imp. 4	Imp. 5	Imp. 5	Imp. 6	Silica Gel or Train	
Final	(ml)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(g)	3690.0
Initial	(ml)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(g)	3488.0
Gain	(ml)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(g)	202.0
									ts	1470
									SVP	29.9200

Blank Correction - Data Summary

Reagent		Acetone
Blank Volume	(ml)	100.0
Gross Wt.	(g)	105.6213
Tare Wt.	(g)	105.6194
Blank Weight Gain	(g)	0.0019
Blank Concentration	(g/ml)	1.90E-05

Blank Weight Gain = Gross Wt. - Tare Wt.

Blank Concentration = Blank Weight Gain / Blank Volume

Particulate Weight Determination - Data Summary

Front Half

Back Half

		Filter	Acetone	Total Gain		Total Gain
	I.D.	Q-679A	B-662			
Beaker Vol.	(ml)	n/a	110.0			
Gross Wt.	(g)	0.3731	100.6377			
Tare Wt.	(g)	0.3711	100.6269			
Blank Corr.	(g)	0.0000	0.0021			
Gain	(g)	0.0020	0.0087	0.0107		0.0000

Blank Correction = Beaker Volume x Blank Concentration

E3-Killam Inc.

SPECIFIC RUN INFORMATION

Project: 99023.0001 Run: 3 **Test Of:** PM **Location:** Outlet

Reference Method No. 2 Calculations

Average Stack Velocity	$V_s = K_p\ C_p\ SQRT\ \Delta P_{avg}\ SQRT\ (T_s / (P_s\ M_s))$	V_s=	81.77	ft/sec.
Average Stack Volumetric Flow Rate	$Q_a = 60\ V_s\ A_s$	Q_a=	61653.3	ACFM
Average Stack Volumetric Flow Rate	$Q_s = 60\ V_s\ A_s\ (1-B_{ws})\ ((T_{std}\ P_s) / (P_{std}\ T_s))$	Q_s=	12853.2	DSCFM

Reference Method No. 3 Calculations

Molecular Weight, Dry	$M_d = 0.44\ \%CO_2 + 0.32\ \%O_2 + 0.28\ (\%CO + N_2)$	M_d=	29.76	lb/lb-mole
Molecular Weight, Wet	$M_s = M_d\ (1-B_{ws}) + 18\ B_{ws}$	M_s=	27.08	lb/lb-mole

Reference Method No. 4 Calculations

Sample Volume, Standard Conditions	$V_{m(std)} = V_m\ Y\ ((T_{std}\ P_m) / (T_m\ P_{std}))$	$V_{m(std)}$=	32.323	DSCF
Water Vapor Volume Collected	$V_{wc(std)} = .04707\ (V_f - V_i)$	$V_{wc(std)}$=	0.000	ft^3/ml
Water Vapor Volume Collected	$V_{wsg(std)} = .04715\ (W_f - W_i)$	$V_{wsg(std)}$=	9.524	ft^3/g
Moisture Volume Fraction of Stack Gas	$B_{ws} = (V_{wc(std)} + V_{wsg(std)}) / (V_{wc(std)} + V_{wsg(std)} + V_{m(std)})$	B_{ws}=	0.228	
Vapor Pressure of Stack H_2O	$VP = SVP - .000367\ (P_s)\ (1+(ts-32/1571))$	VP=	29.899	
Bws VP	$B_{ws}VP = VP / P_s$	$B_{ws}VP$=	1.012	
Min B_{ws} or $B_{ws}VP$	If $B_{ws} > B_{ws}VP$, then $B_{ws}VP$	MIN B_{ws} or $B_{ws}VP$=	0.228	

Reference Method No. 5 Calculations

Percent Isokinetic	$\%I = ((T_s\ V_{m(std)}\ P_{std}) / (1-B_{ws}) / (A_n \Theta\ V_s\ P_s\ T_{std}\ 60))\ 100$	%I=	94.3	
Mass Emissions Rate - Front Half	$p_{mrf} = (m_f / V_{m(std)})\ Q_s\ 0.13216$	P_{mrf}=	0.5623	lbs/hr.
Mass Emissions Rate - Total (Front+Back Half)	$p_{mrt} = (m_t / V_{m(std)})\ Q_s\ 0.13216$	P_{mrt}=	0.5623	lbs/hr.
Stack Concentration - Front Half	$C_{sf} = 15.43\ m_f / Vm_{(std)}$	C_{sf}=	0.0051	gr/DSCF
Stack Concentration - Total (Front+Back Half)	$C_{st} = 15.43\ m_t / Vm_{(std)}$	C_{st}=	0.0051	gr/DSCF
Stack Concentration - Front Half Corrected to 7% O_2	$C_{sfO2} = C_{sf}\ (20.9 - 7.0) / (20.9 - \%O_2)$	C_{sfO2}=	0.0041	gr/DSCF @7%O_2
Stack Concentration - Total (Front+Back Half) Corrected to 7% O_2	$C_{stO2} = C_{st}\ (20.9 - 7.0) / (20.9 - \%O_2)$	C_{stO2}=	0.0041	gr/DSCF @7%O_2

E$_3$-Killam Inc.

SPECIFIC RUN INFORMATION

Project: 99023.0001 **Location:** Outlet **Operator:** MJT

Run: 4 Test Of: PM

Test Date: 10/25/99 Runs/Test: 3

Isokinetic Sampling - Data Summary

Amb. Temp. (°F):	56	Filter I.D. No.:	Q-745A	Meter Box I.D. No.:	E-1	%CO_2 :	9.30
Pbar. (in. Hg.):	29.54	Thimble I.D. No.:	n/a	Meter Y:	0.995	%O_2 :	4.70
Pstatic (in. H_2O):	-0.51	Pitot I.D. No.:	2IP-2	ΔH @:	1.8549	%CO :	0.00
Dn :	0.3200	T-Couple I.D. No.:	2IT-2	Time/Point:	0:02:30	%N_2 :	86.00
Cp :	0.84	Nozzle I.D. No.:	TPQ-2	Total Time (Θ):	60		

Leak Checks	Meter Pre:	0.002	cfm	@	10.0	in. Hg.	Pitot(-):	ok	@	7.1	in. H_2O
	Meter Post:	0.001	cfm	@	5.0	in. Hg.	Pitot(+):	ok	@	6.4	in. H_2O

Trvs. Pt. No.	Time (24Hr.)	ΔP (in. H_2O)	ΔH (in. H_2O)	Meter Vm(cf)	Temperatures (°F) Stack	Meter In	Meter Out	Filter	Probe	Exit	Vac. (in. Hg.)
A1	18:02:00	0.35	0.68	470.769	1612	62	62	248	n/a	53	2.0
2	18:04:30	0.69	1.36	471.800	1583	61	61	249	n/a	52	2.0
3	18:07:00	0.59	1.15	473.400	1594	61	61	248	n/a	52	3.0
4	18:09:30	0.67	1.36	474.700	1514	62	61	258	n/a	52	3.0
5	18:12:00	0.58	1.19	476.100	1503	62	62	252	n/a	52	3.0
6	18:14:30	0.60	1.27	477.800	1437	63	61	253	n/a	54	3.0
7	18:17:00	0.63	1.40	479.200	1345	64	61	254	n/a	55	3.0
8	18:19:30	0.61	1.33	480.800	1387	64	61	253	n/a	55	3.0
9	18:22:00	0.72	1.59	482.200	1366	66	61	245	n/a	61	4.0
10	18:24:30	0.65	1.41	483.900	1397	67	61	253	n/a	62	3.0
11	18:27:00	0.70	1.51	485.500	1406	67	61	249	n/a	62	3.0
12	18:29:30	0.68	1.46	487.100	1423	68	61	249	n/a	63	3.0
	18:32:00			488.696							
B1	18:44:00	0.36	0.72	488.696	1559	63	62	247	n/a	52	2.0
2	18:46:30	0.44	0.86	489.800	1608	65	62	251	n/a	54	2.0
3	18:49:00	0.61	1.20	491.200	1584	65	62	257	n/a	56	3.0
4	18:51:30	0.54	1.10	492.500	1523	65	62	254	n/a	56	3.0
5	18:54:00	0.57	1.17	494.000	1510	66	62	255	n/a	57	3.0
6	18:56:30	0.67	1.47	495.600	1384	67	62	254	n/a	57	3.0
7	18:59:00	0.65	1.40	497.100	1414	68	62	250	n/a	59	3.0
8	19:01:30	0.60	1.31	498.600	1401	68	63	251	n/a	62	3.0
9	19:04:00	0.66	1.42	500.300	1419	69	63	250	n/a	63	3.0
10	19:06:30	0.59	1.27	501.800	1422	70	63	251	n/a	63	3.0
11	19:09:00	0.55	1.19	503.300	1421	70	63	257	n/a	64	3.0
12	19:11:30	0.70	1.50	504.900	1432	71	63	252	n/a	65	3.0
	19:14:00			506.324							
	Avg.	Avg.	Sum	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	Avg.	
	0.60	1.26	35.555	1468.5	65.6	61.8	252.1	#DIV/0!	57.5	2.9	
	Avg. Sqrt.					Avg. Tm				Max.	
	0.772					63.7				4.0	

Analytical Information

Moisture Determination - Data Summary

		Imp. 1	Imp. 2	Imp. 3	Imp. 4	Imp. 5	Imp. 6	Imp. 6	Silica Gel or Train	
Final	(ml)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(g)	3746.0
Initial	(ml)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(g)	3550.0
Gain	(ml)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(g)	196.0
									ts	1469
									SVP	29.9200

Blank Correction - Data Summary

Reagent		Acetone
Blank Volume	(ml)	100.0
Gross Wt.	(g)	105.6213
Tare Wt.	(g)	105.6194
Blank Weight Gain	(g)	0.0019
Blank Concentration	(g/ml)	1.90E-05

Blank Weight Gain = Gross Wt. - Tare Wt.

Blank Concentration = Blank Weight Gain / Blank Volume

Particulate Weight Determination - Data Summary

Front Half					Back Half		
		Filter	Acetone	Total Gain			Total Gain
	I.D.	Q-745A	B-671				
Beaker Vol.	(ml)	n/a	100.0				
Gross Wt.	(g)	0.3863	104.8458				
Tare Wt.	(g)	0.3831	104.8348				
Blank Corr.	(g)	0.0000	0.0019				
Gain	(g)	0.0032	0.0091	0.0123			0.0000

Blank Correction = Beaker Volume x Blank Concentration

E_3-Killam Inc.

SPECIFIC RUN INFORMATION

Project: 99023.0001
Run: 4

Test Of: PM
Location: Outlet

Reference Method No. 2 Calculations

Average Stack Velocity	$V_s = K_p\ C_p\ SQRT\ \Delta P_{avg}\ SQRT\ (T_s / (P_s\ M_s))$	V_s=	85.85	ft/sec.
Average Stack Volumetric Flow Rate	$Q_a = 60\ V_s\ A_s$	Q_a=	64729.5	ACFM
Average Stack Volumetric Flow Rate	$Q_s = 60\ V_s\ A_s\ (1-B_{ws})\ ((T_{std}\ P_s) / (P_{std}\ T_s))$	Q_s=	13857.6	DSCFM

Reference Method No. 3 Calculations

Molecular Weight, Dry	$M_d = 0.44\ \%CO_2 + 0.32\ \%O_2 + 0.28\ (\%CO + N_2)$	M_d=	29.68	lb/lb-mole
Molecular Weight, Wet	$M_s = M_d\ (1-B_{ws}) + 18\ B_{ws}$	M_s=	27.26	lb/lb-mole

Reference Method No. 4 Calculations

Sample Volume, Standard Conditions	$V_{m(std)} = V_m\ Y\ ((T_{std}\ P_m) / (T_m\ P_{std}))$	$V_{m(std)}$=	35.325	DSCF
Water Vapor Volume Collected	$V_{wc(std)} = .04707\ (V_f - V_i)$	$V_{wc(std)}$=	0.000	ft^3/ml
Water Vapor Volume Collected	$V_{wsg(std)} = .04715\ (W_f - W_i)$	$V_{wsg(std)}$=	9.241	ft^3/g
Moisture Volume Fraction of Stack Gas	$B_{ws} = (V_{wc(std)} + V_{wsg(std)}) / (V_{wc(std)} + V_{wsg(std)} + V_{m(std)})$	B_{ws}=	0.207	
Vapor Pressure of Stack H_2O	$VP = SVP - .000367\ (P_s)\ (1+(ts-32/1571))$	VP=	29.899	
Bws VP	$B_{ws}VP = VP / P_s$	$B_{ws}VP$=	1.013	
Min B_{ws} or B_{ws} VP	If $B_{ws} > B_{ws}VP$, then $B_{ws}VP$	MIN B_{ws} or $B_{ws}VP$=	0.207	

Reference Method No. 5 Calculations

Percent Isokinetic	$\%I = ((T_s\ V_{m(std)}\ P_{std}) / (1-B_{ws}) / (A_n \Theta\ V_s\ P_s\ T_{std}\ 60))\ 100$	%I=	95.6	
Mass Emissions Rate - Front Half	$p_{mrf} = (m_f / V_{m(std)})\ Q_s\ 0.13216$	P_{mrf}=	0.6377	lbs/hr.
Mass Emissions Rate - Total (Front+Back Half)	$p_{mrt} = (m_t / V_{m(std)})\ Q_s\ 0.13216$	P_{mrt}=	0.6377	lbs/hr.
Stack Concentration - Front Half	$C_{sf} = 15.43\ m_f / Vm_{(std)}$	C_{sf}=	0.0054	gr/DSCF
Stack Concentration - Total (Front+Back Half)	$C_{st} = 15.43\ m_t / Vm_{(std)}$	C_{st}=	0.0054	gr/DSCF
Stack Concentration - Front Half Corrected to 7% O_2	$C_{sfO2} = C_{sf}\ (20.9 - 7.0) / (20.9 - \%O_2)$	C_{sfO2}=	0.0046	gr/DSCF @7%O_2
Stack Concentration - Total (Front+Back Half) Corrected to 7% O_2	$C_{stO2} = C_{st}\ (20.9 - 7.0) / (20.9 - \%O_2)$	C_{stO2}=	0.0046	gr/DSCF @7%O_2

A.2 EPA Reference Method 18

E3-Killam, Inc.
Field Data Sheet
Industrial Hygiene Sampling

Client TPS
Project Number 99023
Date 25 Oct 99

Sample I.D. Run 2, Spiked

Sample Method Meth 18
Sample Media Silica gel / charcoal tubes

Start Time [ ] Initial Sample Flow Rate 208.6cc
Stop Time [ ] Final Sample Flow Rate 201.5cc
avg 205.1

Sampling Equipment (pump, serial number, regulators, etc.)

Pump # 2968

Start - 13:45 Start - 14:35
Stop - 14:15 Stop - 15:02

Field Notes:

60 min Sample time * .2051 lpm flowrate =
12.3 l Sample volume

E3-Killam, Inc.
Field Data Sheet
Industrial Hygiene Sampling

Client TPS
Project Number 99023
Date 25 Oct 99

Sample I.D. Run 2, Non-Spiked

Sample Method Method 8
Sample Media Silica gel / Charcoal tubes

Start Time
Stop Time

Initial Sample Flow Rate 208.9cc
Final Sample Flow Rate 202.2cc

> avg 205.6

Sampling Equipment (pump, serial number, regulators, etc.)

Pump # 2910

Start - 13:45 Start - 14:33
Stop - 14:15 Stop - 15:02

Field Notes:

60 min Sample time * .2056 lpm flowrate =

12.3 l Sample Volume

E3-Killam, Inc.
Field Data Sheet
Industrial Hygiene Sampling

Client TPS
Project Number 99023
Date 25 Oct 99

Sample I.D. R-3 Spiked

Sample Method Method 18
Sample Media Silica gel / charcoal tubes

Start Time [ ] Initial Sample Flow Rate [208.6cc] > avg 205.1

Stop Time [ ] Final Sample Flow Rate [201 scc]

Sampling Equipment (pump, serial number, regulators, etc.)

Pump # 2968
Start - 15:52 Start - 16:38
Stop - 16:27 Stop - 17:08

Field Notes:

60 min Sample time * .2051 lpm flowrate =
12.3 l sample volume

E3-Killam, Inc.
Field Data Sheet
Industrial Hygiene Sampling

Client TPS
Project Number 99023
Date 25Oct 99

Sample I.D. R-3, Non Spiked

Sample Method Method 18
Sample Media Silica gel / charcoal tubes

Start Time [ ] Initial Sample Flow Rate 208.9cc
Stop Time [ ] Final Sample Flow Rate 202.2cc > Avg = 205.6 cc

Sampling Equipment (pump, serial number, regulators, etc.)

Pump # 2910
Start - 15:52 Start - 16:38
Stop - 16:22 Stop 17:08

Field Notes:

60 min Sample time * .2056 lpm flow rate =
12.3 l Sample Volume

E3-Killam, Inc.
Field Data Sheet
Industrial Hygiene Sampling

Client TPS
Project Number 99023
Date 25 Oct 99

Sample I.D. R-4 Spiked

Sample Method Meth 18
Sample Media Silica Gel ~~Charcoal~~ Tubes

Start Time [ ] Initial Sample Flow Rate 208.9cc > Avg = 205.6

Stop Time [ ] Final Sample Flow Rate 202.2cc

Sampling Equipment (pump, serial number, regulators, etc.)

Pump # 2910
Start - 18:02 Start - 18:41
Stop - 18:37 Stop - 19:14

Field Notes:

60 min Sample time * .2056 lpm flow rate =
12.3 l Sample volume

E3-Killam, Inc.
Field Data Sheet
Industrial Hygiene Sampling

Client TPS
Project Number 99023
Date 25 Oct 99

Sample I.D. R-4 Non-Spiked

Sample Method Meth 18
Sample Media Silica Gel/Charcoal Tubes

Start Time [ ] Initial Sample Flow Rate 208.6cc > avg 205.1

Stop Time [ ] Final Sample Flow Rate 201.5cc

Sampling Equipment (pump, serial number, regulators, etc.)

Pump # 2908

Start - 18:02 Start - 18:40

Stop - 18:32 Stop - 19:14

Field Notes:

60 min Sample time * .205 l pm flowrate =

12.3 l sample volume

PERSONAL PUMP CALIBRATION FORM

Pre-calibration date: 6 Oct 99
Post calibration date: 20 Oct 99
Pump ID: 2968
Gilibrator Flow Cell: 8342-S

Target sample rate: 200 cc

PRE-TEST CALIBRATION READINGS	POST-TEST CALIBRATION READINGS
1) 208.8	1) 201.4
2) 208.3	2) 201.7
3) 208.8	3) 201.5
Average: 208.6	Average: 201.5

Pre-calibration within +/- 5% of Target Sample Rate
YES X
NO
Calibrator's Signature

Post calibration within +/- 5% of Target Sample Rate
YES X
NO
Calibrator's Signature

PERSONAL PUMP CALIBRATION FORM

Pre-calibration date: 6 Oct 99
Post calibration date: 26 Oct 99
Pump ID: 2910
Gilibrator Flow Cell: 8542-S

Target sample rate: 200 cc

PRE-TEST CALIBRATION READINGS	POST-TEST CALIBRATION READINGS
1) 208.6	1) 202.3
2) 209.1	2) 202.0
3) 209.1	3) 202.2
Average: 208.9	Average: 202.2

Pre-calibration within +/- 5% of Target Sample Rate
YES X
NO _____ Calibrator's Signature _____

Post calibration within +/- 5% of Target Sample Rate
YES X
NO _____ Calibrator's Signature _____

B. E_3-KILLAM FIELD PROCEDURES

FIELD PROCEDURE - REFERENCE METHOD 2 (FP2)
Test Procedures

A. Applicability

The average gas velocity in a stack is determined from the gas density and from the measurement of the average velocity head with a Type S pitot tube. This method is applicable for the measurement of the average velocity of a gas stream and for quantifying gas flow.

B. Preliminary Determinations

1. Select the sampling site and the number of sampling points according to USEPA Reference Method 1.

2. Set up pitot tube/manometer apparatus.

C. Procedures

1. Setup
   a) Connect positive leg of pitot tube (impact opening) to inclined side of inclined manometer.
   b) Connect negative leg of pitot tube (static pressure side) to straight side of inclined manometer.
   c) Level and zero manometer.

2. Pre-Test Leak Check
   a) Blow through pitot tube impact opening until at least 3 in. H_2O velocity pressure registers on the manometer. Immediately close off the impact opening.
   b) Observe pressure. The pressure shall remain stable for at least 15 seconds.
   c) On static pressure side of pitot tube, use suction until at least 3 in. H_2O vacuum registers on the manometer. Immediately close off the static opening.
   d) Observe pressure. The pressure shall remain stable for at least 15 seconds.

3. Measurement at Each Traverse Point
   a) Record differential pressure (Δp) reading and stack temperature.
   b) Check manometer level and zero.

4. Post-Test Leak Check
   a) Blow through pitot tube impact opening until at least 3 in. H_2O velocity pressure registers on the manometer. Immediately close off the impact opening.
   b) Observe pressure. The pressure shall remain stable for at least 15 seconds.
   c) On static pressure side of the pitot tube, use suction until at least 3 in. H_2O vacuum registers on the manometer. Immediately close off the static opening.
   d) Observe pressure. The pressure shall remain stable for at least 15 seconds.

5. Additional Readings
   a) Rotate pitot tube until both pitot tube openings are perpendicular to the direction of flow.
   b) Detach negative side of pitot tube from manometer, then record the reading on the manometer.
   c) Record the atmospheric pressure from a barometer.

FIELD PROCEDURE - REFERENCE METHOD 3A/10 (1FP3A/10)
Oxygen and Carbon Dioxide/Carbon Monoxide
Multi-Point, Integrated Sampling, Instrumentation Analysis

A. Preparation

1. Carbon Monoxide (CO)
   a) Use "Protocol 1" calibration gases (CO in N_2), certified by the manufacturer to be within ±2% of the specified concentration, as follows:
      (1) Span. < 1.5 times the applicable standard.
      (2) High-Range. About 90% of span.
      (3) Mid-Range. About 60% of span.
      (4) Low-Range. About 30% of span.
      (5) Zero. Pre-purified grade of N_2.

2. Oxygen and Carbon Dioxide (O_2 and CO_2)
   a) Use "Protocol 1" calibration gases (O_2 and CO_2 in N_2), certified by the manufacturer to be within ±2% of the specified concentration, as follows:
      (1) High-Range. 80 to 100% of span.
      (2) Mid-Range. 40 to 60% of span.
      (3) Zero. <0.25% of span.

3. Setup and calibrate the gas analyzer(s). Adjust system components as necessary.

4. Setup the sampling system as shown in Figure F3A/10-1.

B. System Performance Pre-Test Procedures

1. Analyzer Calibration Error

   Conduct this test initially and each time the system exceeds the system bias and drift specifications.

   a) Introduce the zero, mid-range and high-range gases to the measurement system at any point upstream of the analyzer. Do not make any adjustments to the system except those necessary to adjust the calibration gas flow to the analyzer.
   b) Record the analyzer responses to each calibration gas.
   c) Confirm calibration error is within +/- 2% of span.

D. Sampling Procedures

1. Leak-check the flexible bag
   a) Inflate flexible bag to maximum capacity.
   b) Allow the bag to stand for 24 hours.
   c) A deflated or semi-deflated bag indicates a leak.
   d) Deflate all acceptable sample bags. Discard any that leak.

2. Leak check the train.
   a) Plug probe inlet.
   b) Pull a vacuum ≥ 10 in. Hg.
   c) Turn off sampling pump.
   d) Note vacuum and monitor for 1-minute. No fluctuation in the initial vacuum reading indicates an acceptable leak check.
   e) Carefully release the probe inlet.

FIELD PROCEDURE - REFERENCE METHOD 3A/10 (1FP3A/10)
Oxygen and Carbon Dioxide/Carbon Monoxide
Multi-Point, Integrated Sampling, Instrumentation Analysis

3. Locate the probe at the first traverse point.
4. Purge the sample system, with the flexible bag disconnected.
5. Connect the bag, and commence sampling.
6. Sample at each traverse point at a constant rate.

E. **Analysis**

1. Within 8 hr after the sample is taken, analyze for % CO2, % O2, and CO concentration. Introduce the sample into the instruments until a stable reading is obtained for each desired constituent

F. **System Performance Post-Test Procedures**

1. Following the analysis of the "integrated" bag samples, determine the Analytical Bench Drift. Do not make any adjustments to the measurement system until after the drift checks are completed. Record the system responses. Introduce the calibration gases at the calibration valve installed at the inlet to the analyzers.

2. Confirm Analytical Bench Drift check is within +/-3% of span.

3. If the sampling system does not pass the Analytical Bench Drift check, repeat the calibration error and reanalyze the samples.

FIELD PROCEDURE - REFERENCE METHOD 3A/10 (1FP3A/10)
Oxygen and Carbon Dioxide/Carbon Monoxide
Multi-Point, Integrated Sampling, Instrumentation Analysis

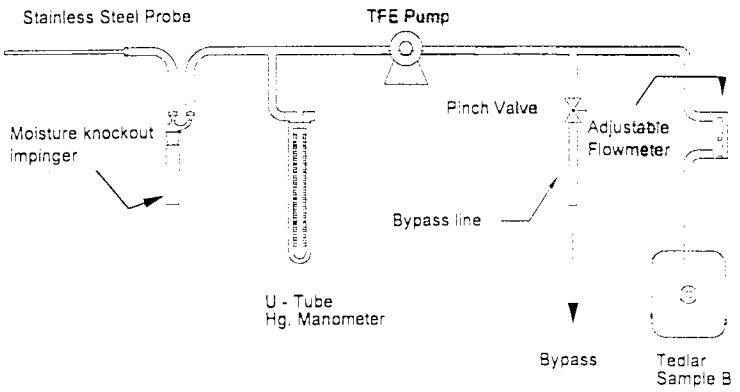


Figure 3A/10-1 Integrated Bag-Sampling System

FIELD PROCEDURE - REFERENCE METHOD 4 (FP4)
Moisture Determination

A. Pretest Preparation

1. Weigh several 200- to 300-g portions of silica gel in air-tight containers to ± 0.5g. Record the total weight of the silica gel plus container on each container.
2. Check filters visually against light for irregularities and flaws or pinhole leaks. Label the filters on the back side near the edge using numbering machine ink.

B. Preliminary Determinations

1. Select the sampling site and the number of sampling points according to USEPA Reference Method 1.
2. Set up pitot tube/manometer apparatus.
3. Leak-check the pitot tube setup.
   a. Blow into the pitot impact opening until at least 3 in. H_2O velocity pressure registers on the manometer, and close off impact opening.
   b. Observe the time (pressure must remain stable for at least 15 seconds).
   c. Do the same for the static pressure side, except use suction to obtain -3in. H_2O.
4. Level and zero the manometer.
5. Determine the stack pressure, temperature, and the range of velocity heads by previous test data or follow Steps B.6 - B.8.
6. Measure the velocity head and temperature.
7. Measure the static pressure in the stack.
8. Determine the atmospheric pressure.
9. Determine the moisture content by previous test data or measurement.
10. Determine or estimate the dry molecular weight.
11. Select a nozzle size based on preliminary stack data. Do NOT change nozzle size during the sampling run.
12. Select a suitable probe liner and probe length such that all traverse points can be sampled.
13. Select the total sampling time and standard sample volume specified in the test procedures for the specific industry. Select equal sampling times of ≥ 2 min per point.

C. Preparation of Collection Train

1. During the preparation and assembly of the sampling train, keep all openings covered to avoid contamination. Use parafilm to close the openings.
2. Prepare impingers according to Figure 1.
3. Weigh the entire impinger train.
4. Using a tweezer or clean disposable surgical gloves, place filter in the filter holder. Check the filter for tears after assembly.
5. Mark the probe with heat resistant tape (or other) to denote the proper distance into the stack or duct for each sampling point.
6. Set up the train. Turn on and set probe and filter box heaters. Place crushed ice around the impingers.
7. Leak-Check the sampling train
   a. Allow time for train temperatures to stabilize.
   b. Plug the nozzle. Fully open the bypass valve and close the coarse adjust valve. Then start the pump.
   c. Slowly close the bypass valve until the desired vacuum is reached (≥ 15 in. Hg or ≥ maximum vacuum reached during the test run.) Do not reverse direction of bypass valve; this will cause water to back up into the filter holder. If the desired vacuum is exceeded, either leak-check at this higher vacuum or end the leak-check as shown in Step 7e, and start over.
   d. Allow the flow rate to stabilize, then determine the leakage rate using DGM readings and a watch. Record the leakage rate. Leakage rate must be ≤ 0.02 cfm or ≤ 4% of average sampling rate, whichever is less.
   e. End the leak-check as follows: first slowly remove the plug from the inlet to the prove, and immediately turn off the vacuum pump. This prevents the water in the impingers from being forced backward into the filter holder and silica gel from being entrained backward into the third impinger.

FIELD PROCEDURE - REFERENCE METHOD 4 (FP4)
Moisture Determination

D. Sampling

1. Record data shown on field data sheet. Record the initial dry gas meter (DGM) reading.
2. Clean the portholes.
3. Remove the nozzle cap, verify that the filter and probe heating systems are up to temperature, and check pitot tube, temperature gauge, and probe alignments and clearances.
4. Close the coarse adjust valve. If necessary to overcome high negative stack pressure, turn on the pump. Position the nozzle at the first traverse point. Immediately start the pump, and adjust the flow to isokinetic conditions.
5. When the probe is in position, block off the openings around the probe and porthole.
6. Traverse the stack cross-section. *Do not bump the probe nozzle into the stack walls.*
   a. Keep the temperature around the filter holder (probe outlet or filter outlet, if applicable) at the proper level.
   b. Add more ice and, if necessary, salt to maintain a temperature of <68°F at the condenser / silica gel outlet.
   c. Periodically check the level and zero of the manometer.
   d. Record DGM readings at the beginning and end of each sampling time increment, before and after each leak-check, and when sampling is halted.
   e. Take other readings shown in field data sheet at least once at each sample point during each time increment and additional readings when significant changes (20% variation in Δp readings) necessitate additional adjustments in flow rate.
   f. If train components are replaced, conduct leak-check according to Step C.7.
7. At the end of the sample run, turn off the coarse adjust valve, remove the probe and nozzle from the stack, turn off the pump, record the final DGM meter reading.
8. Leak-check the sampling train (see Step C.7).
9. Leak-check the pitot lines (see Step B.3).
10. Allow the probe to cool. Then, wipe off all external PM near the tip of the probe nozzle, and place a cap over it.
11. Before moving the sampling train to the cleanup site, remove the probe from the sampling train, wipe off the silicone grease, if used, and cap the open outlet of the probe. Do not lose any condensate that might be present. Wipe off the silicone grease from the filter inlet, and cap it.
12. Remove the umbilical cord from the last impinger, and cap the impinger. After wiping off the silicone grease, if used, cap off the filter holder outlet and impinger inlet.
13. Transfer the probe and filter-impinger assembly to the cleanup area that is clean and protected from the wind.

E. Sample Recovery

1. Container No. 3 (Silica Gel)
   a. Determine whether silica gel has been completely spent, and note on field data sheet its condition.
   b. Weigh the silica gel impinger with the other impingers to the nearest 0.5 g.
2. Impinger Water
   a. Note on field data sheet any color or film in the liquid catch.
   b. Weigh Impingers 1, 2, 3 and the silica gel impinger to within ±0.5g [or measure the liquid volume in impingers 1, 2 and 3 to within ± 1 mL (with a graduated cylinder)].
   c. Discard the liquid, unless analysis of the impinger catch is required. Store as is appropriate.

FIELD PROCEDURE - REFERENCE METHOD 4 (FP4)
Moisture Determination

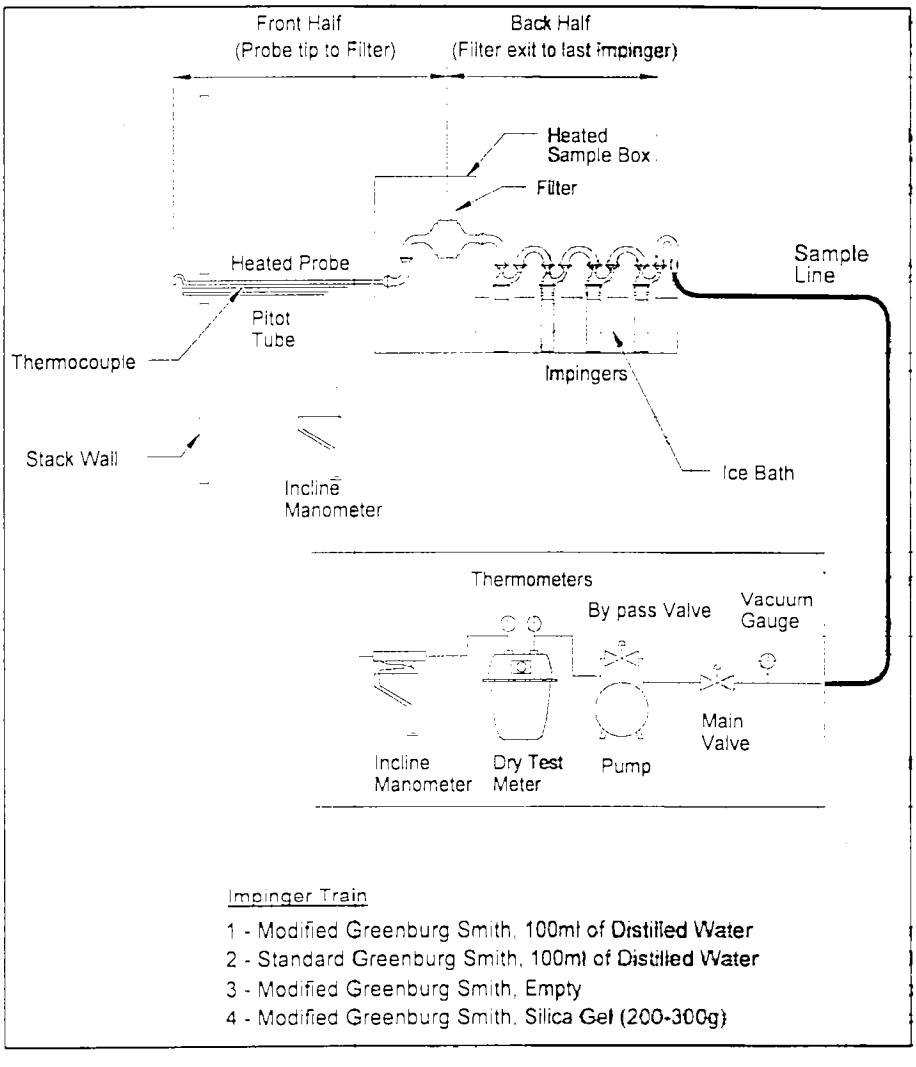


Figure 1. Particulate Sampling Train

FIELD PROCEDURE - REFERENCE METHOD 5 (FP5)
Particulate Matter Isokinetic Sampling

A. Pretest Preparation

1. Weigh several 200- to 300-g portions of silica gel in air-tight containers to ± 0.5g. Record the total weight of the silica gel plus container on each container.

2. Check filters visually against light for irregularities and flaws or pinhole leaks. Label the filters on the back side near the edge using numbering machine ink.

3. Desiccate the filters at 20 ± 5.6 °C and ambient pressure for ≥ 24 hr. and weigh at intervals of ≥ 6 hr to a constant weight, i.e., ≤ 0.5 mg change from previous weighing; record results to ±0.1 mg. During each weighing, do not expose the filter to the laboratory atmosphere for > 2 min and a relative humidity > 50%.

B. Preliminary Determinations

1. Select the sampling site and the number of sampling points according to USEPA Reference Method 1.

2. Set up pitot tube/manometer apparatus.

3. Leak-check the pitot tube setup.

   a. Blow into the pitot impact opening until at least 3 in. H_2O velocity pressure registers on the manometer, and close off impact opening.
   b. Observe the time (pressure must remain stable for at least 15 seconds).
   c. Do the same for the static pressure side, except use suction to obtain -3in. H_2O.

4. Level and zero the manometer.

5. Determine the stack pressure, temperature, and the range of velocity heads by previous test data or follow Steps B.6 - B.8.

6. Measure the velocity head and temperature.

7. Measure the static pressure in the stack.

8. Determine the atmospheric pressure.

9. Determine the moisture content by previous test data or measurement.

10. Determine or estimate the dry molecular weight.

11. Select a nozzle size based on preliminary stack data. Do NOT change nozzle size during the sampling run.

12. Select a suitable probe liner and probe length such that all traverse points can be sampled.

13. Select the total sampling time and standard sample volume specified in the test procedures for the specific industry. Select equal sampling times of ≥ 2 min per point.

FIELD PROCEDURE - REFERENCE METHOD 5 (FP5)
Particulate Matter Isokinetic Sampling

C. Preparation of Collection Train

1. During the preparation and assembly of the sampling train, keep all openings covered to avoid contamination. Use parafilm to close the openings.

2. Prepare impingers according to Figure 1.

3. Tare the sample train by either

   a. Weighing the entire impinger train.
   b. Volumetrically measuring the liquid in each impinger and gravimetrically weighing the silica gel impinger.

4. Using a tweezer or clean disposable surgical gloves, place filter in the filter holder. Check the filter for tears after assembly.

5. Mark the probe with heat resistant tape (or other) to denote the proper distance into the stack or duct for each sampling point.

6. Set up the train. Turn on and set probe and filter box heaters. Place crushed ice around the impingers.

7. Leak-Check the sampling train

   a. Allow time for train temperatures to stabilize.
   b. Plug the nozzle. Fully open the bypass valve and close the coarse adjust valve. Then start the pump.
   c. Slowly close the bypass valve until the desired vacuum is reached (≥ 15 in. Hg or ≥ maximum vacuum reached during the test run.) Do not reverse direction of bypass valve; this will cause water to back up into the filter holder. If the desired vacuum is exceeded, either leak-check at this higher vacuum or end the leak-check as shown in Step 7e. and start over.
   d. Allow the flow rate to stabilize, then determine the leakage rate using DGM readings and a watch. Record the leakage rate. Leakage rate must be ≤ 0.02 cfm or ≤ 4% of average sampling rate, whichever is less.
   e. End the leak-check as follows: first slowly remove the plug from the inlet to the prove, and immediately turn off the vacuum pump. This prevents the water in the impingers from being forced backward into the filter holder and silica gel from being entrained backward into the third impinger.

D. Sampling

1. Record data shown on field data sheet. Record the initial dry gas meter (DGM) reading.

2. Clean the portholes.

3. Remove the nozzle cap, verify that the filter and probe heating systems are up to temperature, and check pitot tube, temperature gauge, and probe alignments and clearances.

4. Close the coarse adjust valve. If necessary to overcome high negative stack pressure, turn on the pump. Position the nozzle at the first traverse point. Immediately start the pump, and adjust the flow to isokinetic conditions.

5. When the probe is in position, block off the openings around the probe and porthole.

6. Traverse the stack cross-section. *Do not bump the probe nozzle into the stack walls.*

   a. Keep the temperature around the filter holder (probe outlet or filter outlet, if applicable) at the proper level.
   b. Add more ice and, if necessary, salt to maintain a temperature of <68°F at the condenser / silica gel outlet.
   c. Periodically check the level and zero of the manometer.

d. Record DGM readings at the beginning and end of each sampling time increment, before and after each leak-check, and when sampling is halted.

e. Take other readings shown in field data sheet at least once at each sample point during each time increment and additional readings when significant changes (20% variation in Δp readings) necessitate additional adjustments in flow rate.

f. If train components are replaced, conduct leak-check according to Step C.7.

7. At the end of the sample run, turn off the coarse adjust valve, remove the probe and nozzle from the stack, turn off the pump, record the final DGM meter reading.

8. Leak-check the sampling train (see Step C.7).

9. Leak-check the pitot lines (see Step B.3).

10. Allow the probe to cool. Then, wipe off all external PM near the tip of the probe nozzle, and place a cap over it.

11. Before moving the sampling train to the cleanup site, remove the probe from the sampling train, wipe off the silicone grease, if used, and cap the open outlet of the probe. Do not lose any condensate that might be present. Wipe off the silicone grease from the filter inlet, and cap it.

12. Remove the umbilical cord from the last impinger, and cap the impinger. After wiping off the silicone grease, if used, cap off the filter holder outlet and impinger inlet.

13. Transfer the probe and filter-impinger assembly to the cleanup area that is clean and protected from the wind.

E. Sample Recovery

1. Place 200 mL acetone from the wash bottle being used for cleanup in a glass sample container labeled "acetone blank."

2. Inspect the train prior to and during disassembly, and note any abnormal conditions.

3. Container No. 1 (Filter)

   a. Using a pair of tweezers and/or clean disposable surgical gloves, carefully remove the filter from the filter holder, and place it in its identified petri dish container. If necessary, fold the filter such that the PM cake is inside the fold.
   b. Using a dry Nylon bristle brush and/or a sharp-edged blade, carefully transfer to the petri dish any PM and/or filter fibers that adhere to the filter holder gasket. Seal the container.

4. Container No. 2 (Acetone Rinses)

Recover particulate matter from the probe nozzle, Swagelok™ fitting, probe liner (use a funnel to aid in transferring liquid washes to the container), front half of the filter holder, and (if applicable) the cyclone, and recover all rinses in a glass container as follows:

   a. Before cleaning the front half of filter holder, wipe clean all joints of silicone grease (if applicable).
   b. Rinse with acetone, brush with a Nylon bristle brush, and rinse with acetone until there are no visible particles. Make a final acetone rinse.
   c. For probe liner, repeat rinse, brush, rinse sequence at least three times for glass liners, and six times for metal liners.
   d. Make a final rinse of the brush with acetone.
   e. After completing the rinse, tighten the lid on the sample container. Mark the height of the fluid level. Label the container.

FIELD PROCEDURE - REFERENCE METHOD 5 (FP5)
Particulate Matter Isokinetic Sampling

5. Container No. 3 (Silica Gel)

   a. Determine whether silica gel has been completely spent, and note on field data sheet its condition.
   b. Weigh the silica gel impinger with the other impingers to the nearest 0.5 g.

6. Impinger Water

   a. Note on field data sheet any color or film in the liquid catch.
   b. Weigh impingers 1, 2, 3 and the silica gel impinger to within ±0.5g [or measure the liquid volume in impingers 1, 2 and 3 to within ± 1 mL (with a graduated cylinder)].
   c. Discard the liquid, unless analysis of the impinger catch is required. Store as is appropriate.

7. Whenever possible, ship sample containers in an upright position.

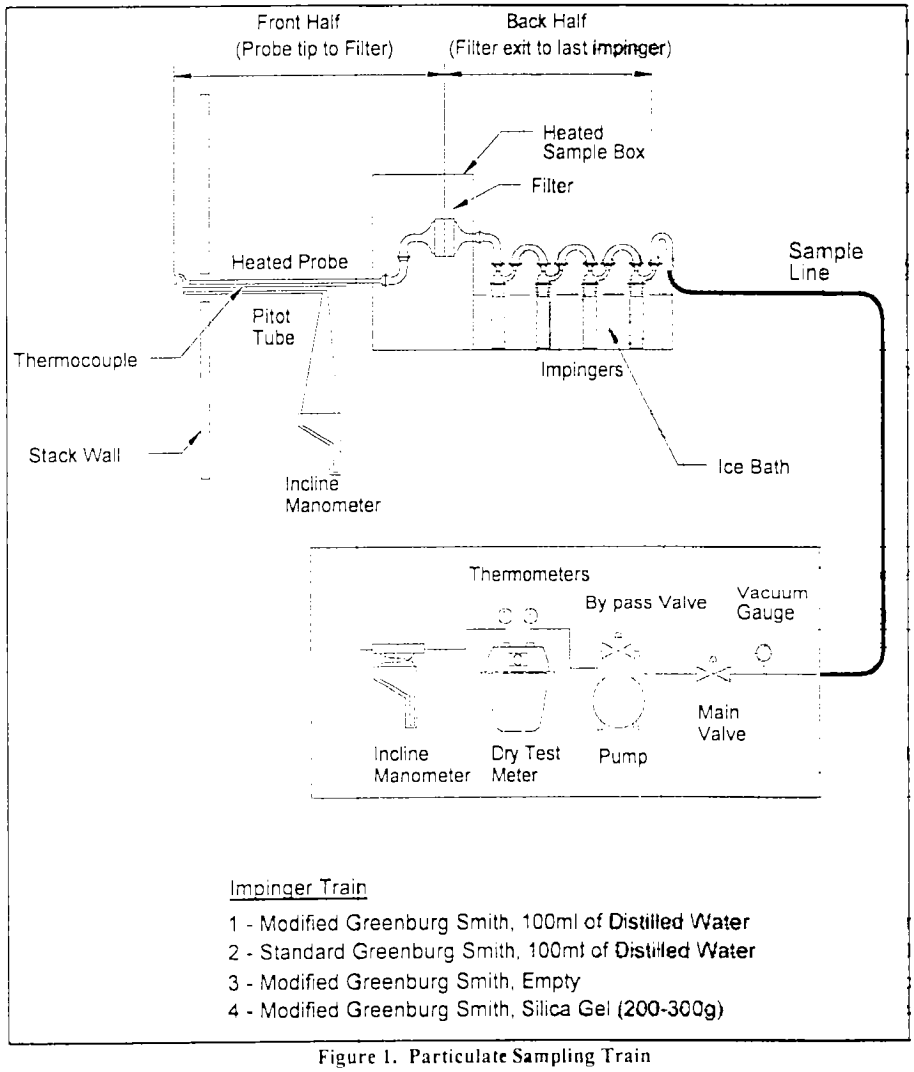


Figure 1. Particulate Sampling Train

FIELD PROCEDURE - REFERENCE METHOD 25A (1FP25A)
Total Hydrocarbons

A. Preparations
1. Use "Protocol 1" calibration gases (propane or methane in air or N_2), certified by the manufacturer to be within ±2% of the specified concentration, as follows:
   a) High-Range. 80-90% of span.
   b) Mid-Range. 45-55% of span.
   c) Low-Range. 25-35% of span.
   d) Zero. Prepurified grade of air or N_2.
2. Setup and calibrate the gas analyzer and data recorder. Adjust system components as necessary.
3. For "Continuous Sampling", set up the sampling system as shown in Figure F10-1.

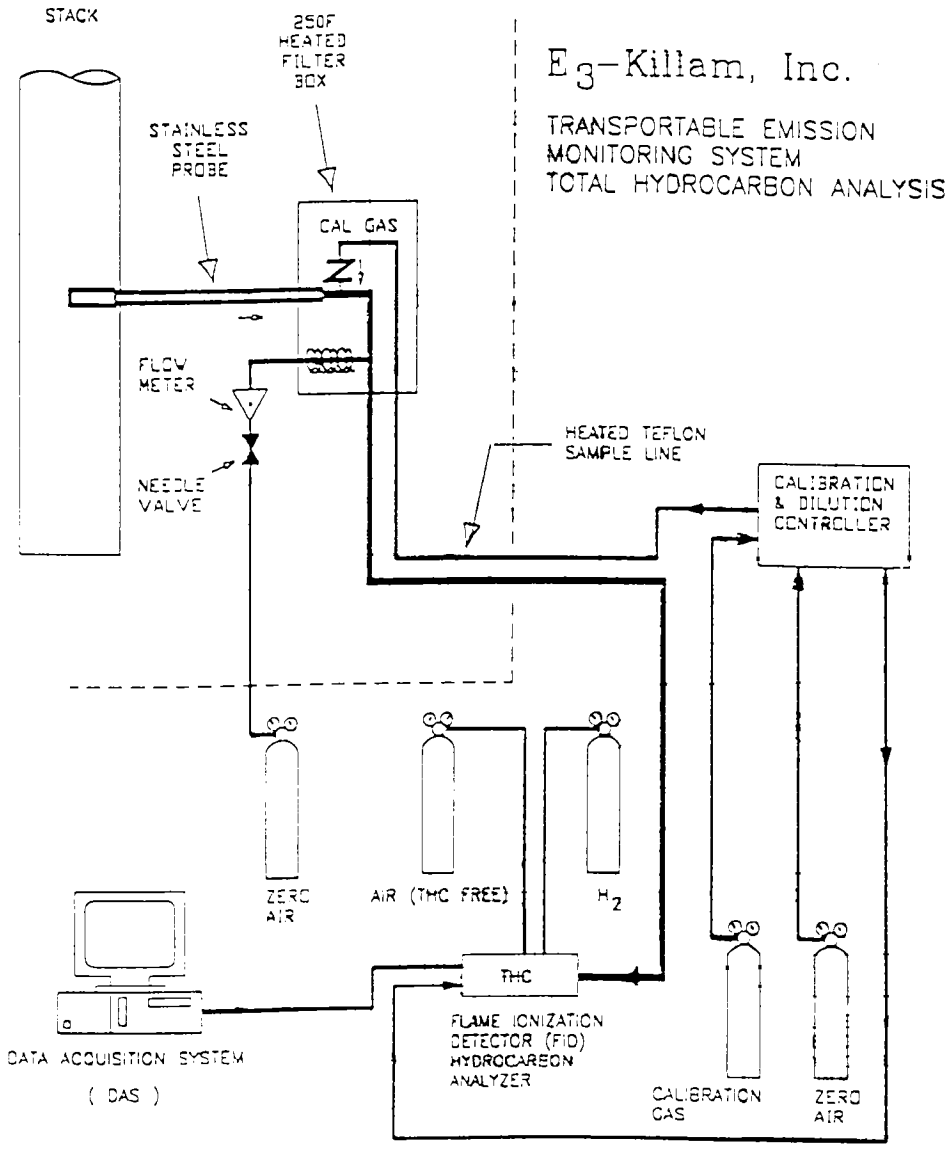
B. System Performance Test Procedures
1. Analyzer Calibration Error
   Conduct this test initially (within 2 hours of sampling) and each time the system exceeds the system bias and drift specifications. Record the analyzer responses to each calibration gas.
   a) Introduce the zero, and high-range gases to the measurement system, at the sample probe. Adjust the system to match the calibration values.
   b) Predict the system response for the low- and mid-range calibration gases.
   c) Introduce the low- and mid-range gases to the measurement system. Confirm that the responses meet the calibration error criteria.
2. Sampling Response Time Check
   Conduct this test initially
   a) Introduce the zero gas into the measurement system. When the system response is stable quickly switch to the high-level calibration gas. Record the time required for the system to respond to 95% of the step change.
   b) Repeat step 1 three times and average the results.

C. Sampling Procedures
1. Sample Collection Procedure
   a) Position the probe at the measurement point.
   b) Purge the sampling system for a minimum of twice the response time.
   c) Begin sample collection and data recording.
   d) Sample using the same sampling rate as that used during the sampling system bias check. Maintain constant sampling rate (±10%) during the entire run.
2. Data Collection Requirements
   a) When determining average concentration, sample a minimum of twice the stable response time for the instrument.
   b) Determine the average measurements recorded at equally spaced intervals over the entire run:
   c) Runs less than or equal to 1 hour must have recorded measurements at 1-minute intervals.
   d) Runs greater than 1 hour must have measurements at 2-minute intervals or a minimum of 96 measurements.

D. Quality Assurance Procedures
1. Following each "Continuous" sample, determine the sampling system drift. Do not adjust the measurement system until after the drift checks are completed. Record the system responses. Introduce the zero and mid-range calibration gases in the same manner as during the calibration error check. Determine whether the calibration drift is valid

   If the sampling system does not pass the bias check void the run and repeat the calibration error test before the next run.
   If the sampling system does pass the bias check, conduct the next run.

FIELD PROCEDURE - REFERENCE METHOD 25A (1FP25A)
Total Hydrocarbons



Method 25A Sample Train

C. QA/QC SUPPORTING DOCUMENTATION

C.1 CEMS

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Cheektowaga, NY
10/25/99
99023.0001

SUMMARY CALCULATIONS

Stack Parameter		Run 1	Run 2	Run 3	Run 4	Avg.
Tstd	F	Aborted	68	68	68	
Molar Volume		run	24.055	24.055	24.055	
Stack Temperature	F		1489	1470	1469	1476
Moisture	%		22.1	22.8	20.7	21.9
Actual Flow Rate	acfm		58275	61653	64730	61553
Dry Std. Flow Rate	dscfm		12150	12853	13858	12954
O_2 (drift corrected)	%		5.1	3.5	4.7	4.4
CO_2 (drift corrected)	%		8.6	10.1	9.3	9.3
CO (drift corrected)	ppmvd		0.5	1.6	2.2	1.4
	ppmvd @ 7%O_2		0.4	1.3	1.9	1.2
	lb/hr		0.03	0.09	0.13	0.08
THC (as Methane)						
	ppmvw		1.1	0.4	0.9	0.8
	ppmvd		1.4	0.5	1.2	1.0
	ppmvd @ 7%O2		1.2	0.4	1.0	0.9
	lb/hr		0.04	0.02	0.04	0.03

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RESPONSE TIME

Time:	10/25/99
Operator:	MTK

E3-Killam TEMS

Analyzer	Upscale Response (sec) 1	2	3	Avg.	Downscale Response (sec) 1	2	3	Avg.	Response Time[1] (sec)
O_2	91	90	94	92	93	89	90	91	92
CO_2	87	88	90	88	88	79	88	85	88
CO	115	112	123	117	123	125	122	123	123
NO_x									
SO_2									
								System Response Time[2]:	123

Notes:
1 Greater value of average upscale response and average downscale response.
2 Maximum value of all analyzer response times.

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Dilution Check

Component Gas		Dilution (%)	Target	Trial #1	Trial #2	Trial #3	Avg. Response	% Accuracy
concentration	mixture							
19.8	O2/CO2/N2	0	0.0	0.1	0.0	0.1	0.1	n/a
		10	2.0					
		20	4.0					
		30	5.9	6.0	6.0	6.0	6.0	1.7
		40	7.9					
		50	9.9					
		60	11.9	12.1	12.0	12.0	12.0	0.8
		70	13.9					
		80	15.8					
		90	17.8					
		100	19.8	20.1	20.1	20.1	20.1	1.5

Accuracy must be ± 2% at all dilution levels

System Check

Certified Concentration (Target)	12.0
Response #1	12.0
Response #2	12.0
Response #3	12.0
Average response	12.0
Accuracy	0.0

Accuracy must be ± 2% for valid system check

$$\text{Accuracy} = \frac{\text{Average Response} - \text{Target}}{\text{Target}} \times 100$$

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CALIBRATION ERROR AND SYSTEM BIAS

O_2						
		Date:	10/25/99	Method:	3A	
		Time:	7:46	Operator:	MTK	
		Analyzer ID:	0.354166667	Span Value:	25	%
		Gas Concentration:	12.0, 19.8	Gas Mixture:	O2/CO2/N2	

Calibration Gas	Divider Setting (%)	Calibration Value (%)	Analyzer Response (%)	Calibration Error (%)	Initial Calibration System Response (%)	Initial Calibration System Bias (%)
ZERO GAS	0%	0	0.2	0.8%	0.6	1.6%
LOW GAS	30%	n/a	n/a	n/a	n/a	n/a
MID GAS	100%	12	11.9	0.4%	12	0.4%
HIGH GAS	100%	19.8	20.1	1.2%	20.2	0.4%
Specification:		[redacted]	[redacted]	< 2%	[redacted]	< 5%

CALIBRATION DRIFT DETERMINATION

O_2 (O_2 values in %)

			Run 1	Run 2	Run 3	Run 4
Span Value:	25	[redacted]				
Refer. Method:		3A				
% Drift Criteria:		< 3.0%				
Time of Drift Check			n/a	15:05	17:10	19:15
Zero	Cert. Values	Initial		0.6	0.2	0.7
		Final		0.2	0.7	0.1
	0.0	Avg. (C_o)		0.4	0.5	0.4
	[redacted]	% Drift		-1.6%	2.0%	-2.4%
		Valid		Yes	Yes	Yes
Upscale (C_{ma})	[redacted]	Initial		12.0	12.5	12.7
		Final		12.5	12.7	12.4
	12.0	Avg. (C_m)		12.3	12.6	12.6
	[redacted]	% Drift		2.0%	0.8%	-1.2%
		Valid		Yes	Yes	Yes
Run Average (C)				5.42	4.02	5.19
Drift Corrected Average (C_{gas})				3.06	3.49	4.71

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CALIBRATION ERROR AND SYSTEM BIAS

CO_2						
		Date:	10/25/99	Method:	3A	
		Time:	7:46	Operator:	MTK	
		Analyzer ID:	VIA510	Span Value:	20	%
		Gas Concentration:	18.2	Gas Mixture:	O2/CO2/N2	

Calibration Gas	Divider Setting (%)	Calibration Value (%)	Analyzer Response (%)	Calibration Error (%)	Initial Calibration System Response (%)	Initial Calibration System Bias (%)
ZERO GAS	0%	0	0	0.0%	0	0.0%
LOW GAS	N/A	N/A	N/A	N/A	N/A	N/A
MID GAS	60%	10.9	11	0.5%	11	0.0%
HIGH GAS	100%	18.2	18.5	1.5%	17.5	-5.0%
Specification:				< 2%		< 5%

CALIBRATION DRIFT DETERMINATION

CO_2 (CO_2 values in %)

Span Value:	20		Run			
Refer. Method:		3A				
% Drift Criteria:		< 3.0%	1	2	3	4
Time of Drift Check			n/a	15:05	17:10	19:15
Zero	Cert. Values	Initial		0.0	0.0	0.0
		Final		0.0	0.0	0.0
	0	Avg. (C_o)		0.0	0.0	0.0
		% Drift		0.0%	0.0%	0.0%
		Valid		Yes	Yes	Yes
Upscale (C_{ma})		Initial		11.00	11.0	10.6
		Final		11.00	10.6	10.1
	10.9	Avg. (C_m)		11.00	10.8	10.4
		% Drift		0.0%	-2.0%	-2.5%
		Valid		Yes	Yes	Yes
Run Average (C)				8.67	10.00	8.83
Drift Corrected Average (C_{gas})				8.59	10.09	9.30

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CALIBRATION ERROR AND SYSTEM BIAS

CO			Date:	10/25/99	Method:	10	
			Time:	7:46	Operator:	MTK	
			Analyzer ID:	TECO 10H	Span Value:	100	ppm
			Gas Concentration:	89.8	Gas Mixture:	CO/N2	

Calibration Gas	Divider Setting (%)	Calibration Value (ppm)	Analyzer Response (ppm)	Calibration Error (%)	Initial Calibration System Response (ppm)	Initial Calibration System Bias (%)
ZERO GAS	0%	0	1	1.0%	1.2	0.2%
LOW GAS	30%	26.9	25.6	1.3%	26.6	1.0%
MID GAS	60%	53.9	53.5	0.4%	55	1.5%
HIGH GAS	100%	89.8	88.8	1.0%	89.2	0.4%
Specification:		[redacted]	[redacted]	< 2%	[redacted]	< 5%

CALIBRATION DRIFT DETERMINATION

CO (CO values in ppm)

Span Value:	100	[redacted]	Run			
Refer. Method:		10				
% Drift Criteria:		< 3.0%	1	2	3	4
Time of Drift Check			n/a	15:05	17:10	19:15
Zero	Cert. Values	Initial		1.2	1.1	0.0
		Final		1.1	0.0	0.0
	0	Avg. (C_o)		1.2	0.6	0.0
	[redacted]	% Drift		-0.1%	-1.1%	0.0%
		Valid		Yes	Yes	Yes
Upscale (C_{ma})	[redacted]	Initial		55.0	54.0	53.1
		Final		54.0	53.1	52.0
	53.9	Avg. (C_m)		54.5	53.6	52.6
	[redacted]	% Drift		-1.0%	-0.9%	-1.1%
		Valid		Yes	Yes	Yes
Run Average (C)				1.72	2.17	2.11
Drift Corrected Average (C_{gas})				0.53	1.60	2.16

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10/25/99
99023.0001

CALIBRATION ERROR AND SYSTEM BIAS

THC_{out}			Date:	10/25/99	Method:	25A	
			Time:	8:42	Operator:	MTK	
			Analyzer ID:	JUM VE7	Span Value:	100	ppmvw
			Gas Concentration:	90.5	Gas Mixture:	CH4/air	

Calibration Gas	Divider Setting (%)	Calibration Value (%)	System Response (ppm)	Predicted Response (ppm)	System Response (ppm)	Calibration Error (%)
ZERO GAS	0	0.0	1.1	[redacted]	[redacted]	-
LOW GAS	0.3	27.2	[redacted]	28.1	28.5	1.5%
MID GAS	0.6	54.3	[redacted]	55.1	55.4	0.6%
HIGH GAS	1	90.5	90.0	[redacted]	[redacted]	0.6%
Specification (of cylinder value):			[redacted]	[redacted]	[redacted]	< 5%

CALIBRATION DRIFT DETERMINATION

THC (as Methane) (values in ppmv)			Time:	Run 1 n/a	2 15:09	3 17:08	4 19:15
Zero	[redacted]	Initial			1.1	0.9	1.8
		Final			0.9	1.8	0.9
	0	Avg. (C_o)			1.0	1.4	1.4
	[redacted]	% Drift			-0.2%	0.9%	-0.9%
		Valid			Yes	Yes	Yes
Upscale (C_m)	[redacted]	Initial			55.4	53.4	53.2
		Final			53.4	53.2	53.6
	54.3	Avg. (C_m)			54.4	53.3	53.4
	[redacted]	% Drift			-2.0%	-0.2%	0.4%
		Valid			Yes	Yes	Yes

Span Value:	100	[redacted]
Refer. Method:		25A
% Drift Criteria:		< 3.0%

C.2 Equipment Calibrations

E3-Killam inc.
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Meter Box ID
E-1

Standard Dry Gas Meter (γ)
Correction Factor
1.00016

Method 5 Pre-Test Calibration

Calibration Date	Pressure (Pb)	Calibrator	Standard Dry Gas Meter Serial Number
11/3/98	29.32	RCS	954298

		Standard Dry Gas Meter Volume (ft^3)			Meter Box Gas Meter Volume (ft^3)			Standard Gas Meter	Meter Box Temperature (°F)			Time
Run #	Δ H	Initial	Final	Net (Vw)	Initial	Final	Net (Vm)	Temp (°F)	Inlet	Outlet	Average	(Minutes)
1	0.50	518.328	523.538	5.211	394.672	399.943	5.271	71.0	77.0	74.5	75.8	13.0
2	1.50	511.182	517.929	6.748	387.444	394.265	6.821	71.5	75.5	74.0	74.8	10.0
3	3.00	523.942	533.407	9.467	400.371	409.913	9.542	71.0	80.5	75.5	78.0	10.0

Run #	γ_i	In Range?	$\Delta H@_i$	In Range?
1	0.996	yes	1.7749	yes
2	0.992	yes	1.8840	yes
3	0.998	yes	1.9057	yes

Average γ **0.995**

Average ΔH@ **1.8549**

$\gamma = (Vw*Pb*(Tm+460))/(Vm*(Pb+DH/13.6)*(Tw+460))$

$\Delta H@=[0.0317*\Delta H/(Pb*(To+460)]*[((Tw+460)*O)/Vw]^2$

Where:

γ= Average Ratio of Standard DGM to Meter Box DGM

ΔH@=Orifice Pressure Differential that equates to 0.75 cfm of air at 68 °F and 29.92 in. Hg.

ΔH= Pressure Differntial across orifice (in. H_2O)
Pb = Barometric Pressure (in. Hg)
Tm = Average temperature of Meter Box Dry gas meter (°F)
Tw = Temperature of Standard Dry Gas Meter (°F)
To = Temperature at outlet of meter box dry gas meter (°F)
Vm = Net volume through meter box dry gas meter (ft3)
Vw = Net volume through standard dry gas meter. (ft3)
O = Time of calibration run (minutes)

Acceptable Tolerances:

Each γ within +/-2% of average γ

Each Delta H@ within +/- 0.15 in. H2O of Average Delta H@

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Method 5 Post-Test Calibration

Meter Box ID
E-1

Standard DGM Serial # 954320

Project	Date	Pressure (Pb)	Standard DGM γ Correction Factor
TPS	28-Oct-99	29.47	1.0005

Project #	Operator	Maximum Vacuum	γ Posted On Meter Box
99023.0001	AK	4.0	0.995

Run #	ΔH (in. H_2O)	Standard Dry Gas Meter Volume (ft^3) Initial	Final	Net (Vw)	Meter Box Gas Meter Volume (ft^3) Initial	Final	Net (Vm)	Standard DGM Temp. (°F)	Meter Box Temperature (°F) Inlet	Outlet	Average	Time (Minutes)	γ_i
1	1.07	531.711	538.471	6.763	510.269	517.025	6.759	60.5	63.0	62.0	62.5	12.0	1.002
2	1.07	538.471	544.675	6.207	517.025	523.210	6.185	61.0	65.0	63.0	64.0	11.0	1.007
3	1.07	544.675	552.550	7.879	523.210	531.069	7.859	61.5	67.0	64.0	65.5	14.0	1.008
												Average γ	1.005

γ_i=Ratio of Reading Standard DGM to Meter Box DGM for each run i, where:

$\gamma_i = (Vw*Pb*(Tm+460))/(Vm*(Pb+\Delta H/13.6)*(Tw+460))$

γ= Average Ratio of Standard DGM to Meter Box DGM

ΔH= Pressure Differntial across orifice (in. H_2O)

Pb = Barometric Pressure (in. Hg)

Tm = Average temperature of Meter Box Dry gas meter (°F)

Tw = Temperature of Standard Dry Gas Meter (°F)

To = Temperature at outlet of meter box dry gas meter (°F)

Vm = Net volume through meter box dry gas meter (ft3)

Vw = Net volume through standard dry gas meter. (ft3)

O = Time of calibration run (minutes)

Acceptable Criteria	Acceptable?
Each γ_i within +/- 2% of Average γ	
Run 1	yes
Run 2	yes
Run 3	yes
γ posted on meter box within +/-5% of average γ	yes

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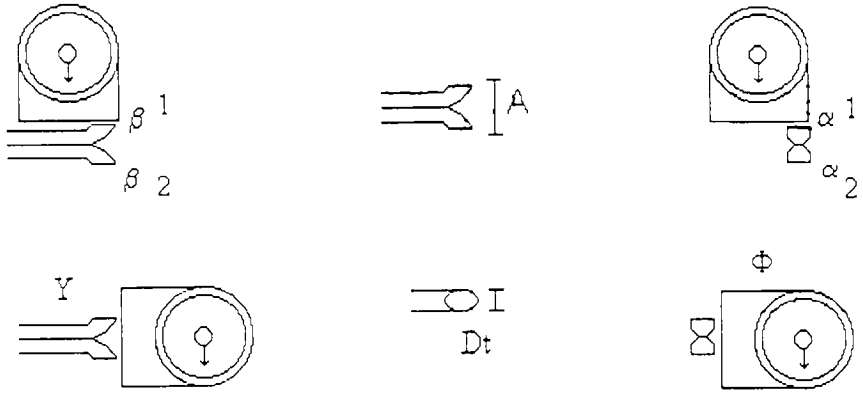
Pitot Tube Calibration

Client:	TPS
Project #:	99023.0001
Report:	Particulate Stack Test
Site:	Soil Remediation Unit

Pre-test Report

		Measurements								
Pitot ID	Calibration Date	α1 (°)	α2 (°)	β1 (°)	β2 (°)	Y (°)	Φ (°)	A (in.)	Dt (in.)	Calibrator's Initials
7IP-2	11-May-99	2.5	2.0	2.5	1.5	2.0	1.0	0.932	0.387	RCS

The diagram below depicts the various measurements listed above.



The following criteria must be met in order to assume an S-type pitot tube has a pitot coefficient of 0.84.

Parameter	Criteria	How Determined	Net Results for Pitot tubes Listed above.			
α_1	$\alpha_1 > -10^\circ, \alpha_1 < +10^\circ$	Measurement	X	Pass		Fail
α_2	$\alpha_2 > -10^\circ, \alpha_2 < +10^\circ$	Measurement	X	Pass		Fail
β_1	$\beta_1 > -5^\circ, \beta_1 < +5^\circ$	Measurement	X	Pass		Fail
β_2	$\beta_2 > -5^\circ, \beta_2 < +5^\circ$	Measurement	X	Pass		Fail
P	1.05 Dt < P < 1.50 Dt	P=A/2	X	Pass		Fail
W	W < 1/32 in. (0.08 cm)	W=AsinΦ	X	Pass		Fail
Z	Z<1/8 in. (0.32 cm)	Z=AsinY	X	Pass		Fail

All S-type pitot tubes above may be assumed to have a pitot coefficient of 0.84. [X]

One or more of the S-type pitot tubes above (in bold) does not meet the criteria to assume a pitot coefficient of 0.84. [ ]

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Thermocouple Calibration

Client:	TPS
Project#:	99023.0001
Report:	Particulate Stack Test
Site:	Soil Remediation Unit

Pre-Test Calibration

Thermo. ID	Date	Thermo. Ambient	Reference Ambient	Reference ID	Calibrator's Initials
7IT-2	11-May-1999	68	68	WBDB	RCS

Post-Test Calibration

Thermo. ID	Date	Thermo. Ambient	Reference Ambient	Reference ID	Calibrator's Initials
7IT-2	28-Oct-1999	67	67	WBDB	RCS

Thermocouple calibration: Thermocouples are calibrated as per EMTIC GD-28. Each thermocouple is calibrated against a standard thermocouple. A difference greater than 2 deg. C results in a failed calibration. Thermocouples that fail calibration prior to field use are discarded.

Post-test calibration results:

All thermocouples used have passed the post calibration test. X

One or more thermocouples (bolded) have not passed the post-test calibration: _____

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Nozzle Calibration Report

Client:	TPS
Project #:	99023.0001
Report:	Particulate Stack Test
Site:	Soil Remediation Unit

Nozzle ID	Measured Diameters (in.) D1	D2	D3	Average Diameter	Largest Variance	Calibration Date	Calibrator
TPQ-1	0.325	0.320	0.324	0.323	0.005	10/18/99	MJT
TPQ-2	0.323	0.318	0.320	0.320	0.005	10/18/99	MJT
TPQ-3	0.321	0.319	0.321	0.320	0.002	10/18/99	MJT

The Calibration of Nozzles:

All nozzles are calibrated at the time of purchase and again on an annual basis. Furthermore a nozzle that shows damage due to field use is calibrated after repairs. Calibration of a nozzle is accomplished by measuring the width of the nozzle's orifice along three different diameters. The measurements are made to within 0.001 inch. A variance of 0.004 inches or greater requires that the nozzle be repaired or disposed of. The average of the three diameters is used in sampling calculations.

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Client:	TPS
Project #	99023.0001
Report:	Particulate Stack Test
Site:	Soil Remediation Unit

Barometer Calibration

Barometer ID B-1

Pre-test Calibration

Barometer Pressure 29.15 in. Hg

Date 9-Aug-99

NWS Pressure 29.22 in. Hg

Time 13:00

Calibrator RCS

If the barometer differs from the national weather service it is set to the correct reading.

Post-test Calibration

Barometer Pressure 29.1 in. Hg

Date 9-Sep-99

NWS Pressure 29.03 in. Hg

Time 10:30

Calibrator RCS

Post-test Results

X	The barometer passed the post-test calibration.
	The barometer failed the post-test calibration. No correction necessary.
	The barometer failed the post-test calibration. Field data correction required.

Notes on barometer calibration:

Elevation at E_3-Killam: 704' Elevation at National Weather Service: 714'

Due to the closeness in elevation between E_3-Killam and the National Weather Service (located at the Buffalo Niagara International Airport) a correction in barometric pressure due to altitude is not required.

Before a test is conducted in the field, the E_3-Killam barometer is adjusted to the value obtained by the National Weather Service. After field work has been completed the barometer is again compared to that of the National Weather Service. A difference of +/- 0.2 in Hg is acceptable. A difference outside this range results in the lower value being used. No correction is necessary if the field barometer is the lower of the two. If the field barometer is the higher of the two then the difference is subtracted from the field data readings.

C.3 Calibration Gas Certifications

For Technical Information Call
1-800-752-1597

AIR PRODUCTS

Air Products and Chemicals, Inc. * Rural Route #1, Tamaqua, PA 18252

ISO CERTIFICATION: 9002

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS STANDARD

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:
ROCHESTER-APCI
77 DEEP ROAD RD
ROCHESTER NY 14624-

Order No: CSS-172592-01
Batch No: 255-0311E
PO:
Release:

Cylinder No: SG9152612BAL
Bar Code No: DEK634
Cylinder Pressure*: 2000 psig
Certification Date: 04/14/1999
Expiration Date: 04/14/2002

CERTIFIED CONCENTRATION		REFERENCE STANDARDS			ANALYTICAL INSTRUMENTATION			
Component	Certified Concentration	Cylinder Number	Standard Type	Standard Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
CARBON DIOXIDE	18.2±.05 %	SG9183176BAL	NTRM	15.91 %	Shimadzu Model	C1049300	04/12/99	GC-TCD
OXYGEN	19.8±.07 %	SG9168291BAL	NTRM 82658X	16.04 %	SHIMADZU GC-8A	59405U	04/12/99	GC-TCD

NITROGEN Balance Gas

* STANDARD SHOULD NOT BE USED BELOW 150 PSIG

Analyst: Michael Koval
Michael Koval

Approved By: Bruce Andersen MK
Bruce Andersen

(16921)

Pub. No. 320-9702

For Technical Information Call
1-800-752-1597

Air Products and Chemicals, Inc. * Rural Route #1, Tamaqua, PA 18252

ISO CERTIFICATION: 9002

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS STANDARD

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:
ROCHESTER-APCI
77 DEEP ROAD RD
ROCHESTER NY 14624-

Order No: SRP-177683-01
Batch No: 255-0306E
PO:
Release:

Cylinder No: SG9132751BAL
Bar Code No: BYV466
Cylinder Pressure*: 2000 psig
Certification Date: 04/14/1999
Expiration Date: 04/14/2002

CERTIFIED CONCENTRATION		REFERENCE STANDARDS			ANALYTICAL-INSTRUMENTATION			
Component	Certified Concentration	Cylinder Number	Standard Type	Standard Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
CARBON DIOXIDE	10.1±.05 %	SG9183176BAL	NTRM	15.91 %	Shimadzu Model	C1049300	04/12/99	GC-TCD
OXYGEN	12.0±.07 %	SG9168291BAL	NTRM 82658X	16.04 %	SHIMADZU GC-8A	59405U	04/12/99	GC-TCD

NITROGEN Balance Gas

* STANDARD SHOULD NOT BE USED BELOW 150 PSIG

Analyst: Michael Koval
Michael Koval

Approved By: Bruce Andersen
Bruce Andersen

[redacted]6921[redacted] [redacted]No. [redacted]02[redacted]

For Technical Information Call
1-800-752-1597

AIR PRODUCTS

Air Products and Chemicals, Inc. * 12722 S. Wentworth Avenue, Chicago, IL 60628

ISO CERTIFICATION: 9002

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS STANDARD

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:
ROCHESTER-APCI
77 DEEP ROAD RD
ROCHESTER NY 14624-

Order No: SRP-168345-05
Batch No: 861-56198
PO:
Release:

Cylinder No: SG9162584BAL
Bar Code No: DHD412
Cylinder Pressure*: 2000 psig
Certification Date: 04/15/1999
Expiration Date: 04/15/2002

CERTIFIED CONCENTRATION		REFERENCE STANDARDS			ANALYTICAL INSTRUMENTATION			
Component	Certified Concentration	Cylinder Number	Standard Type	Standard Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
CARBON MONOXIDE	89.8 ±.57 PPM	SG9150646BAL	GMIS	100.6 PPM	HORIBA VIA-510	405079	03/28/99	NON DISPERSIVE INFRARED
NITROGEN	Balance Gas							

* STANDARD SHOULD NOT BE USED BELOW 150 PSIG

Analyst: Chris Basile

Approved By: Richard Fry

(16921)

Pub. No. 320 9/02

For Technical Information Call
1-800-752-1597

AIR PRODUCTS

Air Products and Chemicals, Inc. * 12722 S. Wentworth Avenue, Chicago, IL 60628

ISO CERTIFICATION: 9002

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS STANDARD

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

Customer:
ROCHESTER-APCI
77 DEEP ROAD RD
ROCHESTER NY 14624-

Order No: SRP-056948-02
Batch No: 861-50647
PO:
Release:

Cylinder No: SG9167849BAL
Bar Code No: DPV538
Cylinder Pressure*: 2000 psig
Certification Date: 10/26/1998
Expiration Date: 10/26/2001

CERTIFIED CONCENTRATION		REFERENCE STANDARDS			ANALYTICAL INSTRUMENTATION			
Component	Certified Concentration	Cylinder Number	Standard Type	Standard Concentration	Instrument Make/Model	Serial Number	Last Calibration	Measurement Principal
METHANE	90.5 ±.42 PPM	SG9152505BAL	GMIS	101.0 PPM	Gow-Mac 750	59405U	10/16/98	GC-FID
AIR	Balance Gas							
Oxygen Concentration	21.1 %							

* STANDARD SHOULD NOT BE USED BELOW 150 PSIG

Analyst: James Laas

Approved By: Richard Fry

[redacted]1692[redacted] No. [redacted]02[redacted]

[illegible] GAS CHEMICALS, INC.
[illegible]
[illegible]
TELEPHONE [illegible]

DATE: [illegible]
TIME: [illegible]
PAGE: 1

CERTIFICATE OF ANALYSIS

ST-[illegible]
[illegible]
60 [illegible]
BUFFALO NY [illegible]

CUSTOMER ACCOUNT : [illegible]
CUSTOMER ORDER NO : [illegible]
OUT ORD LINE REL :
ORDER NO : [illegible]
SHIPPER NUMBER : [illegible]

REMARKS : The information provided on this Certificate of Analysis conforms to the requirements of the Purchase Order listed above. In accordance with our internal work instruction A-3, products below are traceable to NIST.

PRODUCT : NITROGEN
GRADE : UHP Grade
CYLINDER TYPE : ALUMINUM B

BATCH NO	ANALYSIS DATE	FILL CODE	CYLINDER NO	IMPURITY	SPECIFICATION	UNIT OF MEASURE	ANAL FREQ	ANALYTICAL RESULT	UNIT OF MEASURE	PHASE CODE	LAB MET
[illegible]	[illegible]	[illegible]	[illegible]	Oxygen	1	PPMV	B	0.12	PPMV	V	01
				Total Hydrocarbons	0.1	PPMV	B	0.1	PPMV	V	08
				Water	1	PPMV	B	0.20	PPMV	V	07
				Nitrogen Dioxide	0.1	PPMV	B	0.09	PPMV	V	17
				Sulfur Dioxide	0.1	PPMV	B	0.05	PPMV	V	17
				Carbon Dioxide	1	PPMV	B	0.050	PPMV	V	22
				Carbon Monoxide	1	PPMV	B	0.12	PPMV	V	22

ANAL FREQ: C = CONTAMINANT INDIVIDUALLY TESTED B = CONTAMINANT BATCH TESTED S = SOURCE ANALYSIS.
BATCH TEST PERFORMED ON CYLINDER: CERTIFICATE

LIST OF LAB METHODS USED :
08 TOTAL HYDROCARBON ANALYZER
01 ELECTROLYTIC CELL
07 MOISTURE ANALYZER
22 GC-FID
17 DETECTOR TUBE

CERTIFICATION

THIS ANALYSIS HAS BEEN PERFORMED UTILIZING APPROVED ANALYTICAL METHODS AND IS CORRECT TO WITHIN THE ANALYTICAL ACCURACIES OF THIS (THESE) METHOD(S).

AUTHORIZED SIGNATURE

D. PROCESS DATA

TPS Technologies Inc.
Demonstration Test of Soil Remediation Unit
NYSDEC Inactive Hazardous Waste Site No. 9-15-066
Cheektowaga, NY
October 25, 1999

BY: Barry Hinton

DEMONSTRATION TEST ACTIVITIES LOG

TIME	COMMENTS
07:00	Startup of SRU to warm up
08:10	Start soils into plant (unspiked soils)
09:15	Switch feedstock soils to gasoline spiked soils
09:40	Shutdown SRU to make repairs to baghouse auger
10:42	Restart SRU after repairs, feed with spiked soils
11:56	START Test Run #1
12:35	Test Run #1 aborted due to stack tester's (E3-Killam) equipment problems
12:40	Switch feedstock soils to "non-spiked" soils while waiting on
	E3-Killam to resolve equipment problems
13:20	Switch feedstock soils to spiked soils to stabilize SRU for Test Run #2
13:44	START Test Run #2
15:01	END Test Run #2, Total Test Time=1hr 17 minutes, Total Test Tons= 50.52
	Run #2 Production Rate = 39.38 Tons/Hr
15:01	Switch feedstock soils to unspiked soils
15:36	Switch feedstock soils to spiked test pile to stabilize SRU for Test Run #3
15:52	START Test Run #3
17:07	END Test Run #3, Total Test Time= 1 hr 15 minutes, Total Test Tons= 49.50,
	Run #3 Production Rate = 39.60 Tons/hr
17:10	Switch feedstock soils to unspiked soils
17:40	Switch feedstock soils to spiked test pile to stabilize SRU for Test Run #4
18:00	START Test Run #4
19:12	END Test Run #4, Total Test Time= 1 hr 12 minutes, Total Test Tons= 49.30,
	Run #4 Production Rate = 41.08 Tons/hr
19:12	Finish processing remaining soils in SRU feed hopper for shutdown
19:15	Shutdown SRU. Total Tons Processed today (spiked & unspiked) = 400 tons.

Process Data Log Sheet

Demonstration Test of Soil Remediation Unit

NYSDEC Inactive Hazardous Waste Site No. 9-15-066

TPS Technologies Inc.

Cheektowaga, NY

TEST RUN NO. 1

Test Run End Time:	N/A**
Test Run Start Time:	11:56
TOTAL Test Run Time:	N/A**
Test Run End Tons:	N/A**
Test Run Start Tons:	3437.65
TOTAL Test Run Tons:	N/A**

TONS/HOUR THIS RUN=
=Total Test Run Time/Total Test Run Tons
= N/A**

TOTAL OPERATING HOURS THIS DATE: 10.25 Hrs

SoilPure, Inc.

Data Taken Every 15 Minutes

** Test Run Aborted Due to emission tester's equipment problems (pitot tube plugged)

Date	Time	Soil Exit Temp (DegF)	Oxidizer Stack Temp (DegF)	Belt Scale (Tons/Hr)	Baghouse Diff. Press. (in. wc)	Dryer Neg. Press. (in. wc)	Desorber Gas Exit Temp. (DegF)	Baghouse Inlet Temp. (DegF)	Baghouse Exit Temp. (DegF)	Oxidizer Stack CEM O2 (%)	Oxidizer Stack CEM CO (ppm)	System Damper Opening (%)	COMMENTS:
10/25/1999	07:00	Start warmup, safety meeting, grease & fuel equipment, calibrate weigh scale											
10/25/1999	08:10	Start Soil into plant											
10/25/1999	08:30	382	1677	33	3.6	-0.09	426	256	202	CALS	CALS	30	O2 & CO CEM Calibrations by testers
10/25/1999	08:45	350	1664	33	3.6	-0.09	404	259	205	CALS	CALS	30	O2 & CO CEM Calibrations by testers
10/25/1999	09:00	475	1670	39	3.2	-0.07	479	266	213	9.84	0.0	30	
10/25/1999	09:15	392	1652	39	3.1	-0.02	495	286	224	5.03	0.0	32	Start test soil @ 09:15a
10/25/1999	09:30	657	1661	40	3.7	-0.08	448	301	248	3.94	0.0	32	
10/25/1999	09:45	576	1676	No Feed	3.7	-0.14	475	298	236	4.15	0.0	32	Shutdown @ 09:40 for plant auger repa
10/25/1999	10:00	Soil Remediation Unit Off-Line for repairs											
10/25/1999	10:15	Soil Remediation Unit Off-Line for repairs											
10/25/1999	10:30	Soil Remediation Unit Off-Line for repairs											
10/25/1999	10:45	Warming up plant after repairs											Start soil for warmup @ 10:42a
10/25/1999	11:00	419	1681	40	3.0	-0.10	440	265	203	5.42	0.0	32	
10/25/1999	11:15	540	1673	41	3.5	-0.08	468	294	228	4.42	0.0	33	
10/25/1999	11:30	507	1681	38	3.6	-0.06	455	275	230	3.85	0.0	33	
10/25/1999	11:45	494	1662	39	3.5	-0.11	491	291	230	3.98	0.0	33	

Process Data Log Sheet

Demonstration Test of Soil Remediation Unit

NYSDEC Inactive Hazardous Waste Site No. 9-15-066

TPS Technologies Inc.

Cheektowaga, NY

SoilPure, Inc.

Data Taken Every 15 Minutes

TEST RUN NO. 1

PAGE 2 of 2

Test Run End Time:	N/A**
Test Run Start Time:	11:56
TOTAL Test Run Time:	N/A**
Test Run End Tons:	**N/A****
Test Run Start Tons:	3437.65
TOTAL Test Run Tons:	N/A**

TONS/HOUR THIS RUN=
=Total Test Run Time/Total Test Run Tons
= N/A**

** Test Run Aborted Due to emission tester's equipment problems (pitot tube plugged)

Date	Time	Soil Exit Temp (DegF)	Oxidizer Stack Temp (DegF)	Belt Scale (Tons/Hr)	Baghouse Diff. Press. (in. wc)	Dryer Neg. Press. (in. wc)	Desorber Gas Exit Temp. (DegF)	Baghouse Inlet Temp. (DegF)	Baghouse Exit Temp. (DegF)	Oxidizer Stack CEM O2 (%)	Oxidizer Stack CEM CO (ppm)	System Damper Opening (%)	COMMENTS:
10/25/1999	12:00	546	1698	38	3.6	-0.02	493	297	240	4.03	0.0	33	Sample Inlet @ 12:08, Sample 1A-IN
10/25/1999	12:15	533	1680	40	3.8	-0.01	494	294	239	3.16	0.0	33	Sample Outlet @ 12:16, Sample 1A-OUT
10/25/1999	12:30	620	1697	37	3.8	-0.08	505	311	246	4.15	0.0	33	Sample Inlet @ 12:26, Sample 1B-IN
10/25/1999	12:45	494	1694	42	3.8	-0.04	483	293	243	10.16	0.0	33	Sample Outlet @ 12:36, Sample 1B-OUT
10/25/1999	13:00	549	1662	38	3.8	-0.08	488	290	241	3.80	0.0	33	
													TEST RUN ABORTED @ 12:35 due to
													stack tester's equipment problems (plugged
													pitot tube)

dtestlog 1/3

Process Data Log Sheet

Demonstration Test of Soil Remediation Unit

NYSDEC Inactive Hazardous Waste Site No. 9-15-066

TPS Technologies Inc.

Cheektowaga, NY

TEST RUN NO. 2

Test Run End Time: 15:01

Test Run Start Time: 13:44

TOTAL Test Run Time: 01:17 (=1.283 hrs)

Test Run End Tons: 3557.32 tons

Test Run Start Tons: 3506.80 tons

TOTAL Test Run Tons: 50.52 tons

TONS/HOUR THIS RUN=
=Total Test Run Time/Total Test Run Tons
= (50.52 tons / 1.283 hrs)
= 39.38 Tons/Hour

SoilPure, Inc.

Data Taken Every 15 Minutes

Date	Time	Soil Exit Temp (DegF)	Oxidizer Stack Temp (DegF)	Belt Scale (Tons/Hr)	Baghouse Diff. Press. (In. wc)	Dryer Neg. Press. (In. wc)	Desorber Gas Exit Temp. (DegF)	Baghouse Inlet Temp. (DegF)	Baghouse Exit Temp. (DegF)	Oxidizer Stack CEM O2 (%)	Oxidizer Stack CEM CO (ppm)	System Damper Opening (%)	COMMENTS:
10/25/1999	13:15	552	1688	41	3.8	-0.11	474	286	238	4.10	0.0	33	13:20-Switch back soils to spiked Test Pile
10/25/1999	13:30	561	1690	39	3.8	-0.02	512	308	243	3.68	0.0	33	START TEST RUN 2 @ 13:44
10/25/1999	13:44	709	1698	40	4.1	-0.01	552	329	252	4.95	0.0	33	Sample Inlet @ 13:54, Sample 2A-IN
10/25/1999	14:00	532	1688	40	4.0	-0.04	502	297	246	3.25	0.0	33	Sample Outlet @ 14:04, Sample 2A-OUT
10/25/1999	14:15	534	1678	38	4.0	-0.02	504	297	243	4.01	0.0	34	Sample Inlet @ 14:14, Sample 2B-IN
10/25/1999	14:30	589	1673	40	4.0	-0.08	492	298	243	5.20	0.0	34	Sample Outlet @ 14:24, Sample 2B-OUT
10/25/1999	14:45	506	1684	40	4.1	-0.04	489	299	243	3.64	0.0	34	Sample Inlet @ 14:34, Sample 2C-IN
10/25/1999	15:00	497	1730	39	4.1	-0.04	469	289	240	2.95	0.0	33	Sample Outlet @ 14:44, Sample 2C-OUT
10/25/1999	15:01	499	1733	40	4.1	-0.02	461	287	239	2.65	0.0	33	END TEST RUN 2 @ 15:01
	End Test Run #2 @ 15:01, switch back to feeding non-spike soils												
Averages from Test Run START TIME (13:44) through Test Run END TIME (15:01)													
AVERAGES==>	13:44-15:01	552	1698	40	4.1	-0.04	496	299	244	3.81	0.00	33	
10/25/1999	15:15	542	1685	36	4.5	-0.02	445	274	235	4.62	0.0	36	
10/25/1999	15:30	535	1685	38	4.3	-0.09	461	279	232	4.61	0.0	36	

Process Data Log Sheet
Demonstration Test of Soil Remediation Unit
NYSDEC Inactive Hazardous Waste Site No. 9-15-066
TPS Technologies Inc.
Cheektowaga, NY

TEST RUN NO. 3

Test Run End Time: 17:07
Test Run Start Time: 15:52
TOTAL Test Run Time: 01:15 (=1.25 hrs)
Test Run End Tons: 3639.20
Test Run Start Tons: 3589.70
TOTAL Test Run Tons: 49.50

TONS/HOUR THIS RUN=
=Total Test Run Time/Total Test Run Tons
= (49.50 tons / 1.25 hrs)
= 39.60 Tons/Hour

SoilPure, Inc.
Data Taken Every 15 Minutes

Date	Time	Soil Exit Temp (DegF)	Oxidizer Stack Temp (DegF)	Belt Scale (Tons/Hr)	Baghouse Diff. Press. (In. wc)	Dryer Neg. Press. (in. wc)	Desorber Gas Exit Temp. (DegF)	Baghouse Inlet Temp. (DegF)	Baghouse Exit Temp. (DegF)	Oxidizer Stack CEM O2 (%)	Oxidizer Stack CEM CO (ppm)	System Damper Opening (%)	COMMENTS:
10/25/1999	15:36	559	1664	41	4.4	-0.23	467	286	234	4.20	0.0	36	15:36-Switch back soils to spiked Test Pile
10/25/1999	15:45	559	1678	40	4.6	-0.10	470	294	238	3.89	0.0	36	
10/25/1999	15:52	574	1694	39	4.7	-0.04	494	312	241	4.05	0.0	35	START TEST RUN 3 @ 15:32
10/25/1999	16:00	589	1665	40	4.5	-0.08	488	294	241	2.77	0.0	34	Sample Inlet @ 16:02, Sample 3A-IN
10/25/1999	16:15	529	1695	42	4.3	-0.05	462	286	236	4.07	0.0	35	Sample Outlet @ 16:12, Sample 3A-OUT
10/25/1999	16:30	503	1686	42	4.4	-0.07	494	297	238	3.36	0.0	35	Sample Inlet @ 16:22, Sample 3B-IN
10/25/1999	16:45	510	1684	41	4.3	-0.09	508	302	240	4.43	0.0	35	Sample Outlet @ 16:32, Sample 3B-OUT
10/25/1999	17:00	494	1687	40	4.4	-0.02	494	295	241	4.10	0.0	35	Sample Inlet @ 16:42, Sample 3C-IN
10/25/1999	17:07	610	1692	40	4.5	-0.01	506	307	249	4.30	0.0	35	Sample Outlet @ 16:52, Sample 3C-OUT
	End Test Run #3 @ 17:07, switch back to feeding non-spike soils												END TEST RUN 3 @ 17:07
Averages from Test Run START TIME (15:52) through Test Run END TIME (17:07)													
AVERAGES==>	15:52-17:07	544	1686	41	4.4	-0.05	492	299	241	3.87	0.0	35	
10/25/1999	17:15	536	1670	40	4.4	-0.08	477	287	242	CALS	CALS	35	O2 & CO CEM Calibrations by testers
10/25/1999	17:30	482	1668	40	4.4	-0.04	461	289	241	CALS	CALS	35	O2 & CO CEM Calibrations by testers
10/25/1999	17:45	504	1679	39	4.4	-0.12	466	277	236	CALS	CALS	35	O2 & CO CEM Calibrations by testers

Process Data Log Sheet

Demonstration Test of Soil Remediation Unit

NYSDEC Inactive Hazardous Waste Site No. 9-15-066

TPS Technologies Inc.

Cheektowaga, NY

TEST RUN NO. 4

Test Run End Time: 19:12

Test Run Start Time: 18:00

TOTAL Test Run Time: 01:12 (=1.20 hrs)

Test Run End Tons: 3723.00

Test Run Start Tons: 3673.70

TOTAL Test Run Tons: 49.30

TONS/HOUR THIS RUN=
=Total Test Run Time/Total Test Run Tons
= (49.30 tons / 1.20 hrs)
= 41.08 Tons/Hour

SoilPure, Inc.

Data Taken Every 15 Minutes

Date	Time	Soil Exit Temp (DegF)	Oxidizer Stack Temp (DegF)	Belt Scale (Tons/Hr)	Baghouse Diff. Press. (in. wc)	Dryer Neg. Press. (in. wc)	Desorber Gas Exit Temp. (DegF)	Baghouse Inlet Temp. (DegF)	Baghouse Exit Temp. (DegF)	Oxidizer Stack CEM O2 (%)	Oxidizer Stack CEM CO (ppm)	System Damper Opening (%)	COMMENTS:
10/25/1999	18:00	520	1678	41	4.6	-0.09	477	292	239	3.93	0.0	35	15:36-Switch back soils to spiked Test Pile
10/25/1999	18:15	528	1674	40	4.3	-0.02	490	293	244	4.13	0.0	35	START TEST RUN 4 @ 18:00
10/25/1999	18:30	488	1687	40	4.4	-0.11	463	287	237	4.18	0.0	35	Sample Inlet @ 18:10, Sample 4A-IN
10/25/1999	18:45	564	1697	41	4.3	-0.08	483	299	245	4.92	0.0	35	Sample Outlet @ 18:20, Sample 4A-OUT
10/25/1999	19:00	550	1675	39	4.4	-0.12	479	299	250	4.54	0.0	35	Sample Inlet @ 18:30, Sample 4B-IN
10/25/1999	19:12	599	1678	39	4.3	-0.07	495	299	248	5.01	0.0	35	Sample Outlet @ 18:40, Sample 4B-OUT
	End Test Run #4 @ 19:12, run out soils in feed hopper to start shutdown												Sample Inlet @ 18:50, Sample 4C-IN
Averages from Test Run START TIME (18:00) through Test Run END TIME (19:12)													Sample Outlet @ 19:00, Sample 4C-OUT
AVERAGES==>	18:00-19:12	542	1682	40	4.4	-0.08	481	295	244	4.45	0.0	35	END TEST RUN 4 @ 19:12
10/25/1999	19:15	608	1691	40	4.4	-0.04	483	297	250	9.90	0.0	35	
	SHUTDOWN PROCESS FOR THE DAY @ 19:16												
TOTAL TONS PROCESS FOR THE ENTIRE DAY OF 10/25/1999 = 400.00 TONS													

TPS TECHNOLOGIES INC.
SOIL SPIKING CALCULATION FOR
DEMONSTRATION TEST OF SOIL REMEDIATION UNIT
NYSDEC INACTIVE HAZARDOUS WASTE SITE NO. 9-15-066
CHEEKTOWAGA, NY

Soil Type		Clay	(Fine = "Clay", Coarse = "Sand")
Soil H2O Content		10.90	(Percent)
Fuel Spike Type	:	Gasoline(Unleaded)	(Gasoline, #2 Fuel Oil, Etc)
Fuel Spike Density (w/ reference to H2O = 8.34 lb/gal)	:	6.11	(Lbs/Gallon)
Desired Spike Level	:	3,500	(ppm)

TPH TOTAL Target = (Soil + H2O + Spike)	=	40	Tons/Hr	
TPH H2O= TPH Total x H2O Content	=	4.36	Tons/Hr	
TPH (Soil + Spike) = TPH Total x (1- H2O Content)	=	35.64	Tons/Hr	
TPH (Soil) = (TPH Total) - (TPH H2O) - (TPH Spike)	=	35.52	Tons/Hr	
TPH (Soil + H2O) = TPH (Soil) + TPH (H2O) = PRE-SPIKED WET SOIL	=	39.88	Tons/Hr	
TPH (Spike) = ((Desired Spike Level ppm)/1,000,000) x (TPH(Soil + Spike))	=	0.125	Tons/Hr	
Total Test Time (minutes)=	=	60.0	Minutes	
Total Test Time (hours)=	=	1.000	Hours	
TOTAL TONS "WET" SOIL REQ'D THIS TEST RUN	=	39.88	TONS	<=NOTE
TOTAL TONS "DRY" SOIL REQ'D THIS TEST RUN	=	35.52	TONS	<=NOTE

Weight of Fuel Used For Spike (=TPH Spike x Test Time Hours x 2000lbs/ton)	=	249.48	Lbs
# Gallons Fuel Spike For This Test Run (= Weight of Fuel / Fuel Density Lbs per gallon)	=	40.83	Gallons
# Gallons Fuel Spike PER TON Soil (= Gallons Fuel Spike This Test /TOTAL Wet Tons This Test)	=	1.02	Gallons/Ton

Process Soil Sample Log Sheet

Demonstration Test of Soil Remediation Unit

NYSDEC Inactive Hazardous Waste Site No. 9-15-066

TPS Technologies Inc.

Cheektowaga, NY

PROCESS INLET SAMPLES				PROCESS OUTLET SAMPLES				
DATE	TIME SAMPLE TAKEN	SAMPLE ID (eg. 1A IN)*	LAB ANALYSIS TO BE PERFORMED	DATE	TIME SAMPLE TAKEN	SAMPLE ID (eg. 1A OUT)*	LAB ANALYSIS TO BE PERFORMED	COMMENTS:
TEST RUN #1				TEST RUN #1				
10/25/1999	12:06	1A-IN	8260B	10/25/1999	12:16	1A-OUT	8260B & 8270C	** Test Run #1 Aborted @ 12:35 due to emission tester's
10/25/1999	12:26	1B-IN	8260B	10/25/1999	12:36	1B-OUT	8260B & 8270C	equipment problem (plugged pitot tube)
	N/A**	1C-IN	8260B		N/A**	1C-OUT	8260B & 8270C	
TEST RUN #2				TEST RUN #2				
10/25/1999	13:54	2A-IN	8260B	10/25/1999	14:04	2A-OUT	8260B & 8270C	Test Run #2 Completed Successfully
10/25/1999	14:14	2B-IN	8260B	10/25/1999	14:24	2B-OUT	8260B & 8270C	
10/25/1999	14:34	2C-IN	8260B	10/25/1999	14:44	2C-OUT	8260B & 8270C	
TEST RUN #3				TEST RUN #3				
10/25/1999	16:02	3A-IN	8260B	10/25/1999	16:12	3A-OUT	8260B & 8270C	Test Run #3 Completed Successfully
10/25/1999	16:22	3B-IN	8260B	10/25/1999	16:32	3B-OUT	8260B & 8270C	
10/25/1999	16:42	3C-IN	8260B	10/25/1999	16:52	3C-OUT	8260B & 8270C	
TEST RUN #4				TEST RUN #4				
10/25/1999	18:10	4A-IN	8260B	10/25/1999	18:20	4A-OUT	8260B & 8270C	Test Run #4 Completed Successfully
10/25/1999	18:30	4B-IN	8260B	10/25/1999	18:40	4B-OUT	8260B & 8270C	
10/25/1999	18:50	4C-IN	8260B	10/25/1999	19:00	4C-OUT	8260B & 8270C	

NOTES: * = For Sample IDs, example: 1A-IN represents Test Run 1, sample A, Inlet of Process, 1A-OUT represents Test Run 1, Sample A, Outlet of Process collected 10 minutes following sampling of Inlet sample 1A-IN.

E. LABORATORY REPORTS

E.1 EPA Reference Method 18

PHILIP SERVICES

Certificate of Analysis

CLIENT INFORMATION		LABORATORY INFORMATION	
Attention:	Mike Hamilton	**Contact:**	Ron McLeod
Client Name:	E3-Killam Inc.	**Project:**	AN991351
Project:	99023	**Date Received:**	99/10/29
Project Desc:	TPS	**Date Reported:**	99/11/01
Address:	80 Curtwright Drive #1 Buffalo, NY 14221-7072	**Submission No.:**	9J1283
		Sample No.:	
Fax Number:	716-631-5864		
Phone Number:	716-631-5858		

NOTES: *'-' = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available*
LOQ can by determined for all analytes by multiplying the appropriate MDL X 3.33
Solids data is based on dry weight except for biota analyses.
Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

Methods used by PASC are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Nineteenth Edition. Other methods are based on the principles of MISA or EPA methodologies. New York State: ELAP Identification Number 10756.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at PASC for a period of three weeks from receipt of data or as per contract.

COMMENTS:

All spiked tubes show approximately 100% recovery. Amount spiked into the front half: 100 ug

Certified by: R.V.A. McLeod

PHILIP ANALYTICAL SERVICES CORPORATION
5555 North Service Road, Burlington, Ontario, Canada L7L 5H7 Tel (905) 332-0778 Fax (905) 332-0169

11/1/99

PASC - Certificate of Analysis

		R-2 Spiked	R-2 Spiked	R-3 Spiked	R-3 Spiked	R-4 Spiked	R-4 Spiked
Client ID:		1st F.H.	1st F.H.	1st F.H.	1st F.H.	1st F.H.	1st F.H.
Lab No.:		065168 99	065169 99	065169 99	065169 99	065170 99	065170 99
Date Sampled:		99/10/29	99/10/30	99/10/29	99/10/29	99/10/29	99/10/29
Component	Units		Duplicate		Duplicate		Duplicate
Trichloroethylene	ug	104	99	109	98	97	99
Toluene	"	99	98	99	98	99	97

11/1/99

PASC - Certificate of Analysis

		R-2 Spiked	R-2 Spiked	R-3 Spiked	R-3 Spiked	R-4 Spiked	R-4 Spiked
Client ID:		1st B.H.	1st B.H.	1st B.H.	1st B.H.	1st B.H.	1st B.H.
Lab No.:		065171 99	065171 99	065172 99	065172 99	065173 99	065173 99
Date Sampled:		99/10/29	99/10/29	99/10/29	99/10/29	99/10/29	99/10/29
Component	Units		Duplicate		Duplicate		Duplicate
Trichloroethylene	ug	<4.5	<5.4	<4.5	<4.5	<4.6	<4.8
Toluene	"	<1	<1.2	<1	<1	<1.1	<1.1

PHILIP SERVICES

Certificate of Analysis

CLIENT INFORMATION

Attention:	Mike Hamilton
Client Name:	E3-Killam Inc.
Project:	99023
Project Desc:	TPS
Address:	80 Curtwright Drive #1 Buffalo, NY 14221-7072
Fax Number:	716-631-5864
Phone Number:	716-631-5858

LABORATORY INFORMATION

Contact:	Ron McLeod
Project:	AN991351
Date Received:	99/10/26
Date Reported:	99/10/28
Submission No.:	9J1053
Sample No.:	063795-063812

NOTES: *'-' = not analysed '<' = less than Method Detection Limit (MDL) 'NA' = no data available*
LOQ can by determined for all analytes by multiplying the appropriate MDL X 3.33
Solids data is based on dry weight except for biota analyses.
Organic analyses are not corrected for extraction recovery standards except for isotope dilution methods, (i.e. CARB 429 PAH, all PCDD/F and DBD/DBF analyses)

Methods used by PASC are based upon those found in 'Standard Methods for the Examination of Water and Wastewater', Nineteenth Edition. Other methods are based on the principles of MISA or EPA methodologies. New York State: ELAP Identification Number 10756.

All work recorded herein has been done in accordance with normal professional standards using accepted testing methodologies, quality assurance and quality control procedures except where otherwise agreed to by the client and testing company in writing. Any and all use of these test results shall be limited to the actual cost of the pertinent analysis done. There is no other warranty expressed or implied. Your samples will be retained at PASC for a period of three weeks from receipt of data or as per contract.

COMMENTS:

Certified by:

PHILIP ANALYTICAL SERVICES CORPORATION
5555 North Service Road, Burlington, Ontario, Canada L7L 5H7 Tel: (905) 332-8788 FAX: (905) 332-9169

10/28/99

PASC - Certificate of Analysis

			Method	Media	Nonspiked	Nonspiked	Nonspiked	Media	Nonspiked	Nonspiked	Nonspiked
Client ID:			**Blank**	**Blank F.H.**	R2 NS-2 FH	R3 NS-3 FH	R4 NS-4 FH	Blank BH	R2 NS-2 BH	R3 NS-3 BH	R4 NS-4 BH
Lab No.:			063795 99	063796 99	063798 99	**063800 99**	**063802 99**	**063806 99**	**063808 99**	063810 99	063812 99
Date Sampled:			-	**99/10/26**	99/10/26	99/10/26	99/10/26	99/10/26	99/10/26	99/10/26	**99/10/26**
Component	**MDL**	**Units**									
Toluene		ug	<10	<10	<10	<10	<10	<10	<10	<10	<10
Trichloroethene		ug	<10	<10	<10	<10	<10	<10	<10	<10	<10

E.2 Soil Sampling Summary
(preprocessed and processed)

IT CORPORATION/BUFFALO AIRPORT PROJECT-NYSDEC INACTIVE HAZARDOUS WASTE SITE NO. 9-15-066

SOIL TREATMENT SAMPLE LOG FOR THERMORETEC/TPS TECHNOLOGIES INC.

SOIL SAMPLE DATE	PROCESSING DAY	SOIL SAMPLE TONS BEGIN	SOIL SAMPLE TONS END	SOIL SAMPLE TOTAL TONS	TPS SAMPLE ID	IT CORP. SAMPLE ID*	DATE SAMPLE SENT TO LAB	DATE RESULTS BACK FROM LAB	TURN-AROUND REQUESTED
10/25/99	14	3300			TPS-1A OUT	PT-T-14-01	10/25/99	10/28/99	48 Hr
10/25/99	14				TPS-1B OUT	PT-T-14-02	10/25/99	10/28/99	48 Hr
THE NEXT 9 CLEAN SOIL SAMPLE RESULTS ARE FROM THE PROCESS OUTLET DURING THE DEMONSTRATION TEST (10/25/99)									
10/25/99	14				TPS 2A-OUT	PT-T-14-03	10/25/99	10/28/99	48 Hr
10/25/99	14				TPS 2B-OUT	PT-T-14-04	10/25/99	10/28/99	48 Hr
10/25/99	14				TPS 2C-OUT	PT-T-14-05	10/25/99	10/28/99	48 Hr
10/25/99	14				TPS 3A-OUT	PT-T-14-06	10/25/99	10/28/99	48 Hr
10/25/99	14				TPS 3B-OUT	PT-T-14-07	10/25/99	10/28/99	48 Hr
10/25/99	14				TPS 3C-OUT	PT-T-14-08	10/25/99	10/28/99	48 Hr
10/25/99	14				TPS 4A-OUT	PT-T-14-09	10/25/99	10/28/99	48 Hr
10/25/99	14				TPS 4B-OUT	PT-T-14-10	10/25/99	10/28/99	48 Hr
10/25/99	14		3700	400	TPS 4C-OUT	PT-T-14-11	10/25/99	10/28/99	48 Hr
THE NEXT 9 SOIL SAMPLE RESULTS ARE FROM THE PROCESS INLET DURING THE DEMONSTRATION TEST (10/25/99)									
10/25/99	14	N/A	N/A	N/A	TPS 2A-IN	N/A	10/25/99	10/28/99	48 Hr
10/25/99	14	N/A	N/A	N/A	TPS 2B-IN	N/A	10/25/99	10/28/99	48 Hr
10/25/99	14	N/A	N/A	N/A	TPS 2C-IN	N/A	10/25/99	10/28/99	48 Hr
10/25/99	14	N/A	N/A	N/A	TPS 3A-IN	N/A	10/25/99	10/28/99	48 Hr
10/25/99	14	N/A	N/A	N/A	TPS 3B-IN	N/A	10/25/99	10/28/99	48 Hr
10/25/99	14	N/A	N/A	N/A	TPS 3C-IN	N/A	10/25/99	10/28/99	48 Hr
10/25/99	14	N/A	N/A	N/A	TPS 4A-IN	N/A	10/25/99	10/28/99	48 Hr
10/25/99	14	N/A	N/A	N/A	TPS 4B-IN	N/A	10/25/99	10/28/99	48 Hr
10/25/99	14	N/A	N/A	N/A	TPS 4C-IN	N/A	10/25/99	10/28/99	48 Hr

NOTES: * = IT Corporation's Sample ID format of PT-T-XX-YY where PT = Post Treatment, T = Treatment, XX = Treatment Day Number, and YY = Sample Number on Treatment Day XX

IT CORPORATION/BUFFALO AIRPORT PROJECT-NYSDEC INACTIVE HAZARDOUS WASTE SITE NO. 9-15-066

SOIL TREATMENT SAMPLE RESULTS FOR THERMORETEC/TPS TECHNOLOGIES INC.
CLEANUP RESULTS EXPRESSED IN PPB (ug/kg)-Remedial Action Objective shown in Parentheses Below Each Constituent

SOIL SAMPLE DATE	TPS SAMPLE ID	IT CORP. SAMPLE ID*	Ethylbenzene (8,250)	Toluene (2,250)	TCA or 1,1,1-Trichloroethane (1,140)	TCE or Trichloroethene (1,050)	Vinyl Chloride (200)	Total Xylenes (1,800)	Cresol or 4-Methylphenol (1,350)	Soil From Area	
10/25/99	TPS-1A OUT	PT-T-14-01	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (380)	P,Q or I	Composite at Lab for 8260 & 8270
10/25/99	TPS-1B OUT	PT-T-14-02	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (1.2)	ND (380)	P,Q or I	
THE NEXT 9 CLEAN SOIL SAMPLE RESULTS ARE FROM THE PROCESS OUTLET DURING THE DEMONSTRATION TEST (10/25/99)											
10/25/99	TPS 2A-OUT	PT-T-14-03	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (390)	I & P	Discrete Sample
10/25/99	TPS 2B-OUT	PT-T-14-04	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (380)	I & P	Discrete Sample
10/25/99	TPS 2C-OUT	PT-T-14-05	9.9	ND (1.1)	ND (1.1)	240.0	ND (1.1)	76.0	ND (380)	I & P	Discrete Sample
10/25/99	TPS 3A-OUT	PT-T-14-06	ND (1.1)	2.9	ND (1.1)	1.4	ND (1.1)	ND (1.1)	ND (380)	I & P	Discrete Sample
10/25/99	TPS 3B-OUT	PT-T-14-07	ND (1.2)	1.4	ND (1.2)	1.9	ND (1.2)	ND (1.2)	ND (390)	I & P	Discrete Sample
10/25/99	TPS 3C-OUT	PT-T-14-08	ND (1.2)	1.8	ND (1.2)	5.5	ND (1.2)	1.6	ND (390)	I & P	Discrete Sample
10/25/99	TPS 4A-OUT	PT-T-14-09	ND (1.2)	1.8	ND (1.2)	3.5	ND (1.2)	ND (1.2)	ND (380)	I & P	Discrete Sample
10/25/99	TPS 4B-OUT	PT-T-14-10	ND (1.2)	1.2	ND (1.2)	1.4	ND (1.2)	ND (1.2)	ND (400)	I & P	Discrete Sample
10/25/99	TPS 4C-OUT	PT-T-14-11	ND (1.2)	1.2	ND (1.2)	1.4	ND (1.2)	ND (1.2)	ND (390)	I & P	Discrete Sample
THE NEXT 9 SOIL SAMPLE RESULTS ARE FROM THE PROCESS INLET DURING THE DEMONSTRATION TEST (10/25/99)											
10/25/99	TPS 2A-IN	N/A	4,000.0	6,100.0	ND (5.5)	600.0	ND (5.5)	27,000.0	N/A	I & P	Discrete Sample
10/25/99	TPS 2B-IN	N/A	260.0	350.0	11.0	400.0	ND (5.6)	1,700.0	N/A	I & P	Discrete Sample
10/25/99	TPS 2C-IN	N/A	5,200.0	4,000.0	ND (280)	700.0	ND (280)	41,000.0	N/A	I & P	Discrete Sample
10/25/99	TPS 3A-IN	N/A	3,400.0	6,100.0	1,100.0	320.0	ND (280)	23,000.0	N/A	I & P	Discrete Sample
10/25/99	TPS 3B-IN	N/A	2,600.0	3,600.0	ND (280)	930.0	ND (280)	19,000.0	N/A	I & P	Discrete Sample
10/25/99	TPS 3C-IN	N/A	6,800.0	8,400.0	ND (280)	1,400.0	ND (280)	48,000.0	N/A	I & P	Discrete Sample
10/25/99	TPS 4A-IN	N/A	1,200.0	1,400.0	ND (141)	890.0	ND (141)	9,800.0	N/A	I & P	Discrete Sample
10/25/99	TPS 4B-IN	N/A	590.0	700.0	ND (140)	850.0	ND (140)	4,800.0	N/A	I & P	Discrete Sample
10/25/99	TPS 4C-IN	N/A	1,100.0	980.0	ND (140)	600.0	ND (140)	9,100.0	N/A	I & P	Discrete Sample
AVERAGES FOR INLET SAMPLES==> TPS 2A-IN thru 4C-IN (used Detection Limit for those at Non-Detect)			2794.4	3514.4	264.2	743.3	172.4	20377.8	N/A		

E.3 Pre-Processed Soil

ANALYTICAL REPORT

PERFORMANCE TEST
PRE-PROCESSED INLET
SAMPLE RESULTS

TPS TECHNOLOGIES, INC.
HOWARD TURNER
PO BOX 415
CHEEKTOWAGA NY 14225

Report Date:	29-OCT-99
Project:	BUFFALO AIRPORT
Lab Number:	209333
Sample Number(s):	209333-01 to 209333-09

Louis J. Cercone
Laboratory Director

STL
Committed To Your Success
315 Fullerton Avenue
Newburgh, NY 12550
Tel: (914) 562-0890
Fax: (914) 562-0841

Volatile Organics Analysis Data Sheet
Form 1 VOA
8260B

Client ID:	TPS 2A-IN	Date Collected:	25-OCT-99
STL Sample Number:	209333-01	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES, INC.	Date Extracted:	
Project Name:	BUFFALO AIRPORT	Date Analyzed:	26-OCT-99
% Solid:	90.2	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	1g	Lab File Id:	W1941.D
Level:	LOW	Dilution Factor:	5.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	5.5	4000	D
108-88-3	Toluene	5.5	6100	D
71-55-6	1,1,1-Trichloroethane	5.5		U
79-01-6	Trichloroethene	5.5	600	D
75-01-4	Vinyl chloride	5.5		U
1330-20-7	Xylenes, total	5.5	27000	D

STL
Consultants To Your Success
315 Fullerton Avenue
Newburgh, NY 12550
Tel: (914) 562-0890
Fax: (914) 562-0841

Volatile Organics Analysis Data Sheet
Form 1 VOA
8260B

Client ID:	TPS 2B-IN	Date Collected:	25-OCT-99
STL Sample Number:	209333-02	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES, INC.	Date Extracted:	
Project Name:	BUFFALO AIRPORT	Date Analyzed:	26-OCT-99
% Solid:	90.0	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	1g	Lab File Id:	W1942.D
Level:	LOW	Dilution Factor:	5.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	5.6	260	
108-88-3	Toluene	5.6	350	
71-55-6	1,1,1-Trichloroethane	5.6	11	
79-01-6	Trichloroethene	5.6	400	
75-01-4	Vinyl chloride	5.6		U
1330-20-7	Xylenes, total	5.6	1700	D

STL
Committed To Your Success
315 Fullerton Avenue
Newburgh, NY 12550
Tel: (914) 562-0890
Fax: (914) 562-0841

Volatile Organics Analysis Data Sheet
Form 1 VOA
82608

Client ID:	TPS 2C-IN	Date Collected:	25-OCT-99
STL Sample Number:	209333-03	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES, INC.	Date Extracted:	
Project Name:	BUFFALO AIRPORT	Date Analyzed:	28-OCT-99
% Solid:	89.6	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	10000ul	Lab File Id:	W1958.D
Level:	MED	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	280	5200	
108-88-3	Toluene	280	4000	
71-55-6	1,1,1-Trichloroethane	280		U
79-01-6	Trichloroethene	280	700	
75-01-4	Vinyl chloride	280		U
95-47-6	Xylenes, total	280	41000	

Volatile Organics Analysis Data Sheet
Form 1 VOA
8260B

Client ID:	TPS 3A-IN	Date Collected:	25-OCT-99
STL Sample Number:	209333-04	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES, INC.	Date Extracted:	
Project Name:	BUFFALO AIRPORT	Date Analyzed:	28-OCT-99
% Solid:	90.5	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	10000ul	Lab File Id:	W1959.D
Level:	MED	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	280	3400	
108-88-3	Toluene	280	6100	
71-55-6	1,1,1-Trichloroethane	280	1100	
79-01-6	Trichloroethene	280	320	
75-01-4	Vinyl chloride	280		U
95-47-6	o-Xylene	280		U
1330-20-7	Xylenes, total	280	23000	

315 Fullerton Avenue
Newburgh, NY 12550
Tel: (914) 562-0890

Volatile Organics Analysis Data Sheet
Form 1 VOA
82608

Client ID:	TPS 3B-IN	Date Collected:	25-OCT-99
STL Sample Number:	209333-05	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES, INC.	Date Extracted:	
Project Name:	BUFFALO AIRPORT	Date Analyzed:	28-OCT-99
% Solid:	89.2	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	10000ul	Lab File Id:	W1960.D
Level:	MED	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	280	2600	
108-88-3	Toluene	280	3600	
71-55-6	1,1,1-Trichloroethane	280		U
79-01-6	Trichloroethene	280	930	
75-01-4	Vinyl chloride	280		U
1330-20-7	Xylenes, total	280	19000	

Volatile Organics Analysis Data Sheet
Form 1 VOA
8260B

Client ID:	TPS 3C-IN	Date Collected:	25-OCT-99
STL Sample Number:	209333-06	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES, INC.	Date Extracted:	
Project Name:	BUFFALO AIRPORT	Date Analyzed:	27-OCT-99
% Solid:	90.0	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	10000ul	Lab File Id:	W1961.D
Level:	MED	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	280	6800	
108-88-3	Toluene	280	8400	
71-55-6	1,1,1-Trichloroethane	280		U
79-01-6	Trichloroethene	280	1400	
75-01-4	Vinyl chloride	280		U
1330-20-7	Xylenes, total	280	48000	

Volatile Organics Analysis Data Sheet
Form 1 VOA
8260B

Client ID:	TPS 4A-IN	Date Collected:	25-OCT-99
STL Sample Number:	209333-07	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES, INC.	Date Extracted:	
Project Name:	BUFFALO AIRPORT	Date Analyzed:	28-OCT-99
% Solid:	88.5	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	10000ul	Lab File Id:	W1962.D
Level:	MED	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	141	1200	
108-88-3	Toluene	141	1400	
71-55-6	1,1,1-Trichloroethane	141		U
79-01-6	Trichloroethene	141	890	
75-01-4	Vinyl chloride	141		U
1330-20-7	Xylenes, total	141	9800	

Volatile Organics Analysis Data Sheet
Form 1 VOA
8260B

Client ID:	TPS 48-IN	Date Collected:	25-OCT-99
STL Sample Number:	209333-08	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES, INC.	Date Extracted:	
Project Name:	BUFFALO AIRPORT	Date Analyzed:	27-OCT-99
% Solid:	90.8	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	10000ul	Lab File Id:	W1963.D
Level:	MED	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	140	590	
108-88-3	Toluene	140	700	
71-55-6	1,1,1-Trichloroethane	140		U
79-01-6	Trichloroethene	140	850	
75-01-4	Vinyl chloride	140		U
1330-20-7	Xylenes, total	140	4800	

STL
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Tel: (914) 562-0890
Fax: (914) 562-0841

Volatile Organics Analysis Data Sheet
Form 1 VOA
8260B

Client ID:	TPS 4C-IN	Date Collected:	25-OCT-99
STL Sample Number:	209333-09	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES, INC.	Date Extracted:	
Project Name:	BUFFALO AIRPORT	Date Analyzed:	28-OCT-99
% Solid:	89.4	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	10000ul	Lab File Id:	W1964.D
Level:	MED	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	140	1100	
108-88-3	Toluene	140	980	
71-55-6	1,1,1-Trichloroethane	140		U
79-01-6	Trichloroethene	140	600	
75-01-4	Vinyl chloride	140		U
1330-20-7	Xylenes, total	140	9100	

STL GROUP
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CHAIN OF CUSTODY

315 Fullerton Avenue
Newburgh, NY 12550
TEL (914) 562-0890
FAX (914) 562-0841

CUSTOMER NAME: TPS Technologies
ADDRESS: P.O. Box 415
CITY, STATE, ZIP: Cheektowaga, NY 14225
NAME OF CONTACT: Howard Turner PHONE NO.
PROJECT LOCATION: Buffalo Airport
PROJECT NUMBER / PO NO.

REPORT TYPE
STANDARD ☒ ISRA ☐
NYASP A ☐ B ☐ CLP ☐
OTHER ____

TURNAROUND
☐ NORMAL ____
☒ QUICK 48 hr.
☐ VERBAL ____

REPORT # (Lab Use Only)
280333

SAMPLE TEMP. ____ °C
pH CHECK Y ____ N ____
REVIEWED BY ____

NY PUBLIC WATER SUPPLIES
SOURCE ID ____
ELRP TYPE ____
FEDERAL ID ____

NOTE: SAMPLE TEMPERATURE UPON RECEIPT MUST BE 4°C.

Matrix
DW = DRINKING WATER S = SOIL O = OIL
WW = WASTE WATER SL = SLUDGE GW = GROUND WATER

STL #	SAMPLING DATE	TIME AM PM	COMP	GRAB	MATRIX	CLIENT I.D.	Total Number of Containers	40ml Glass HCl	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250ml Amber	2 oz Cordpak	ANALYSIS REQUESTED
01	10/25	13:54		X	S	TPS 2A-IN	1												8260 B
02	10/25	14:14		X	S	TPS 2B-IN	1												8260 B
03	10/25	14:34		X	S	TPS-2C-IN	1												8260 B
04	10/25	16:02		X	S	TPS-3A-IN	1												8260 B
05	10/25	16:22		X	S	TPS-3B-IN	1												8260 B
06	10/25	16:42		X	S	TPS-3C-IN	1												8260 B
07	10/25	18:10		X	S	TPS-4A-IN	1												8260 B
08	10/25	18:30		X	S	TPS-4B-IN	1												8260 B
09	10/25	18:50		X	S	TPS-4C-IN	1												8260 B

ALL SAMPLES INDIVIDUAL DO NOT COMPOSITE

Fax Results ASAP To (716) 631-9813

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
[signature]	TPS	10/25/99	7:30 Am				
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY [signature]	COMPANY	DATE 10/26/99	TIME 11:00

COMMENTS ____

E.4 Processed Soil

ANALYTICAL REPORT

PERFORMANCE TEST
PROCESS OUTLET
SAMPLE RESULTS

TPS TECHNOLOGIES, INC.
HOWARD TURNER
PO BOX 415
CHEEKTOWAGA NY 14225

Report Date:	29-OCT-99
Project:	BUFFALO AIRPORT
Lab Number:	209332
Sample Number(s):	209332-01 to 209332-09

Louis J. Cercone
Laboratory Director

Volatile Organics Analysis Data Sheet
Form 1 VOA
8260B

Client ID:	TPS 2A-OUT	Date Collected:	25-OCT-99
STL Sample Number:	209332-01	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES	Date Extracted:	
Project Name:	BUFFALO AIRPORT	Date Analyzed:	26-OCT-99
% Solid:	84.4	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	5g	Lab File Id:	W1932.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	1.1		U
108-88-3	Toluene	1.1		U
71-55-6	1,1,1-Trichloroethane	1.1		U
79-01-6	Trichloroethene	1.1		U
75-01-4	Vinyl chloride	1.1		U
1330-20-7	Xylenes, total	1.1		U

315 Fullerton Avenue
Newburgh, NY 12550
Tel: (914) 562-0890
Fax: (914) 562-0841

Semi-volatile Organics Analysis Data Sheet
Form 1 SV
8270C

Client ID:	TPS 2A-CUT	Date Collected:	25-OCT-99
STL Sample Number:	209332-01	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES	Date Extracted:	28-OCT-99
Project Name:	BUFFALO AIRPORT	Date Analyzed:	28-OCT-99
% Solid:	84.4	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-5
Sample Wt/Vol:	30g	Lab File Id:	E17490.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
106-44-5	4-Methylphenol	390		U

Volatile Organics Analysis Data Sheet
Form 1 VOA
8260B

Client ID:	TPS 2B-CUT	Date Collected:	25-OCT-99
STL Sample Number:	209332-02	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES	Date Extracted:	
Project Name:	BUFFALO AIRPORT	Date Analyzed:	26-OCT-99
% Solid:	87.0	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	5g	Lab File Id:	W1933.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	1.1		U
108-88-3	Toluene	1.1		U
71-55-6	1,1,1-Trichloroethane	1.1		U
79-01-6	Trichloroethene	1.1		U
75-01-4	Vinyl chloride	1.1		U
1330-20-7	Xylenes, total	1.1		U

Semi-volatile Organics Analysis Data Sheet
Form 1 SV
8270C

Client ID:	TPS 2B-OUT	Date Collected:	25-OCT-99
STL Sample Number:	209332-02	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES	Date Extracted:	28-OCT-99
Project Name:	BUFFALO AIRPORT	Date Analyzed:	28-OCT-99
% Solid:	87.0	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-5
Sample Wt/Vol:	30g	Lab File Id:	E17491.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
106-44-5	4-Methylphenol	360		U

Volatile Organics Analysis Data Sheet
Form 1 VOA
8260B

Client ID:	TPS 2C-OUT	Date Collected:	25-OCT-99
STL Sample Number:	209332-03	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES	Date Extracted:	
Project Name:	BUFFALO AIRPORT	Date Analyzed:	26-OCT-99
% Solid:	87.1	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	5g	Lab File Id:	W1934.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	1.1	9.9	
108-88-3	Toluene	1.1		U
71-55-6	1,1,1-Trichloroethane	1.1		U
79-01-6	Trichloroethene	1.1	240	D
75-01-4	Vinyl chloride	1.1		U
1330-20-7	Xylenes, total	1.1	76	

Semi-volatile Organics Analysis Data Sheet
Form 1 SV
8270C

Client ID:	TPS 2C-OUT	Date Collected:	25-OCT-99
STL Sample Number:	209332-03	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES	Date Extracted:	26-OCT-99
Project Name:	BUFFALO AIRPORT	Date Analyzed:	27-OCT-99
% Solid:	87.1	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-5
Sample Wt/Vol:	30g	Lab File Id:	E17480.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
106-44-5	4-Methylphenol	380		U

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Fax. (914) 562-0841

Volatile Organics Analysis Data Sheet
Form 1 VOA
8260B

Client ID:	TPS 3A-OUT	Date Collected:	25-OCT-99
STL Sample Number:	209332-04	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES	Date Extracted:	
Project Name:	BUFFALO AIRPORT	Date Analyzed:	27-OCT-99
% Solid:	87.4	Report Date:	29-OCT-99
Matrix:	3 Soil/Slag	Column:	DB-624
Sample Wt/Vol:	5g	Lab File Id:	W1945.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	1.1		U
108-88-3	Toluene	1.1	2.9	
71-55-6	1,1,1-Trichloroethane	1.1		U
79-01-6	Trichloroethene	1.1	1.4	
75-01-4	Vinyl chloride	1.1		U
1330-20-7	Xylenes, total	1.1		U

Semi-volatile Organics Analysis Data Sheet
Form 1 SV
8270C

Client ID:	TPS 3A-OUT	Date Collected:	25-OCT-99
STL Sample Number:	209332-04	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES	Date Extracted:	26-OCT-99
Project Name:	BUFFALO AIRPORT	Date Analyzed:	27-OCT-99
% Solid:	87.4	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-5
Sample Wt/Vol:	30g	Lab File Id:	E17481.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
106-44-5	4-Methylphenol	380		U

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Fax: (914) 562-0841

Volatile Organics Analysis Data Sheet
Form 1 VOA
8260B

Client ID:	TPS 38-CUT	Date Collected:	25-OCT-99
STL Sample Number:	209332-05	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES	Date Extracted:	
Project Name:	BUFFALO AIRPORT	Date Analyzed:	26-OCT-99
% Solid:	86.3	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	5g	Lab File Id:	W1936.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	1.2		U
108-88-3	Toluene	1.2	1.4	
71-55-6	1,1,1-Trichloroethane	1.2		U
79-01-6	Trichloroethene	1.2	1.9	
75-01-4	Vinyl chloride	1.2		U
1330-20-7	Xylenes, total	1.2		U

Semi-volatile Organics Analysis Data Sheet
Form 1 SV
8270C

Client ID:	TPS 3B-OUT	Date Collected:	25-OCT-99
STL Sample Number:	209332-05	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES	Date Extracted:	26-OCT-99
Project Name:	BUFFALO AIRPORT	Date Analyzed:	27-OCT-99
% Solid:	85.3	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-5
Sample Wt/Vol:	30g	Lab File Id:	E17482.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
106-44-5	4-Methylphenol	390		U

Volatile Organics Analysis Data Sheet
Form 1 VOA
8260B

Client ID:	TPS 3C-OUT	Date Collected:	25-OCT-99
STL Sample Number:	209332-06	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES	Date Extracted:	
Project Name:	BUFFALO AIRPORT	Date Analyzed:	26-OCT-99
% Solid:	85.0	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	5g	Lab File Id:	W1937.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	1.2		U
108-88-3	Toluene	1.2	1.8	
71-55-6	1,1,1-Trichloroethane	1.2		U
79-01-6	Trichloroethene	1.2	5.5	
75-01-4	Vinyl chloride	1.2		U
1330-20-7	Xylenes, total	1.2	1.6	

Semi-volatile Organics Analysis Data Sheet
Form 1 SV
8270C

Client ID: TPS 3C-OUT
STL Sample Number: 209332-06
Client Name: TPS TECHNOLOGIES
Project Name: BUFFALO AIRPORT
% Solid: 85.0
Matrix: 3 Soil/Sldg
Sample Wt/Vol: 30g
Level: LOW

Date Collected: 25-OCT-99
Date Received: 26-OCT-99
Date Extracted: 26-OCT-99
Date Analyzed: 27-OCT-99
Report Date: 29-OCT-99
Column: DB-5
Lab File Id: E17483.D
Dilution Factor: 1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
106-44-5	4-Methylphenol	390		U

Volatile Organics Analysis Data Sheet
Form 1 VOA
8260B

Client ID: TPS 4A-OUT
STL Sample Number: 209332-07
Client Name: TPS TECHNOLOGIES
Project Name: BUFFALO AIRPORT
% Solid: 86.7
Matrix: 3 Soil/Sldg
Sample Wt/Vol: 5g
Level: LOW

Date Collected: 25-OCT-99
Date Received: 26-OCT-99
Date Extracted:
Date Analyzed: 26-OCT-99
Report Date: 29-OCT-99
Column: DB-624
Lab File Id: W1938.D
Dilution Factor: 1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	1.2		U
108-88-3	Toluene	1.2	1.8	
71-55-6	1,1,1-Trichloroethane	1.2		U
79-01-6	Trichloroethene	1.2	3.5	
75-01-4	Vinyl chloride	1.2		U
1330-20-7	Xylenes, total	1.2		U

Semi-volatile Organics Analysis Data Sheet
Form 1 SV
8270C

Client ID: TPS 4A-OUT
STL Sample Number: 209332-07
Client Name: TPS TECHNOLOGIES
Project Name: BUFFALO AIRPORT
% Solid: 86.7
Matrix: 3 Soil/Sldg
Sample Wt/Vol: 30g
Level: LOW

Date Collected: 25-OCT-99
Date Received: 26-OCT-99
Date Extracted: 26-OCT-99
Date Analyzed: 27-OCT-99
Report Date: 29-OCT-99
Column: DB-5
Lab File Id: E17484.D
Dilution Factor: 1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
106-44-5	4-Methylphenol	380		U

Volatile Organics Analysis Data Sheet
Form 1 VOA
82608

Client ID: TPS 4B-OUT

STL Sample Number: 209332-08

Client Name: TPS TECHNOLOGIES

Project Name: BUFFALO AIRPORT

% Solid: 84.3

Matrix: 3 Soil/Sldg

Sample Wt/Vol: 5g

Level: LOW

Date Collected: 25-OCT-99

Date Received: 26-OCT-99

Date Extracted:

Date Analyzed: 26-OCT-99

Report Date: 29-OCT-99

Column: DB-624

Lab File Id: W1939.D

Dilution Factor: 1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	1.2		U
108-88-3	Toluene	1.2	1.2	
71-55-6	1,1,1-Trichloroethane	1.2		U
79-01-6	Trichloroethene	1.2		U
75-01-4	Vinyl chloride	1.2	1.4	
1330-20-7	Xylenes, total	1.2		U

Semi-volatile Organics Analysis Data Sheet
Form 1 SV
8270C

Client ID:	TPS 4B-OUT	Date Collected:	25-OCT-99
STL Sample Number:	209332-08	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES	Date Extracted:	26-OCT-99
Project Name:	BUFFALO AIRPORT	Date Analyzed:	27-OCT-99
% Solid:	84.3	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-5
Sample Wt/Vol:	30g	Lab File Id:	E17485.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
106-44-5	4-Methylphenol	400		U

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Fax: (914) 562-0841

Volatile Organics Analysis Data Sheet
Form 1 VOA
8260B

Client ID:	TPS 4C-OUT	Date Collected:	25-OCT-99
STL Sample Number:	209332-09	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES	Date Extracted:	
Project Name:	BUFFALO AIRPORT	Date Analyzed:	26-OCT-99
% Solid:	85.1	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-624
Sample Wt/Vol:	5g	Lab File Id:	W1940.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
100-41-4	Ethylbenzene	1.2		U
108-88-3	Toluene	1.2	1.2	
71-55-6	1,1,1-Trichloroethane	1.2		U
79-01-6	Trichloroethene	1.2	1.4	
75-01-4	Vinyl chloride	1.2		U
1330-20-7	Xylenes, total	1.2		U

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Fax: (914) 562-0841

Semi-volatile Organics Analysis Data Sheet
Form 1 SV
8270C

Client ID:	TPS 4C-OUT	Date Collected:	25-OCT-99
STL Sample Number:	209332-09	Date Received:	26-OCT-99
Client Name:	TPS TECHNOLOGIES	Date Extracted:	26-OCT-99
Project Name:	BUFFALO AIRPORT	Date Analyzed:	28-OCT-99
% Solid:	85.1	Report Date:	29-OCT-99
Matrix:	3 Soil/Sldg	Column:	DB-5
Sample Wt/Vol:	30g	Lab File Id:	E17486.D
Level:	LOW	Dilution Factor:	1.00

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
106-44-5	4-Methylphenol	390		U

CHAIN OF CUSTODY

STL
Committed To Your Success

315 Fullerton Avenue
Newburgh, NY 12550
TEL (914) 562-0890
FAX (914) 562-0841

CUSTOMER NAME: TPS Technologies Inc
ADDRESS: PO Box 415
CITY, STATE, ZIP: Chaffee NY 14225
NAME OF CONTACT: Howard Turner PHONE NO.
PROJECT LOCATION: Buffalo Airport
PROJECT NUMBER / PO NO.:

REPORT TYPE
STANDARD [X] ISRA [ ]
NYASP A [ ] B [ ] CLP [ ]
OTHER

TURNAROUND
[ ] NORMAL
[X] QUICK 48 hr.
[ ] VERBAL

REPORT # (Lab Use Only)
209332
SAMPLE TEMP. C
pH CHECK Y N
REVIEWED BY:

NY PUBLIC WATER SUPPLIES
SOURCE ID
ELRP TYPE
FEDERAL ID

NOTE: SAMPLE TEMPERATURE UPON RECEIPT MUST BE 4°C.

Matrix
DW = DRINKING WATER S = SOIL O = OIL
WW = WASTE WATER SL = SLUDGE GW = GROUND WATER

STL #	SAMPLING DATE	SAMPLING TIME AM PM	COMP	GRAB	MATRIX	CLIENT I.D.	Total Number of Containers	40ml Glass HCl	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250ml Amber	2 oz. Ocrpak	ANALYSIS REQUESTED
01	10/25	N:04		X	S	TPS 2A-out	1												8260 B & 8270 C BNA
02	10/25	14:24		X	S	TPS 2B-out	1												8260 B & 8270 C BNA
03	10/25	14:44		X	S	TPS 2C-out	1												8260 B & 8270 C BNA
04	10/25	16:12		X	S	TPS 3A-out	1												8260 B & 8270 C BNA
05	10/25	16:32		X	S	TPS 3B-out	1												8260 B & 8270 C BNA
06	10/25	16:52		X	S	TPS 3C-out	1												8260 B & 8270 C BNA
07	10/25	18:20		X	S	TPS 4A-out	1												8260 B & 8270 C BNA
08	10/25	18:40		X	S	TPS 4B-out	1												8260 B & 8270 C BNA
09	10/25	19:00		X	S	TPS 4C-out	1												8260 B & 8270 C BNA

ALL SAMPLES INDIVIDUAL. DO NOT COMPOSITE

PSDI

FAX RESULTS ASAP (716) 631-9813

RELINQUISHED BY	COMPANY	DATE	TIME	RECEIVED BY	COMPANY	DATE	TIME
	STL	10/25/99	4:20 pm				
	TPS	10/25/99	7:50 PM				
						10/26/99	10:35

COMMENTS

F. CYCLONIC FLOW DATA

E_3-Killam Inc.

VELOCITY AND VOLUMETRIC FLOW DETERMINATION SPREADSHEET

DATA INPUT

Stack / Duct Conditions

Ambient Temp.:	67.00	.Points / Traverse :	12
Pbar (in. Hg):	29.82	Total No. of Points.:	24
Pstatic (in. H_2O):	-0.51	Nipple Length (in.):	0
Bws:	0.27	**1 - For Circular Ducts**	
Cp:	0.84	Duct Dia. (in.):	48.00
tstd(°F):	68	Duct Area (ft^2):	12.5664
%CO_2 :	10.00	**2 - For Rectangular Ducts**	
%O_2 :	7.50	Length (in.):	0.00
%CO :	0.00	Width (in.):	0.00
%N_2 :	82.50	Equiv. Dia. [D_e (in.)]:	#DIV/0!
Required CFM:	0.70	Duct Area (ft^2) :	0.0000
Meter ΔH@:	1.8000	**3 - FOR CALCS, USE 1 OR 2**	
Meter Temp.:	90.00	Duct Area (ft^2):	12.5664

Time (24Hr.)	Traverse Point No.	ts (°F)	ΔP	ΔP.5	Null Angle
14:55:00	A1	1658	0.35	*0.5916*	5
	2	1614	0.49	*0.7000*	3
	3	1529	0.58	*0.7616*	0
	4	1439	0.62	*0.7874*	2
	5	1332	0.62	*0.7874*	6
	6	1310	0.63	*0.7937*	4
	7	1222	0.75	*0.8660*	4
	8	1170	0.80	*0.8944*	7
	9	1119	0.82	*0.9055*	5
	10	1084	0.82	*0.9055*	3
	11	1055	0.74	*0.8602*	0
	12	990	0.52	*0.7211*	2
	B1	1603	0.40	*0.6325*	4
	2	1590	0.67	*0.8185*	6
	3	1549	0.70	*0.8367*	3
	4	1475	0.71	*0.8426*	0
	5	1367	0.72	*0.8485*	0
	6	1295	0.74	*0.8602*	2
	7	1233	0.80	*0.8944*	2
	8	1177	0.84	*0.9165*	4
	9	1123	0.90	*0.9487*	7
	10	1074	0.88	*0.9381*	6
	11	1052	0.89	*0.9434*	4
	12	1052	0.96	*0.9798*	3
	Sum	31112	16.95	*20.0*	82
	Avg.	1296	0.71	*0.8348*	3.4

DATA OUTPUT

Area of duct (ft^2)	12.5664
Vs - ft/sec.	89.11
Qa - ACFM	67189
Qs - DSCFM	14677
Md - lb/lb-mole	29.90
Ms - lb/lb-mole	26.69
Tm - °R	550
Ts - °R	1756
Tstd - °R	528
Ps - in. Hg.	29.78
Suggested Nozzle Dia. (in.)	0.3234

EQUIPMENT USED

Pitot ID	7IP-3
Thermocouple ID	7IT-3
Barometer ID	B-3
Meter Box ID	N-2
Technician	MJT

TEST PROGRAM SPECIFICS

Date	10/11/99
Project Number	99023.0001
Client	TPS
Test Location	Outlet