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REPORT ON PERFORMANCE TESTING

Performed for:

IT CORPORATION
THERMAL DRYING SYSTEM EXHAUST STACK
FERNALD, OH

Client Reference No: 773481-1958
CAE Project No: 8705
Revision 0: June 14, 2000

To the best of our knowledge, the data presented in this report are accurate and complete.

Submitted by,

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Reviewed by,

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Attachment in Files
A-1408

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PROJECT OVERVIEW

IT Corporation contracted Clean Air Engineering to perform performance testing at their facility located in Fernald, OH.

The test parameters included the following:

- Total suspended particulate (TSP);
- carbon monoxide (CO);
- total hydrocarbons (THC);
- volatile organic compounds (VOC);
- oxygen (O_2);
- carbon dioxide (CO_2);
- volumetric flow and moisture.

The testing took place at the exhaust stack on May 17 and May 18, 2000. Coordinating the field testing were:

Greg McCartney - IT Corporation
Peter Sturdevant – Hamilton County DES
Georg Pavlovics - Clean Air Engineering

Table 1-1:
Summary of Test Results

Source Constituent	Sampling Method	Average Emission
Exhaust Stack		
Particulate lb/hr)	EPA M5	0.0029
Particulate (tons/yr)	EPA M5	0.0013
CO (ppmdv)	EPA M10	0.6
CO (lb/hr)	EPA M10	0.005
THC as propane (ppmdv)	EPA M25A	0.4
THC as propane (lb/hr)	EPA M25A	0.005

Volatile Organic Compound Concentrations

The laboratory report along with quality control data is included in Appendix Section F. For each test run, four samples were acquired in the field (A through D). Only the A, B and C samples were analyzed. The D volatile organic sampling train (VOST) tube pair was archived by the laboratory. The condensate catch was recovered at the end of each test run and subsequently analyzed. Thus, the condensate catch would include any amounts from all four samples (A through D) for that particular test run.

PROJECT OVERVIEW

Detectable Compounds

VOST analysis consisted of analysis of thirty-one compounds. A complete list of the compounds is included in Appendix F. A total of seven compounds were detected in the samples. They include:

- Chloromethane;
- Bromomethane;
- Methylene Chloride;
- Benzene.
- Acetone;
- Carbon Disulfide;
- Toluene;

All compounds were detected at low concentrations (below 0.5 µg).

VOST Blank Trap Analyses

Both Trip Blanks and Field Blanks were acquired and analyzed. A copy of the analysis is provided in Appendix F. For all data reported, blank values have not been used to correct the sample concentrations.

Compounds were detected in both the trip blank and field blank. Compounds detected in the Field Blank include:

- Bromomethane;
- Methylene Chloride;
- Benzene;
- Carbon Disulfide;
- Toluene;
- Acetone.

Compounds detected in the trip blank included:

- Bromomethane;
- Methylene Chloride.

The concentrations detected were below 0.05 µg for all but Acetone and Carbon Disulfide, which were detected in concentrations below 0.3 µg. Although these amounts are detectable, they are not considered to be significant.

VOST Condensate Analysis

All condensate values are reported in the Parameters section of the Appendix B, but not included (added to) in the results of analysis of the adsorption tube pairs. This is consistent with Method 0030 standard procedures.

For every test run, two volatile compounds (methylene chloride and trichloroethene) occurred at levels on the same order of magnitude in the condensate as in the adsorption tubes. These two compounds were also detected in the condensate blank. Acetone was detected in the condensate of the third run only. Methylene chloride and acetone are common laboratory solvents. This is believed to have been caused by contamination within the field lab and/or analytical laboratory. The methylene chloride and acetone concentrations reported are not believed to represent the concentration in the flue gas.

PROJECT OVERVIEW

VOST Reporting

Concentrations and emission are reported the following manner.

- Each run consisted of four (4) sample sets (A, B, C, D). Only the A, B and C samples sets were analyzed. The run concentration represents the average of sets A, B and C (Table 2-3, 2-4, 2-5).
- The overall average concentration represents the average of runs 1, 2 and 3 (Table 1-2).
- If a compound was below detection for all three sample sets, that compound was not included in the results tables of section 1 and 2. The complete list of compounds analyzed with the VOST sampling are presented in Appendix F.
- If a compound was below detection for one or two sample sets, the non detected concentration was reported as "<0.0E+00". The run concentration was calculated averaging the three sets and using a "zero" value for the non detect. The average concentration was reported with a "<".

Table 1-2 presents the summary of VOST results.

Table 1-2:
Summary of VOST Results

		Average
Chloromethane		
C	Concentration (mg/dscm)	<1.4E-03
C	Concentration (ppm)	<6.8E-04
E	Emission rate (lb/hr)	<9.6E-06
Bromomethane		
C	Concentration (mg/dscm)	1.3E-03
C	Concentration (ppm)	3.3E-04
E	Emission rate (lb/hr)	8.9E-06
Carbon disulfide		
C	Concentration (mg/dscm)	<7.1E-04
C	Concentration (ppm)	<2.2E-04
E	Emission rate (lb/hr)	<4.8E-06
Acetone		
C	Concentration (mg/dscm)	<3.5E-03
C	Concentration (ppm)	<1.4E-03
E	Emission rate (lb/hr)	<2.3E-05
Methylene chloride		
C	Concentration (mg/dscm)	1.9E-03
C	Concentration (ppm)	5.4E-04
E	Emission rate (lb/hr)	1.3E-05
Chloroform		
C	Concentration (mg/dscm)	<8.4E-05
C	Concentration (ppm)	<1.7E-05
E	Emission rate (lb/hr)	<5.3E-07
Benzene		
C	Concentration (mg/dscm)	1.4E-03
C	Concentration (ppm)	4.3E-04
E	Emission rate (lb/hr)	9.4E-06
Toluene		
C	Concentration (mg/dscm)	<3.1E-05
C	Concentration (ppm)	<8.1E-06
E	Emission rate (lb/hr)	<1.9E-07

The test conditions and results of analysis are presented in Tables 2-1 through 2-5 on pages 2-1 through 2-5

RESULTS

Table 2-1:
Exhaust Stack - Particulate

Run No.		**2**
Date (2000)		May 18
Start Time		07:38
Stop Time		13:57
Gas Conditions		
O_2	Oxygen (dry volume %)	7.3
CO_2	Carbon dioxide (dry volume %)	3.9
T_s	Temperature (°F)	1438
B_{wo}	Moisture (volume %)	9.35
Volumetric Flow Rate		
Q_a	Actual conditions (acfm)	6,775
Q_{std}	Standard conditions (dscfm)	1,678
Particulate		
C	Concentration (gr/acf)	0.00005
C	Concentration (gr/dscf)	0.00020
C	Concentration (g/dscm)	0.00046
E	Emission rate (lb/hr)	0.0029
E	Emission rate (tons/yr)	0.013

RESULTS

Table 2-2:
Exhaust Stack – CEM

Run No.		1	2	3	Average
Date (2000)		May 17	May 17	May 17	
Start Time		11:15	12:33	13:51	
Stop Time		12:15	13:33	15:04	
Gas Conditions[1]					
Ts	Temperature (°F)	1,437	1,437	1,437	1,437
O_2	Oxygen (dry volume %)	7.59	7.72	6.91	7.41
CO_2	Carbon Dioxide (dry volume %)	4.23	4.17	4.38	4.26
B_{wo}	Moisture in sample (% by volume)	9.16	9.16	9.16	9.16
Q_a	Volumetric flow rate, actual (acfm)	7,369	7,369	7,369	7,369
Q_{std}	Volumetric flow rate, standard (dscfm)	1,829	1,829	1,829	1,829
Carbon Monoxide					
C_{gas}	Concentration drift corrected (ppmdv)	1.5	0.01	0.2	0.6
C_{gas}	Concentration moisture corrected (ppmwv)	1.4	0.01	0.2	0.5
E	Emission rate (lb/hr)	0.0119	0.0001	0.0019	0.0046
E	Emission rate (ton/yr)	0.0521	0.0005	0.0083	0.0203
Total Hydrocarbons as Propane					
C_{gas}	Concentration drift corrected (ppmwv)	0.6	0.1	0.3	0.3
C_{gas}	Concentration moisture corrected (ppmdv)	0.7	0.2	0.3	0.4
E	Emission rate (lb/hr)	0.009	0.002	0.004	0.005
E	Emission rate (ton/yr)	0.038	0.008	0.016	0.020

1. Temperature, moisture and flow parameters obtained for velocity/moisture sample train.

RESULTS

Table 2-3:
Exhaust Stack – VOST, Run 1

Run No.		1A	1B	1C	Average
Date (2000)		May 17	May 17	May 17	
Start Time		10:36	11:28	12:20	
Stop Time		11:16	12:08	13:00	
Volumetric Flow Rate[1]					
Qa	Actual conditions (acfm)	7,369	7,369	7,369	7,369
Qstd	Standard conditions (dscfm)	1,829	1,829	1,829	1,829
Chloromethane					
C	Concentration (mg/dscm)	1.6E-02	<0.0E+00	<0.0E+00	<4.0E-03
C	Concentration (ppm)	7.6E-03	<0.0E+00	<0.0E+00	<1.9E-03
E	Emission rate (lb/hr)	1.1E-04	<0.0E+00	<0.0E+00	<2.7E-05
Bromomethane					
C	Concentration (mg/dscm)	4.6E-03	1.5E-03	2.6E-03	2.2E-03
C	Concentration (ppm)	1.2E-03	3.8E-04	6.5E-04	5.5E-04
E	Emission rate (lb/hr)	3.2E-05	1.0E-05	1.8E-05	1.5E-05
Carbon disulfide					
C	Concentration (mg/dscm)	<0.0E+00	<0.0E+00	1.1E-02	<2.8E-03
C	Concentration (ppm)	<0.0E+00	<0.0E+00	3.6E-03	<8.9E-04
E	Emission rate (lb/hr)	<0.0E+00	<0.0E+00	7.8E-05	<1.9E-05
Acetone					
C	Concentration (mg/dscm)	3.6E-03	<0.0E+00	3.4E-03	<1.7E-03
C	Concentration (ppm)	1.5E-03	<0.0E+00	1.4E-03	<7.2E-04
E	Emission rate (lb/hr)	2.4E-05	<0.0E+00	2.3E-05	<1.2E-05
Methylene chloride					
C	Concentration (mg/dscm)	3.4E-03	5.1E-03	1.1E-03	2.4E-03
C	Concentration (ppm)	9.6E-04	1.4E-03	3.2E-04	6.8E-04
E	Emission rate (lb/hr)	2.3E-05	3.5E-05	7.8E-06	1.6E-05
Benzene					
C	Concentration (mg/dscm)	2.2E-03	2.1E-03	2.5E-03	1.7E-03
C	Concentration (ppm)	6.9E-04	6.4E-04	7.6E-04	5.2E-04
E	Emission rate (lb/hr)	1.5E-05	1.4E-05	1.7E-05	1.2E-05

[1] The volumetric flow rates were obtained from the Velocity/Moisture Parameters.
A complete list of analyzed VOST compounds are presented in Appendix B and G.
<0.0E+00 Indicates sample analysis of compound was below detectable limit.
< Indicates average includes one or more runs with compound below detectable limit.

RESULTS

Table 2-4:
Exhaust Stack – VOST, Run 2

Run No.		2A	2B	2C	Average
Date (2000)		May 17	May 17	May 17	
Start Time		14:24	15:24	17:10	
Stop Time (approx.)		15:04	17:01	17:50	
Volumetric Flow Rate[1]					
Qa	Actual conditions (acfm)	7,369	7,369	7,369	7,369
Qstd	Standard conditions (dscfm)	1,829	1,829	1,829	1,829
Chloromethane					
C	Concentration (mg/dscm)	<0.0E+00	<0.0E+00	2.9E-03	<7.2E-04
C	Concentration (ppm)	<0.0E+00	<0.0E+00	1.4E-03	<3.4E-04
E	Emission rate (lb/hr)	<0.0E+00	<0.0E+00	2.0E-05	<4.9E-06
Bromomethane					
C	Concentration (mg/dscm)	2.2E-03	3.8E-03	1.5E-03	1.9E-03
C	Concentration (ppm)	5.6E-04	9.6E-04	3.9E-04	4.8E-04
E	Emission rate (lb/hr)	1.5E-05	2.6E-05	1.1E-05	1.3E-05
Acetone					
C	Concentration (mg/dscm)	9.4E-03	7.2E-03	8.4E-03	6.3E-03
C	Concentration (ppm)	3.9E-03	3.0E-03	3.5E-03	2.6E-03
E	Emission rate (lb/hr)	6.5E-05	4.9E-05	5.7E-05	4.3E-05
Methylene chloride					
C	Concentration (mg/dscm)	4.5E-03	3.2E-03	1.0E-03	2.2E-03
C	Concentration (ppm)	1.3E-03	9.1E-04	2.8E-04	6.1E-04
E	Emission rate (lb/hr)	3.1E-05	2.2E-05	6.8E-06	1.5E-05
Benzene					
C	Concentration (mg/dscm)	2.1E-03	2.1E-03	3.6E-03	2.0E-03
C	Concentration (ppm)	6.6E-04	6.3E-04	1.1E-03	6.0E-04
E	Emission rate (lb/hr)	1.5E-05	1.4E-05	2.5E-05	1.3E-05

[1] The volumetric flow rates were obtained from the Velocity/Moisture Parameters.
A complete list of analyzed VOST compounds are presented in Appendix B and G.
<0.0E+00 Indicates sample analysis of compound was below detectable limit.
< Indicates average includes one or more runs with compound below detectable limit.

RESULTS

Table 2-5:
Exhaust Stack – VOST, Run 3

Run No.		3A	3B	3C	Average
Date (2000)		May 18	May 18	May 18	
Start Time		07:43	08:32	09:20	
Stop Time		08:23	09:12	10:00	
Volumetric Flow Rate[1]					
Qa	Actual conditions (acfm)	6,775	6,775	6,775	6,775
Qstd	Standard conditions (dscfm)	1,678	1,678	1,678	1,678
Chloromethane					
C	Concentration (mg/dscm)	<0.0E+00	4.0E-03	<0.0E+00	<9.9E-04
C	Concentration (ppm)	<0.0E+00	1.9E-03	<0.0E+00	<4.7E-04
E	Emission rate (lb/hr)	<0.0E+00	2.5E-05	<0.0E+00	<6.2E-06
Bromomethane					
C	Concentration (mg/dscm)	1.2E-03	1.7E-03	2.0E-03	1.2E-03
C	Concentration (ppm)	3.0E-04	4.4E-04	5.0E-04	3.1E-04
E	Emission rate (lb/hr)	7.5E-06	1.1E-05	1.2E-05	7.7E-06
Acetone					
C	Concentration (mg/dscm)	9.7E-03	1.1E-02	3.4E-03	5.9E-03
C	Concentration (ppm)	4.0E-03	4.4E-03	1.4E-03	2.5E-03
E	Emission rate (lb/hr)	6.1E-05	6.7E-05	2.1E-05	3.7E-05
Methylene chloride					
C	Concentration (mg/dscm)	6.0E-03	4.8E-03	1.4E-03	3.1E-03
C	Concentration (ppm)	1.7E-03	1.4E-03	4.0E-04	8.7E-04
E	Emission rate (lb/hr)	3.8E-05	3.0E-05	8.8E-06	1.9E-05
Chloroform					
C	Concentration (mg/dscm)	<0.0E+00	<0.0E+00	1.35E-03	<3.4E-04
C	Concentration (ppm)	<0.0E+00	<0.0E+00	2.72E-04	<6.8E-05
E	Emission rate (lb/hr)	<0.0E+00	<0.0E+00	8.47E-06	<2.1E-06
Benzene					
C	Concentration (mg/dscm)	2.9E-03	2.8E-03	2.3E-03	2.0E-03
C	Concentration (ppm)	8.9E-04	8.5E-04	7.2E-04	6.1E-04
E	Emission rate (lb/hr)	1.8E-05	1.7E-05	1.5E-05	1.3E-05
Toluene					
C	Concentration (mg/dscm)	5.0E-04	<0.0E+00	<0.0E+00	<1.2E-04
C	Concentration (ppm)	1.3E-04	<0.0E+00	<0.0E+00	<3.2E-05
E	Emission rate (lb/hr)	3.1E-06	<0.0E+00	<0.0E+00	<7.8E-07

[1] The volumetric flow rates were obtained from the Velocity/Moisture Parameters.
A complete list of analyzed VOST compounds are presented in Appendix B and G.
<0.0E+00 Indicates sample analysis of compound was below detectable limit.
< Indicates average includes one or more runs with compound below detectable limit.

DESCRIPTION OF INSTALLATION

IT Corporation operates an Indirect Fired Thermal Drying System (TDS) to dry sludges. The plant utilizes natural gas as a fuel and is equipped with several pieces of emission control equipment which include a scrubber (V-5001), subcool quench (V-5002), a wet electrostatic precipitator (S-5004), two High Efficiency Particulate Air filters in parallel (FX-5004A, B) and a thermal oxidizer (F-5001).

The testing reported in this document was performed at the exhaust stack (X-5001).

A complete description of the TDS can be found in Appendix G.

METHODOLOGY

The sampling followed procedures as detailed in U.S. Environmental Protection Agency (EPA) Methods 2, 3, 3A, 4, 5, 10, 25A and 0030. The following table summarizes the methods and their respective sources.

Table 4-1:
Summary of Sampling Procedures

Title 40 CFR Part 60 Appendix A	
Method 1	"Sample and Velocity Traverses for Stationary Sources"
Method 2	"Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)"
Method 3	"Gas Analysis for the Determination of Dry Molecular Weight"
Method 3A	"Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)"
Method 4	"Determination of Moisture Content in Stack Gases"
Method 5	"Determination of Particulate Emissions from Stationary Sources"
Method 10	"Determination of Carbon Monoxide Emissions from Stationary Sources"
Method 25A	"Determination of Total Gaseous Organic Concentrations using a Flame Ionization Analyzer (FIA)"
EPA SW-846, Test Methods for Evaluating Solid Waste, Volume II	
Method 0030	"Volatile Organic Sampling Train"

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

Major aspects of the sampling, recovery and analytical procedures are summarized on pages 4-2 through 4-10.

All equipment except sampling nozzles were calibrated at Clean Air Engineering's laboratory prior to shipment to the project site. The nozzles were calibrated on-site prior to testing. Following the test program, the validity of the dry gas meters was checked using a critical orifice. This validity check was then used as a post-test meter calibration in accordance with EPA Method 5, Section 7.2.1. A copy of all equipment certifications are presented in Appendix Section C.

METHODOLOGY

SAMPLING POINT DETERMINATION

Sampling point locations were determined according to EPA Method 1.

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

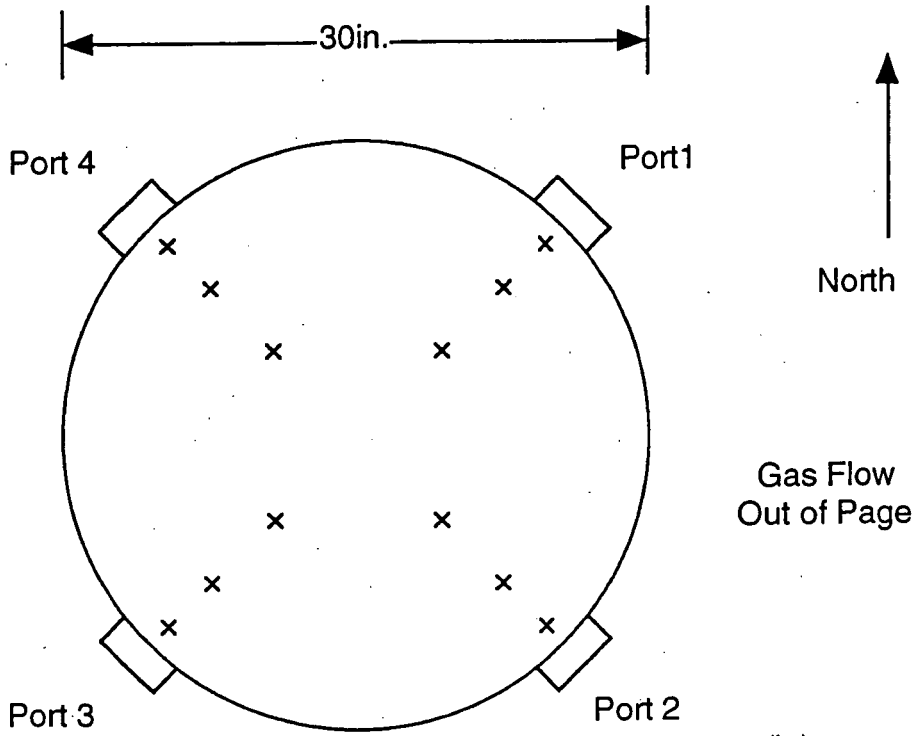
Table 4-2:
Sampling Points

Location	Constituent	Method	Run No.	Ports	Points per Port	Minutes per Point	Total Minutes	Figure
Stack	Particulate	5	1	2	6	30	360	4-1
Stack	CO, THC[1]	10, 25A	1-3	1	1	60	60	4-1
Stack	VOST[2]	0030	1-3	1	1	40	160	4-1

[1] CO and THC was sampled from the approximate center of the duct.
[2] VOST was sampled from the approximate center of the duct. Each run consisted of four 40 minute sample segments.

METHODOLOGY

SAMPLING POINT DETERMINATION (CONTINUED)



Traverse-Sampling Point	Port to Point Distance (in.)
1	28.7
2	25.6
3	21.1
4	8.9
5	4.4
6	1.3

Diameters to upstream disturbance: 9.2 — Limit: 2.0 minimum
Diameters to downstream disturbance: 6.8 — Limit: 0.5 minimum

Figure 4-1: TDS Stack Sampling Point Determination (EPA Method 1)

METHODOLOGY

VELOCITY AND VOLUMETRIC FLOW RATE - EPA METHOD 2

EPA Method 2 was used, in conjunction with other testing, to determine the gas velocity and flow rate at the exhaust stack.

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

COMPOSITION AND MOLECULAR WEIGHT - EPA METHOD 3

In order to determine the oxygen (O_2) concentration, carbon dioxide (CO_2) concentration and gas molecular weight, a time-integrated sample of the gas was obtained and analyzed in accordance with EPA Method 3. The gas sample was collected into a Tedlar sample bag and analyzed for O_2 and CO_2 concentrations using an Orsat gas analyzer.

MOISTURE CONTENT - EPA METHOD 4

The flue gas moisture content at the exhaust stack was determined in accordance with EPA Method 4, in conjunction with method 2 testing. The gas moisture was determined by quantitatively condensing the water in chilled impingers. The amount of moisture condensed was determined gravimetrically. A dry gas meter was used to measure the volume of gas sampled. The amount of water condensed and the volume of gas sampled were used to calculate the gas moisture content in accordance with EPA Method 4.

PARTICULATE EMISSIONS - EPA METHOD 5

EPA Method 5 was used to measure particulate matter at the exhaust stack. This method defines particulate matter as any material that is collected before or on the surface of a glass fiber filter. Stack gas was isokinetically withdrawn through a temperature-controlled probe and high-efficiency glass fiber filter.

Figure 4-2 illustrates the EPA Method 5 sampling apparatus which was used. The sampling apparatus contained glass lined temperature-controlled probe equipped with a Type S pitot tube (for measuring stack gas flow rate) and a sharp-edged glass button-hook nozzle. The exit of the probe was connected to a high efficiency glass fiber filter supported in a glass filter holder inside an oven. The exit of the filter holder connected to a series of four full size impingers. The first two impingers each contained 100 milliliters of distilled water. The third impinger was empty, and the fourth contained a tared quantity of silica gel. The impingers were immersed in an ice bath for the duration of each test.

METHODOLOGY

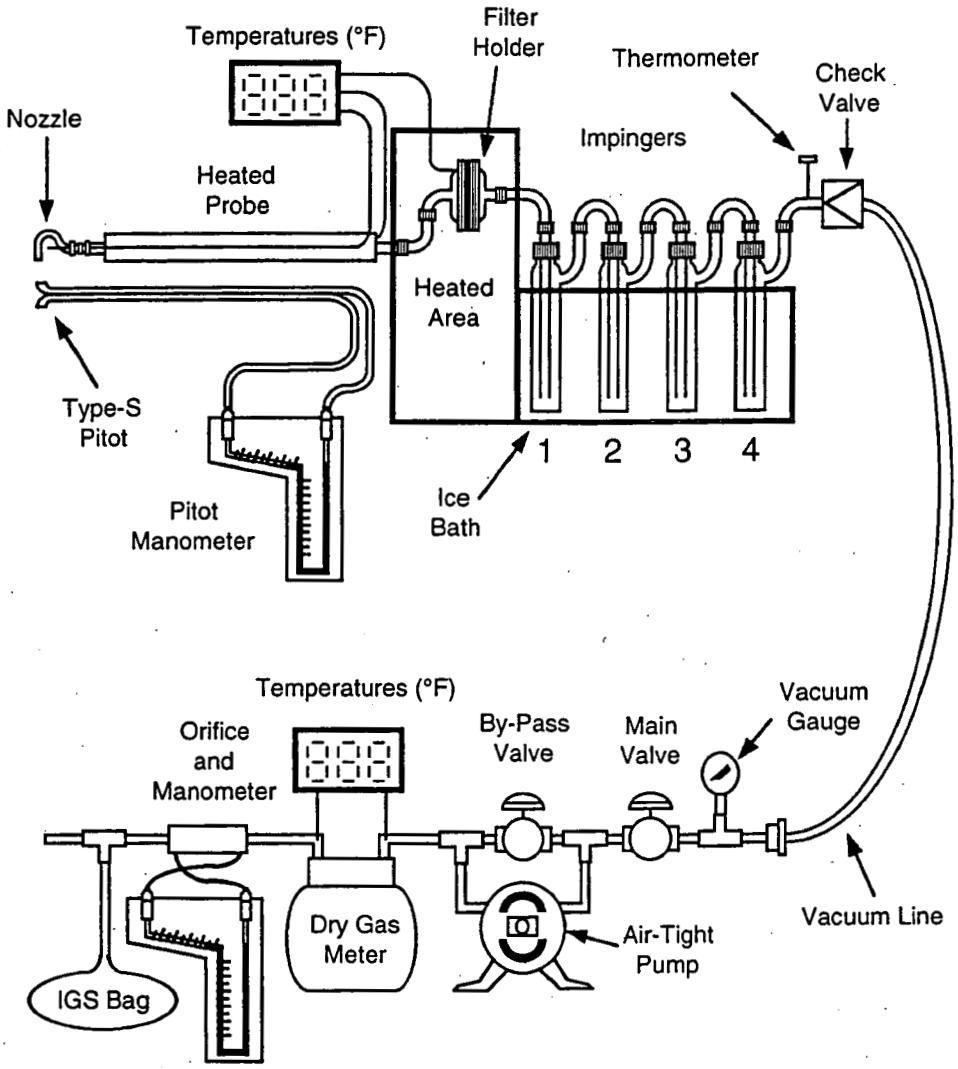
Procedures for selecting sampling locations and for operation of the apparatus were derived from EPA Method 5 and associated EPA Methods 1 through 4. The sampling apparatus was leak-checked before and after each test run. Sampling was performed at an isokinetic rate greater than 90% and less than 110%.

At the conclusion of each test run, the probe and nozzle were rinsed and brushed with acetone. The acetone rinse was collected into a glass sample container. The glass fiber filter and associated particulate catch were recovered quantitatively into the original filter container and sealed. The volume of water collected in the impinger apparatus was measured and the water archived.

Particulate samples collected on Whatman 934 AH glass fiber filters were analyzed gravimetrically to a constant weight. The probe and nozzle wash was transferred to tared beakers, evaporated to dryness and weighed to a constant weight. The weight differentials of the filter and acetone washes were combined to determine total particulate matter. The particulate analysis was performed by Clean Air Engineering located in Palatine, Illinois.

METHODOLOGY

PARTICULATE EMISSIONS (CONTINUED)



Impinger Contents
1) 100 ml water
2) 100 ml water
3) empty
4) 300 g silica gel

Figure 4-2: Particulate Sampling Apparatus (EPA Method 5)

METHODOLOGY

CONTINUOUS EMISSIONS MONITORING

Monitoring of carbon monoxide (CO) and total hydrocarbons (THC) emissions at the stack was performed using a combination of EPA Methods 10 and 25A. In addition to the pollutant monitoring, oxygen (O_2) and carbon dioxide (CO_2) concentrations were also monitored using EPA Method 3A. A gas sample was continuously extracted from the stack and delivered to a series of gas analyzers which measured the pollutant or diluent concentrations in the gas. The analyzers were calibrated on-site using certified mixtures of calibration gases.

Figure 4-3 contains a general schematic of the continuous emissions monitoring (CEM) system. The system utilized a heated stainless steel probe for gas withdrawal. The end of the probe was connected to a heated Teflon sample line which delivered the sample gases from the stack to the CEM system. The heated sample line was designed to maintain the gas temperature above 250°F in order to prevent condensation of stack gas moisture within the line.

Table 4-3 lists the analyzers used to perform the continuous emissions monitoring.

Table 4-3
Gas Analyzers

GAS	METHOD	REFERENCE ANALYZER MANUFACTURER	PRINCIPLE OF OPERATION
O_2	EPA 3A	Servomex 1420B	Paramagnetic
CO_2	EPA 3A	Servomex 1400	NDIR
CO	EPA 10	TECO 48	Gas Filter Correlation NDIR
THC	EPA 25A	J.U.M. Engineering VE-7	Flame Ionization Detection (FID)

Determination of O_2, CO_2 and CO Concentrations
EPA Methods 3A, 6C, 7E and 10

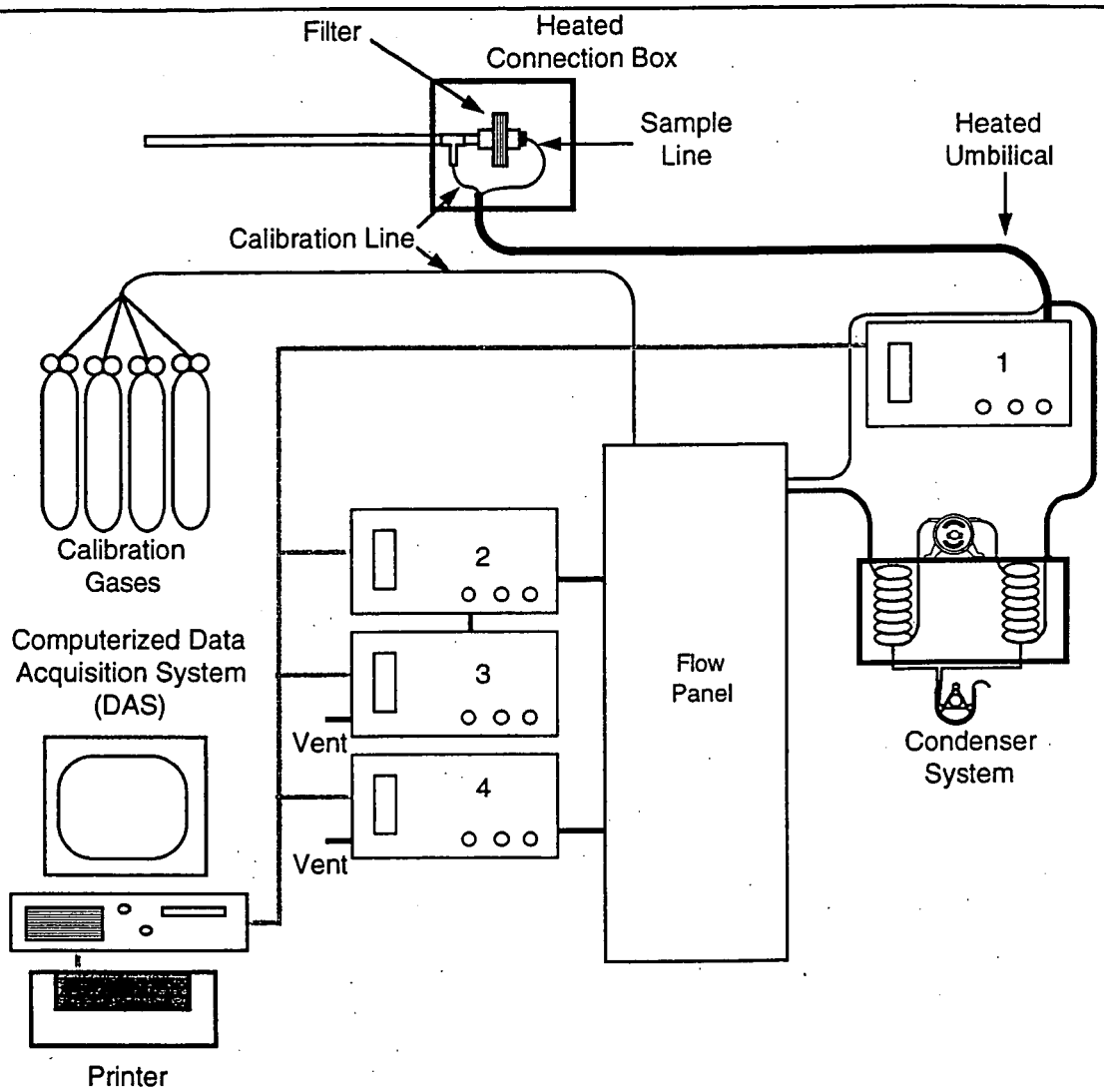
Before entering the analyzers, the gas sample was split into two streams. One stream passed directly into a refrigerated condenser which cooled the gas to approximately 35°F to remove the stack gas moisture. After passing through the condenser, the dry gas entered a Teflon-head diaphragm pump and a flow control panel which delivered the gas in series to the O_2, CO_2 and CO analyzers. Each of these analyzers measured the respective gas concentrations on a dry volumetric basis.

Determination of THC Concentrations - EPA Method 25A

The other gas stream remained heated and was transported through a Teflon line directly into the THC analyzer, which measured the gas on a wet volumetric basis. The THC analyzer contained a separate heated pump for gas delivery.

METHODOLOGY

CONTINUOUS EMISSIONS MONITORING (CONTINUED)



No	Gas	Monitor	Range Used	Calibration Gas Concentrations
1)	THC	J.U.M. Engineering VE-7	0 – 100 ppm	8.56, 24.96, 55.13, 84.4 ppm
2)	O_2	Servomex 1420B	0 – 25 %	6.05, 14.0 %
3)	CO_2	Servomex 1400	0 - 25%	6.03, 13.98 %
4)	CO	TECO 48	0 – 100 ppm	25.44, 59.1, 89.0 ppm

Figure 4-3: CEM Apparatus (EPA Methods 3A, 10 and 25A)

METHODOLOGY

CONTINUOUS EMISSIONS MONITORING (CONTINUED)

Each of the analyzers was calibrated according to the respective reference method procedures. Before testing, each analyzer was checked for calibration error by introducing a zero, mid-level and high level certified calibration gas directly into the analyzer. All of the reference method criteria for calibration error were demonstrated for each analyzer before testing could proceed.

EPA Protocol No. 1 certified calibration mixtures were used to calibrate the analyzers. The THC analyzer was calibrated with propane. All calibration gases were blended with nitrogen.

Before and after each of the three test runs, the zero gas and one up-scale gas for each analyzer was introduced into the sampling line at the exit of the heated probe to check for sampling system bias and calibration drift. The demonstration of reference method criteria for bias (pre- and post-test) and calibration drift was required for a valid test run. The results of the pre-test and post-test bias checks were used to correct the average flue gas concentration measured during each test run for analyzer drift during that period.

VOLATILE ORGANIC COMPOUNDS - SW-846 METHOD 0030

Sampling for volatile organic compounds (VOC) was performed in accordance with SW-846 Method 0030. This sampling train is commonly referred to as the volatile organic sampling train (VOST). A schematic of the sampling train is shown in Figure 4-4.

Each run consisted of four 40 minutes sets of samples, labeled A, B, C and D. Sample volume collected per set was approximately 20L. Sample set D was collected in case the prior sets were damaged. No analysis was conducted on these sets..

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

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

METHODOLOGY

The samples were analyzed for VOCs in accordance with SW-846 Methods 8240 and 5040. All of the organic analytical work was subcontracted to Philip Analytical Services located in Burlington, Ontario, Canada. Each cartridge was analyzed separately. The condensate for each set (A-D) was consolidated on site and analyzed as such. The internal standards were added to each VOST tube or the condensate immediately prior to analysis by gas chromatography and mass spectrometry (GC/MS). A summary report for the analysis is included in Appendix section G.

VOLATILE ORGANIC COMPOUNDS (CONTINUED)

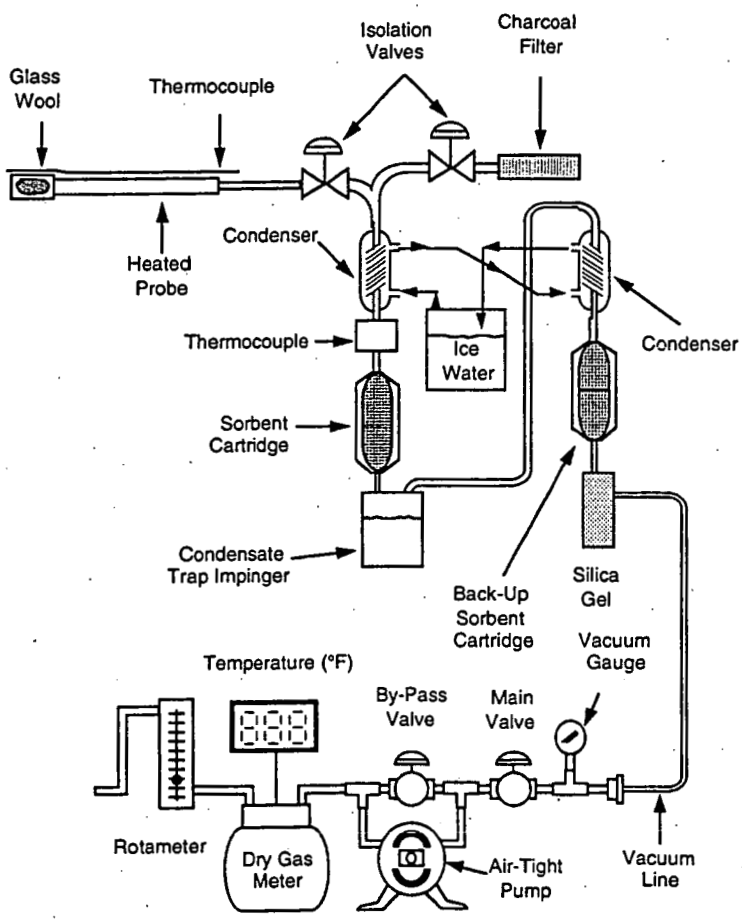


Figure 4-4: VOST Sampling Apparatus (EPA SW-846 Method 0030)

3050

APPENDIX

SAMPLE CALCULATIONS ..... A
PARAMETERS ..... B
CALIBRATION DATA C
FIELD DATA ..... D
FIELD DATA PRINTOUTS ..... E
LABORATORY DATA ..... F
PERFORMANCE CRITERIA TEST PLAN ..... G
SYSTEM OPERATING PARAMETERS AND CHRONOLOGY ..... H

SAMPLE CALCULATIONS

A

SAMPLE CALCULATIONS

3050

The tables presenting the results are generated electronically from raw data. It may not be possible to exactly duplicate these results using a calculator. The reference method data, results and all calculations are carried to sixteen decimal places throughout. The final table is formatted to an appropriate number of significant figures.

1. Volume of water collected (wscf)

$$V_{wstd} = (0.04707)(V_{lc})$$

Where:

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

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

$$V_{mstd} = \frac{(17.64)(V_m)\left(P_{bar} + \frac{\Delta H}{13.6}\right)(Y_d)}{(460 + T_m)}$$

Where:

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

3. Sample gas pressure (in. Hg)

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

Where:

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

4. Actual vapor pressure (in. Hg)[1]

$$P_v = P_s$$

Where:

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

[1] For effluent gas temperatures over 212°F, P_v is assumed to be equal to P_s.

SAMPLE CALCULATIONS (CONTINUED)

5. Moisture content (%)

$$B_{wo} = \frac{V_{wstd}}{V_{mstd} + V_{wstd}} \times 100\%$$

Where:

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

6. Saturated moisture content (%)

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

Where:

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

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

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

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

Where:

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

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

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

Where:

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

SAMPLE CALCULATIONS (CONTINUED)

3050

9. Velocity of sample gas (ft/sec)

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

Where:

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

10. Total flow of sample gas (acfm)

$$Q_a = (60)(A_s)(V_s)$$

Where:

A_s	cross sectional area of sampling location (ft^2)
Q_a	volumetric flow rate at actual conditions (acfm)
V_s	sample gas velocity (ft/sec)
60	conversion factor (sec/min)

11. Total flow of sample gas (dscfm)

$$Q_{std} = \frac{(Q_a)(P_s)(17.64)(1-B_{wo})}{(\overline{T_s}+460)}$$

Where:

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

12. Particulate concentration (gr/dscf)

$$C_{gr/dscf} = \frac{(15.43)(m_n)}{V_{mstd}}$$

Where:

$C_{gr/dscf}$	measured concentration in the gas stream (gr/dscf)
m_n	total amount of particulate matter collected, corrected for applicable reagent blank (g)
V_{mstd}	volume of gas sample through the dry gas meter at standard conditions (ft^3)
15.43	conversion factor (gr/g)

SAMPLE CALCULATIONS (CONTINUED)

13. Particulate concentration (g/dscm)

$$C_{g/dscm} = (M_n)\frac{(35.31)}{(V_{mstd})}$$

Where:

$C_{g/dscm}$	measured concentration in the gas stream (g/dscm)
m_n	total amount of particulate matter collected, corrected for applicable reagent blank (g)
V_{mstd}	volume of gas sample through the dry gas meter at standard conditions (ft^3)
15.43	conversion factor (ft^3/m^3)

14. Particulate concentration (gr/acf)

$$C_{gr/acf} = \left(C_{gr/dscf}\right)\left(\frac{Q_{std}}{Q_a}\right)$$

Where:

$C_{gr/dscf}$	measured concentration in the gas stream (gr/dscf)
$C_{gr/acf}$	measured concentration in the gas stream (gr/acf)
Q_a	volumetric flow rate at actual conditions (acfm)
Q_{std}	volumetric flow rate at standard conditions, dry basis (dscfm)

15. Particulate emission (lb/hr)

$$E_{lb/hr} = \frac{\left(C_{gr/dscf}\right)\left(Q_{std}\right)(60)}{7,000}$$

Where:

$C_{gr/dscf}$	measured concentration in the gas stream (gr/dscf)
$E_{lb/hr}$	emission rate (lb/hr)
Q_{std}	volumetric flow rate at standard conditions, dry basis (dscfm)
60	conversion factor (min/hr)
7,000	conversion factor (gr/lb)

16. Particulate emission (tons/yr)

$$E_{tons/yr} = \frac{\left(C_{gr/dscf}\right)\left(Q_{std}\right)(60)(8760)}{7,000(2000)}$$

Where:

$C_{gr/dscf}$	measured concentration in the gas stream (gr/dscf)
$E_{lb/hr}$	emission rate (lb/hr)
Q_{std}	volumetric flow rate at standard conditions, dry basis (dscfm)
60	conversion factor (min/hr)
7,000	conversion factor (gr/lb)
8760	conversion factor (hrs/yr)
2,000	conversion factor (lbs/ton)

SAMPLE CALCULATIONS (CONTINUED)

17. Percent isokinetic (%)

$$I = \frac{(0.09450)(\overline{T_s} + 460)(V_{mstd})}{(P_s)(V_s)\left(\frac{(D_n)^2(\pi)}{(144)(4)}\right)(\Theta)(1 - B_{wo})}$$

Where:

D_n	diameter of nozzle (in)
B_{wo}	proportion of water vapor in the gas stream by volume
I	percent of isokinetic sampling (%)
P_s	absolute sample gas pressure (in. Hg)
T_s	average sample gas temperature (°F)
V_{mstd}	volume of gas sample through the dry gas meter at standard conditions (ft^3)
V_s	sample gas velocity (ft/sec)
Θ	total sampling time (min)
0.09450	constant
460	°F to °R conversion constant

18. Continuous emissions monitoring for total hydrocarbons (drift corrected in ppmwv)[1]

$$C_{gas} = \left((C_{avg}) - \left(\frac{C_{oi} + C_{of}}{2}\right)\right)\frac{(C_{ma})}{\left(\left(\frac{C_{mi} + C_{mf}}{2}\right) - \left(\frac{C_{oi} + C_{of}}{2}\right)\right)}$$

Where:

C_{gas}	concentration corrected for drift (ppmwv)
C_{avg}	measured concentration in the gas stream (ppmwv)
C_{ma}	actual concentration of the upscale calibration gas (ppm)
C_{mi}	initial system calibration bias check response for the upscale calibration gas (ppm)
C_{mf}	final system calibration bias check response for the upscale calibration gas (ppm)
C_{oi}	initial system calibration bias check response for the zero gas (ppm)
C_{of}	final system calibration bias check response for the zero gas (ppm)

19. Continuous emissions monitoring for total hydrocarbons as propane (moisture corrected to ppmdv)[1]

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

Where:

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

[1] The calculations for carbon monoxide are performed in a similar manner.

SAMPLE CALCULATIONS (CONTINUED)

20. Continuous emissions monitoring for total hydrocarbons (lb/hr)[1]

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

Where:

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

21. Organic compound concentration (lb/dscf)

$$C_{lb/dscf} = \frac{(m)}{(453.59)(10^6)(V_{mstd})}$$

Where:

$C_{lb/dscf}$	measured concentration in the gas stream (lb/dscf)
m	total mass of compound collected (μg)
V_{mstd}	volume of gas sample through the dry gas meter at standard conditions (ft^3)
10^6	conversion factor micrograms to grams (μg/g)
453.59	conversion factor grams to pounds (g/lb)

22. Organic compound concentration (gr/dscf)

$$C_{gr/dscf} = (C_{lb/dscf})(7000)$$

Where:

$C_{lb/dscf}$	measured concentration in the gas stream (lb/dscf)
7000	conversion factor pounds to grains (lb/gr)

23. Organic compound concentration (mg/dscm)

$$C_{mg/dscm} = \frac{(m)(35.31)}{(V_{mstd})(1000)}$$

Where:

$C_{mg/dscm}$	measured concentration in the gas stream (mg/dscm)
m	total mass of compound collected (μg)
V_{mstd}	volume of gas sample through the dry gas meter at standard conditions (ft^3)
35.31	conversion factor cubic feet to cubic meter (ft^3/m^3)
1000	conversion factor micrograms to milligrams (μg/mg)

[1] The calculations for carbon monoxide are performed in a similar manner, using the molecular weight 28.01.

SAMPLE CALCULATIONS (CONTINUED)

3050

24. Organic compound concentration (ppm)

$$C_{ppm} = \frac{(C_{lb/dscf})(385.3)(10^6)}{(MW)}$$

Where:

C_{ppm}	concentration calibrated for drift (ppm, propane)
$C_{lb/dscf}$	measured concentration in the gas stream (lb/dscf)
385.3	molar volume of 1 lb-mole of air at STP.
10^6	conversion factor (ppm)
MW	molecular weight of organic compound

25. Organic compound emission (lb/hr)

$$E_{lb/hr} = \frac{(C_{lb/dscf})(Q_{std})}{(60)}$$

Where:

$C_{gr/dscf}$	measured concentration in the gas stream (lb/dscf)
$E_{lb/hr}$	emission rate (lb/hr)
Q_{std}	volumetric flow rate at standard conditions, dry basis (dscfm)
60	conversion factor (min/hr)

PARAMETERS

B

IT CORPORATION
CAE Project No: 8705
Thermal Oxidizer Stack

VELOCITY AND MOISTURE PARAMETERS

Run No.		1
Date (2000)		May 17
Start Time (approx.)		17:36
Stop Time (approx.)		18:36
Sampling Conditions		
Y_d	Dry gas meter correction factor	1.0072
C_p	Pitot tube coefficient	0.84
P_g	Static pressure (in. H_2O)	-0.2
A_s	Sample location area (ft^2)	4.28
P_{bar}	Barometric pressure (in. Hg)	29.40
O_2	Oxygen (dry volume %)	8.5
CO_2	Carbon dioxide (dry volume %)	4.0
V_{lc}	Liquid collected (ml)	93.3
V_m	Volume metered, meter conditions (ft^3)	44.47
T_m	Dry gas meter temperature (°F)	76
T_s	Sample temperature (°F)	1,437
ΔH	Meter box orifice pressure drop (in. H_2O)	2.00
Flow Results		
V_{wstd}	Volume of water collected (ft^3)	4.39
V_{mstd}	Volume metered, standard (ft^3)	43.56
P_s	Sample gas pressure, absolute (in. Hg)	29.39
P_v	Vapor pressure, actual (in. Hg)	29.39
B_{wo}	Moisture in sample (% by volume)	9.16
B_{ws}	Saturated moisture (% by volume)	100.00
$\sqrt{\Delta P}$	Velocity head ($\sqrt{\text{in.}}$ H_2O)	0.263
M_d	MW of sample gas, dry (lb/lb-mole)	28.98
M_s	MW of sample gas, wet (lb/lb-mole)	27.97
V_s	Velocity of sample (ft/sec)	28.7
Q_a	Volumetric flow rate, actual (acfm)	7,369
Q_{std}	Volumetric flow rate, standard (dscfm)	1,829

IT CORPORATION
CAE Project No: 8705
Thermal Oxidizer Stack

PARTICULATE
VELOCITY AND MOISTURE PARAMETERS

Run No.		**2**
Date (2000)		May 18
Start Time (approx.)		07:38
Stop Time (approx.)		13:57
Sampling Conditions		
Y_d	Dry gas meter correction factor	1.0072
C_p	Pitot tube coefficient	0.84
P_g	Static pressure (in. H_2O)	-0.1
A_s	Sample location area (ft^2)	4.28
P_{bar}	Barometric pressure (in. Hg)	29.40
D_n	Nozzle diameter (in.)	0.580
O_2	Oxygen (dry volume %)	7.3
CO_2	Carbon dioxide (dry volume %)	3.9
V_{lc}	Liquid collected (ml)	572.4
V_m	Volume metered, meter conditions (ft^3)	271.02
T_m	Dry gas meter temperature (°F)	85
T_s	Sample temperature (°F)	1,438
ΔH	Meter box orifice pressure drop (in. H_2O)	2.02
Θ	Total sampling time (min)	360
Flow Results		
V_{wstd}	Volume of water collected (ft^3)	26.94
V_{mstd}	Volume metered, standard (ft^3)	261.22
P_s	Sample gas pressure, absolute (in. Hg)	29.39
P_v	Vapor pressure, actual (in. Hg)	29.39
B_{wo}	Moisture in sample (% by volume)	9.35
B_{ws}	Saturated moisture (% by volume)	100.00
$\sqrt{\Delta P}$	Velocity head ($\sqrt{\text{in. } H_2O}$)	0.242
M_d	MW of sample gas, dry (lb/lb-mole)	28.92
M_s	MW of sample gas, wet (lb/lb-mole)	27.90
V_s	Velocity of sample (ft/sec)	26.4
%I	Isokinetic sampling (%)	100.8
Q_a	Volumetric flow rate, actual (acfm)	6,775
Q_{std}	Volumetric flow rate, standard (dscfm)	1,678

IT CORPORATION
CAE Project No: 8705
Thermal Oxidizer Stack

PARTICULATE WEIGHT SHEET

Run No.		Blank	2	
Date (2000)			May 18	
Start Time (approx.)			07:38	
Stop Time (approx.)			13:57	
Front Half Acetone Wash				
ID	Identifier	xx18	f55	
	Sample volume (ml)	200	150	
	Aliquot used (ml)	200	150	
	Tare weight (g)	107.7209	124.8304	
	Gross weight (g)	107.7210	124.8321	
	Correction factor (g)		0.0001	detection limit
	Net weight (g)	0.0001	0.0016	0.0001
Front Half Filter				
ID	Identifier		203421	
	Tare weight (g)		0.3162	
	Gross weight (g)		0.3180	
	Net weight (g)		0.0018	
Total Front Half Particulate				
m_n	Matter collected (g)		0.0034	

IT CORPORATION
CAE Project No: 8705
Thermal Oxidizer Stack

PARTICULATE PARAMETERS

Run No.		**2**
Date (2000)		May 18
Start Time (approx.)		07:38
Stop Time (approx.)		13:57
Gas Conditions		
O_2	Oxygen (dry volume %)	7.3
CO_2	Carbon dioxide (dry volume %)	3.9
T_s	Sample temperature (°F)	1438
V_{mstd}	Volume metered, standard (ft^3)	261.22
B_{wo}	Moisture (volume %)	9.35
Volumetric Flow Rate		
Q_s	Volumetric flow rate, actual (acfm)	6,775
Q_{std}	Volumetric flow rate, standard (dscfm)	1,678
Particulate		
m_n	Matter collected (g)	0.0034
C	Concentration (gr/acf)	0.00005
C	Concentration (gr/dscf)	0.00020
C	Concentration (g/dscm)	0.00046
E	Emission rate (lb/hr)	0.0029
E	Emission rate (tons/yr)	0.013

IT Corporation @ WPRAP; Fernald, Ohio
CAE Project No: 8705
Thermal Oxidizer Stack

CEM PARAMETERS

Run No.		1	2	3
Date (2000)		May 17	May 17	May 17
Start Time		11:15	12:33	13:51
Stop Time		12:15	13:33	15:04
Gas Conditions				
Ts	Temperature (°F)	1,437	1,437	1,437
O_2	Oxygen (dry volume %)	7.6	7.7	6.9
CO_2	Carbon Dioxide (dry volume %)	4.2	4.2	4.4
B_{wo}	Moisture in sample (% by volume)	9.16	9.16	9.16
Q_a	Volumetric flow rate, actual (acfm)	7,369	7,369	7,369
Q_{std}	Volumetric flow rate, standard (dscfm)	1,829	1,829	1,829
OXYGEN				
Data Acquisition				
C	Effluent gas concentration (%, dry)	7.5	7.7	6.9
Calibration Gases				
C_{oi}	Calibration bias check, initial zero gas	0.0	0.0	0.0
C_{mi}	Calibration bias check, initial upscale gas	6.0	6.0	6.0
C_{of}	Calibration bias check, final zero gas	0.0	0.0	0.0
C_{mf}	Calibration bias check, final upscale gas	6.0	6.0	6.0
C_{ma}	Actual concentration of upscale gas	6.05	6.05	6.05
Calculated Results				
C_{gas}	Concentration drift corrected (%, dry)	7.6	7.7	6.9
CARBON DIOXIDE				
Data Acquisition				
C	Effluent gas concentration (%, dry)	4.1	4.1	4.3
Calibration Gases				
C_{oi}	Calibration bias check, initial zero gas	0.0	0.0	0.0
C_{mi}	Calibration bias check, initial upscale gas	5.9	5.9	5.9
C_{of}	Calibration bias check, final zero gas	0.0	0.0	0.0
C_{mf}	Calibration bias check, final upscale gas	5.9	5.9	5.9
C_{ma}	Actual concentration of upscale gas	6.03	6.03	6.03
Calculated Results				
C_{gas}	Concentration drift corrected (%, dry)	4.2	4.2	4.4

IT Corporation @ WPRAP; Fernald, Ohio
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Thermal Oxidizer Stack

CEM PARAMETERS

Run No.		1	2	3
Date (2000)		May 17	May 17	May 17
Start Time		11:15	12:33	13:51
Stop Time		12:15	13:33	15:04
Gas Conditions				
Ts	Temperature (°F)	1,437	1,437	1,437
O_2	Oxygen (dry volume %)	7.6	7.7	6.9
CO_2	Carbon Dioxide (dry volume %)	4.2	4.2	4.4
B_{wo}	Moisture in sample (% by volume)	9.16	9.16	9.16
Q_a	Volumetric flow rate, actual (acfm)	7,369	7,369	7,369
Q_{std}	Volumetric flow rate, standard (dscfm)	1,829	1,829	1,829
CARBON MONOXIDE				
Data Acquisition				
C	Effluent gas concentration (ppmdv)	2.0	0.3	0.6
Calibration Gases				
C_{oi}	Calibration bias check, initial zero gas	0.6	0.4	0.2
C_{mi}	Calibration bias check, initial upscale gas	25.6	25.6	25.5
C_{of}	Calibration bias check, final zero gas	0.4	0.2	0.5
C_{mf}	Calibration bias check, final upscale gas	25.6	25.5	25.5
C_{ma}	Actual concentration of upscale gas	25.44	25.44	25.44
Calculated Results				
C_{gas}	Concentration drift corrected (ppmdv)	1.5	0.01	0.2
E	Emission rate (lb/hr)	0.012	0.000	0.002
E	Emission rate (ton/yr)	0.052	0.001	0.008
TOTAL HYDROCARBONS AS PROPANE				
Data Acquisition				
C	Effluent gas concentration (ppmwv)	0.6	0.1	0.2
Calibration Gases				
C_{oi}	Calibration bias check, initial zero gas	0.1	0.0	-0.1
C_{mi}	Calibration bias check, initial upscale gas	24.4	25.1	24.8
C_{of}	Calibration bias check, final zero gas	0.0	-0.1	0.0
C_{mf}	Calibration bias check, final upscale gas	25.1	24.8	25.0
C_{ma}	Actual concentration of upscale gas	24.96	24.96	24.96
Calculated Results				
C_{gas}	Concentration drift corrected (ppmwv)	0.6	0.1	0.3
C_{gas}	Concentration moisture corrected (ppmdv)	0.7	0.2	0.3
E	Emission rate (lb/hr)	0.009	0.002	0.004
E	Emission rate (ton/yr)	0.038	0.008	0.016

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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.		1A	1B	1C	1D
Date (2000)		May 17	May 17	May 17	May 17
Start Time (approx.)		10:36	11:28	12:20	13:09
Stop Time (approx.)		11:16	12:08	13:00	13:49
Sampling Conditions					
Yd	Dry gas meter correction factor	1.0027	1.0027	1.0027	1.0027
Pb	Barometric pressure (in. Hg)	29.40	29.40	29.40	29.40
Vm	Volume metered, meter conditions (liters)	31.10	21.56	21.44	22.05
Vm	Volume metered, meter conditions (ft3)	1.0982	0.7613	0.7571	0.7786
Tm	Dry gas meter temperature (°F)	80	87	91	93
ΔH	Meter box orifice pressure drop (in. H2O)	1.70	1.61	1.60	1.60
Calculated Results					
Vmstc	Volume metered, standard (ft3)	1.0613	0.7263	0.7178	0.7351
Flow Results[1]					
Qa	Volumetric flow rate, actual (acfm)	7,369	7,369	7,369	7,369
Qstd	Volumetric flow rate, standard (dscfm)	1,829	1,829	1,829	1,829

1 The flow results were obtained from the Velocity/Moisture Parameters.

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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.		1A	1B	1C
Date (2000)		May 17	May 17	May 17
Start Time (approx.)		10:36	11:28	12:20
Stop Time (approx.)		11:16	12:08	13:00
Chloromethane (MW=50.49)				
m	Matter collected (µg)	0.480	0.000	0.000
C	Concentration (lb/dscf)	9.97E-10		
C	Concentration (gr/dscf)	6.98E-06		
C	Concentration (mg/dscm)	1.60E-02		
C	Concentration (ppm)	7.61E-03		
E	Emission rate (lb/hr)	1.09E-04		
Vinyl Chloride (MW=62.50)				
m	Matter collected (µg)	0.000	0.000	0.000
Bromomethane (MW=94.95)				
m	Matter collected (µg)	0.139	0.031	0.052
C	Concentration (lb/dscf)	2.89E-10	9.41E-11	1.60E-10
C	Concentration (gr/dscf)	2.02E-06	6.59E-07	1.12E-06
C	Concentration (mg/dscm)	4.62E-03	1.51E-03	2.56E-03
C	Concentration (ppm)	1.17E-03	3.82E-04	6.48E-04
E	Emission rate (lb/hr)	3.17E-05	1.03E-05	1.75E-05
1,1-Dichloroethane (MW=98.97)				
m	Matter collected (µg)	0.000	0.000	0.000
Trichlorofluoromethane (MW=137.37)				
m	Matter collected (µg)	0.000	0.000	0.000
1,1-Dichloroethene (MW=96.94)				
m	Matter collected (µg)	0.000	0.000	0.000
Carbon disulfide (MW=76.14)				
m	Matter collected (µg)	0.000	0.000	0.230
C	Concentration (lb/dscf)			7.06E-10
C	Concentration (gr/dscf)			4.94E-06
C	Concentration (mg/dscm)			1.13E-02
C	Concentration (ppm)			3.57E-03
E	Emission rate (lb/hr)			7.75E-05
Acetone(MW=58.08)				
m	Matter collected (µg)	0.107	0.000	0.069
C	Concentration (lb/dscf)	2.22E-10		2.12E-10
C	Concentration (gr/dscf)	1.56E-06		1.48E-06
C	Concentration (mg/dscm)	3.56E-03		3.39E-03
C	Concentration (ppm)	1.47E-03		1.41E-03
E	Emission rate (lb/hr)	2.44E-05		2.33E-05

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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.		1A	1B	1C
Date (2000)		May 17	May 17	May 17
Start Time (approx.)		10:36	11:28	12:20
Stop Time (approx.)		11:16	12:08	13:00
Methylene chloride (MW=84.94)				
m	Matter collected (µg)	0.102	0.104	0.023
C	Concentration (lb/dscf)	2.12E-10	3.16E-10	7.06E-11
C	Concentration (gr/dscf)	1.48E-06	2.21E-06	4.94E-07
C	Concentration (mg/dscm)	3.39E-03	5.06E-03	1.13E-03
C	Concentration (ppm)	9.61E-04	1.43E-03	3.20E-04
E	Emission rate (lb/hr)	2.33E-05	3.46E-05	7.75E-06
1,2-Dichloroethene(total) (MW=96.95)				
m	Matter collected (µg)	0.000	0.000	0.000
Chloroform (MW=119.39)				
m	Matter collected (µg)	0.000	0.000	0.000
2-Butanone (MW=72.11)				
m	Matter collected (µg)	0.000	0.000	0.000
Carbon tetrachloride (MW=153.84)				
m	Matter collected (µg)	0.000	0.000	0.000
Benzene (MW=78.11)				
m	Matter collected (µg)	0.067	0.043	0.050
C	Concentration (lb/dscf)	1.39E-10	1.31E-10	1.54E-10
C	Concentration (gr/dscf)	9.74E-07	9.14E-07	1.07E-06
C	Concentration (mg/dscm)	2.23E-03	2.09E-03	2.46E-03
C	Concentration (ppm)	6.87E-04	6.44E-04	7.57E-04
E	Emission rate (lb/hr)	1.53E-05	1.43E-05	1.69E-05
Trichloroethene (MW=131.40)				
m	Matter collected (µg)	0.000	0.000	0.000
1,2-Dichloropropane (MW=112.99)				
m	Matter collected (µg)	0.000	0.000	0.000
1,2-Dichloroethane (MW=98.96)				
m	Matter collected (µg)	0.000	0.000	0.000
Bromodichloromethane (MW=163.83)				
m	Matter collected (µg)	0.000	0.000	0.000
cis-1,3-Dichloropropene (MW=110.98)				
m	Matter collected (µg)	0.000	0.000	0.000
trans-1,3-Dichloropropene (MW=110.98)				
m	Matter collected (µg)	0.000	0.000	0.000

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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.	1A	1B	1C
Date (2000)	May 17	May 17	May 17
Start Time (approx.)	10:36	11:28	12:20
Stop Time (approx.)	11:16	12:08	13:00
4-Methyl-2-pentanone (MW=100.16)			
m Matter collected (µg)	0.000	0.000	0.000
Toluene (MW=92.13)			
m Matter collected (µg)	0.000	0.000	0.000
Tetrachloroethene (MW=165.85)			
m Matter collected (µg)	0.000	0.000	0.000
Chlorobenzene (MW=112.56)			
m Matter collected (µg)	0.000	0.000	0.000
Ethylbenzene (MW=106.16)			
m Matter collected (µg)	0.000	0.000	0.000
Xylene(total) (MW=106.16)			
m Matter collected (µg)	0.000	0.000	0.000
1,1,1-Trichloroethane (MW=133.42)			
m Matter collected (µg)	0.000	0.000	0.000
Styrene (MW=104.14)			
m Matter collected (µg)	0.000	0.000	0.000
Dibromochloromethane (MW=208.28)			
m Matter collected (µg)	0.000	0.000	0.000
1,1,2-Trichloroethane (MW=133.42)			
m Matter collected (µg)	0.000	0.000	0.000
Bromoform (MW=252.77)			
m Matter collected (µg)	0.000	0.000	0.000
2-Hexanone (MW=100.16)			
m Matter collected (µg)	0.000	0.000	0.000
1,1,2,2-Tetrachloroethane (MW=167.86)			
m Matter collected (µg)	0.000	0.000	0.000

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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.		2A	2B	2C	2D
Date (2000)		May 17	May 17	May 17	May 17
Start Time (approx.)		14:24	15:24	17:10	17:59
Stop Time (approx.)		15:04	17:01	17:50	18:39
Sampling Conditions					
Yd	Dry gas meter correction factor	1.0027	1.0027	1.0027	1.0027
Pb	Barometric pressure (in. Hg)	29.40	29.40	29.40	29.40
Vm	Volume metered, meter conditions (liters)	25.10	25.10	20.79	22.64
Vm	Volume metered, meter conditions (ft3)	0.8863	0.8863	0.7341	0.7994
Tm	Dry gas meter temperature (°F)	88	79	80	84
ΔH	Meter box orifice pressure drop (in. H2O)	1.59	1.59	1.60	1.60
Calculated Results					
Vmstc	Volume metered, standard (ft3)	0.8450	0.8583	0.7096	0.7676
Flow Results[1]					
Qa	Volumetric flow rate, actual (acfm)	7,369	7,369	7,369	7,369
Qstd	Volumetric flow rate, standard (dscfm)	1,829	1,829	1,829	1,829

[1] The flow results were obtained from the Velocity/Moisture Parameters.

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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.		2A	2B	2C
Date (2000)		May 17	May 17	May 17
Start Time (approx.)		14:24	15:24	17:10
Stop Time (approx.)		15:04	17:01	17:50
Chloromethane (MW=50.49)				
m	Matter collected (µg)	0.000	0.000	0.058
C	Concentration (lb/dscf)			1.80E-10
C	Concentration (gr/dscf)			1.26E-06
C	Concentration (mg/dscm)			2.89E-03
C	Concentration (ppm)			1.38E-03
E	Emission rate (lb/hr)			1.98E-05
Vinyl Chloride (MW=62.50)				
m	Matter collected (µg)	0.000	0.000	0.000
Bromomethane (MW=94.95)				
m	Matter collected (µg)	0.053	0.092	0.031
C	Concentration (lb/dscf)	1.38E-10	2.36E-10	9.63E-11
C	Concentration (gr/dscf)	9.68E-07	1.65E-06	6.74E-07
C	Concentration (mg/dscm)	2.21E-03	3.78E-03	1.54E-03
C	Concentration (ppm)	5.61E-04	9.59E-04	3.91E-04
E	Emission rate (lb/hr)	1.52E-05	2.59E-05	1.06E-05
1,1-Dichloroethane (MW=98.97)				
m	Matter collected (µg)	0.000	0.000	0.000
Trichlorofluoromethane (MW=137.37)				
m	Matter collected (µg)	0.000	0.000	0.000
1,1-Dichloroethene (MW=96.94)				
m	Matter collected (µg)	0.000	0.000	0.000
Carbon disulfide (MW=76.14)				
m	Matter collected (µg)	0.000	0.000	0.000
Acetone(MW=58.08)				
m	Matter collected (µg)	0.226	0.175	0.168
C	Concentration (lb/dscf)	5.90E-10	4.50E-10	5.22E-10
C	Concentration (gr/dscf)	4.13E-06	3.15E-06	3.65E-06
C	Concentration (mg/dscm)	9.44E-03	7.20E-03	8.36E-03
C	Concentration (ppm)	3.91E-03	2.98E-03	3.46E-03
E	Emission rate (lb/hr)	6.47E-05	4.93E-05	5.73E-05
Methylene chloride (MW=84.94)				
m	Matter collected (µg)	0.107	0.078	0.020
C	Concentration (lb/dscf)	2.79E-10	2.00E-10	6.21E-11
C	Concentration (gr/dscf)	1.95E-06	1.40E-06	4.35E-07
C	Concentration (mg/dscm)	4.47E-03	3.21E-03	9.95E-04
C	Concentration (ppm)	1.27E-03	9.09E-04	2.82E-04
E	Emission rate (lb/hr)	3.06E-05	2.20E-05	6.82E-06

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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.		2A	2B	2C
Date (2000)		May 17	May 17	May 17
Start Time (approx.)		14:24	15:24	17:10
Stop Time (approx.)		15:04	17:01	17:50
1,2-Dichloroethene(total) (MW=96.95)				
m	Matter collected (µg)	0.000	0.000	0.000
Chloroform (MW=119.39)				
m	Matter collected (µg)	0.000	0.000	0.000
2-Butanone (MW=72.11)				
m	Matter collected (µg)	0.000	0.000	0.000
Carbon tetrachloride (MW=153.84)				
m	Matter collected (µg)	0.000	0.000	0.000
Benzene (MW=78.11)				
m	Matter collected (µg)	0.051	0.050	0.073
C	Concentration (lb/dscf)	1.33E-10	1.28E-10	2.27E-10
C	Concentration (gr/dscf)	9.31E-07	8.99E-07	1.59E-06
C	Concentration (mg/dscm)	2.13E-03	2.06E-03	3.63E-03
C	Concentration (ppm)	6.56E-04	6.34E-04	1.12E-03
E	Emission rate (lb/hr)	1.46E-05	1.41E-05	2.49E-05
Trichloroethene (MW=131.40)				
m	Matter collected (µg)	0.000	0.000	0.000
1,2-Dichloropropane (MW=112.99)				
m	Matter collected (µg)	0.000	0.000	0.000
1,2-Dichloroethane (MW=98.96)				
m	Matter collected (µg)	0.000	0.000	0.000
Bromodichloromethane (MW=163.83)				
m	Matter collected (µg)	0.000	0.000	0.000
cis-1,3-Dichloropropene (MW=110.98)				
m	Matter collected (µg)	0.000	0.000	0.000
trans-1,3-Dichloropropene (MW=110.98)				
m	Matter collected (µg)	0.000	0.000	0.000
4-Methyl-2-pentanone (MW=100.16)				
m	Matter collected (µg)	0.000	0.000	0.000
Toluene (MW=92.13)				
m	Matter collected (µg)	0.000	0.000	0.000
Tetrachloroethene (MW=165.85)				
m	Matter collected (µg)	0.000	0.000	0.000

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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.	2A	2B	2C
Date (2000)	May 17	May 17	May 17
Start Time (approx.)	14:24	15:24	17:10
Stop Time (approx.)	15:04	17:01	17:50
Chlorobenzene (MW=112.56)			
m Matter collected (µg)	0.000	0.000	0.000
Ethylbenzene (MW=106.16)			
m Matter collected (µg)	0.000	0.000	0.000
Xylene(total) (MW=106.16)			
m Matter collected (µg)	0.000	0.000	0.000
1,1,1-Trichloroethane (MW=133.42)			
m Matter collected (µg)	0.000	0.000	0.000
Styrene (MW=104.14)			
m Matter collected (µg)	0.000	0.000	0.000
Dibromochloromethane (MW=208.28)			
m Matter collected (µg)	0.000	0.000	0.000
1,1,2-Trichloroethane (MW=133.42)			
m Matter collected (µg)	0.000	0.000	0.000
Bromoform (MW=252.77)			
m Matter collected (µg)	0.000	0.000	0.000
2-Hexanone (MW=100.16)			
m Matter collected (µg)	0.000	0.000	0.000
1,1,2,2-Tetrachloroethane (MW=167.86)			
m Matter collected (µg)	0.000	0.000	0.000

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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.		3A	3B	3C	3D
Date (2000)		May 18	May 18	May 18	May 18
Start Time (approx.)		07:43	08:32	09:20	10:06
Stop Time (approx.)		08:23	09:12	10:00	10:46
Sampling Conditions					
Yd	Dry gas meter correction factor	1.0027	1.0027	1.0027	1.0027
Pb	Barometric pressure (in. Hg)	29.40	29.40	29.40	29.40
Vm	Volume metered, meter conditions (liters)	20.76	21.68	20.36	21.03
Vm	Volume metered, meter conditions (ft3)	0.7331	0.7655	0.7189	0.7426
Tm	Dry gas meter temperature (°F)	77	88	91	91
ΔH	Meter box orifice pressure drop (in. H2O)	1.58	1.60	1.60	1.60
Calculated Results					
Vmstc	Volume metered, standard (ft3)	0.7122	0.7297	0.6812	0.7035
Flow Results[1]					
Qa	Volumetric flow rate, actual (acfm)	6,775	6,775	6,775	6,775
Qstd	Volumetric flow rate, standard (dscfm)	1,678	1,678	1,678	1,678

1 The flow results were obtained from the Particulate Parameters.

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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.		3A	3B	3C
Date (2000)		May 18	May 18	May 18
Start Time (approx.)		07:43	08:32	09:20
Stop Time (approx.)		08:23	09:12	10:00
Chloromethane (MW=50.49)				
m	Matter collected (µg)	0.000	0.082	0.000
Vinyl Chloride (MW=62.50)				
m	Matter collected (µg)	0.000	0.000	0.000
Bromomethane (MW=94.95)				
m	Matter collected (µg)	0.024	0.036	0.038
C	Concentration (lb/dscf)	7.43E-11	1.09E-10	1.23E-10
C	Concentration (gr/dscf)	5.20E-07	7.61E-07	8.61E-07
C	Concentration (mg/dscm)	1.19E-03	1.74E-03	1.97E-03
C	Concentration (ppm)	3.01E-04	4.41E-04	4.99E-04
E	Emission rate (lb/hr)	7.48E-06	1.10E-05	1.24E-05
1,1-Dichloroethane (MW=98.97)				
m	Matter collected (µg)	0.000	0.000	0.000
Trichlorofluoromethane (MW=137.37)				
m	Matter collected (µg)	0.000	0.000	0.000
1,1-Dichloroethene (MW=96.94)				
m	Matter collected (µg)	0.000	0.000	0.000
Carbon disulfide (MW=76.14)				
m	Matter collected (µg)	0.000	0.000	0.000
Acetone(MW=58.08)				
m	Matter collected (µg)	0.196	0.220	0.065
C	Concentration (lb/dscf)	6.07E-10	6.65E-10	2.10E-10
C	Concentration (gr/dscf)	4.25E-06	4.65E-06	1.47E-06
C	Concentration (mg/dscm)	9.72E-03	1.06E-02	3.37E-03
C	Concentration (ppm)	4.03E-03	4.41E-03	1.40E-03
E	Emission rate (lb/hr)	6.11E-05	6.69E-05	2.12E-05
Methylene chloride (MW=84.94)				
m	Matter collected (µg)	0.122	0.100	0.027
C	Concentration (lb/dscf)	3.78E-10	3.02E-10	8.74E-11
C	Concentration (gr/dscf)	2.64E-06	2.11E-06	6.12E-07
C	Concentration (mg/dscm)	6.05E-03	4.84E-03	1.40E-03
C	Concentration (ppm)	1.71E-03	1.37E-03	3.96E-04
E	Emission rate (lb/hr)	3.80E-05	3.04E-05	8.80E-06

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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.		3A	3B	3C
Date (2000)		May 18	May 18	May 18
Start Time (approx.)		07:43	08:32	09:20
Stop Time (approx.)		08:23	09:12	10:00
1,2-Dichloroethene(total) (MW=96.95)				
m	Matter collected (µg)	0.000	0.000	0.000
Chloroform (MW=119.39)				
m	Matter collected (µg)	0.000	0.000	0.026
C	Concentration (lb/dscf)			8.41E-11
C	Concentration (gr/dscf)			5.89E-07
C	Concentration (mg/dscm)			1.35E-03
C	Concentration (ppm)			2.72E-04
E	Emission rate (lb/hr)			8.47E-06
2-Butanone (MW=72.11)				
m	Matter collected (µg)	0.000	0.000	0.000
Carbon tetrachloride (MW=153.84)				
m	Matter collected (µg)	0.000	0.000	0.000
Benzene (MW=78.11)				
m	Matter collected (µg)	0.058	0.057	0.045
C	Concentration (lb/dscf)	1.80E-10	1.72E-10	1.46E-10
C	Concentration (gr/dscf)	1.26E-06	1.21E-06	1.02E-06
C	Concentration (mg/dscm)	2.88E-03	2.76E-03	2.33E-03
C	Concentration (ppm)	8.86E-04	8.50E-04	7.18E-04
E	Emission rate (lb/hr)	1.81E-05	1.73E-05	1.47E-05
Trichloroethene (MW=131.40)				
m	Matter collected (µg)	0.000	0.000	0.000
1,2-Dichloropropane (MW=112.99)				
m	Matter collected (µg)	0.000	0.000	0.000
1,2-Dichloroethane (MW=98.96)				
m	Matter collected (µg)	0.000	0.000	0.000
Bromodichloromethane (MW=163.83)				
m	Matter collected (µg)	0.000	0.000	0.000
cis-1,3-Dichloropropene (MW=110.98)				
m	Matter collected (µg)	0.000	0.000	0.000
trans-1,3-Dichloropropene (MW=110.98)				
m	Matter collected (µg)	0.000	0.000	0.000
4-Methyl-2-pentanone (MW=100.16)				
m	Matter collected (µg)	0.000	0.000	0.000

IT CORPORATION
CAE Project No: 8705
Stack

VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.		3A	3B	3C
Date (2000)		May 18	May 18	May 18
Start Time (approx.)		07:43	08:32	09:20
Stop Time (approx.)		08:23	09:12	10:00
Toluene (MW=92.13)				
m	Matter collected (µg)	0.010	0.000	0.000
C	Concentration (lb/dscf)	3.10E-11		
C	Concentration (gr/dscf)	2.17E-07		
C	Concentration (mg/dscm)	4.96E-04		
C	Concentration (ppm)	1.29E-04		
E	Emission rate (lb/hr)	3.12E-06		
Tetrachloroethene (MW=165.85)				
m	Matter collected (µg)	0.000	0.000	0.000
Chlorobenzene (MW=112.56)				
m	Matter collected (µg)	0.000	0.000	0.000
Ethylbenzene (MW=106.16)				
m	Matter collected (µg)	0.000	0.000	0.000
Xylene(total) (MW=106.16)				
m	Matter collected (µg)	0.000	0.000	0.000
1,1,1-Trichloroethane (MW=133.42)				
m	Matter collected (µg)	0.000	0.000	0.000
Styrene (MW=104.14)				
m	Matter collected (µg)	0.000	0.000	0.000
Dibromochloromethane (MW=208.28)				
m	Matter collected (µg)	0.000	0.000	0.000
1,1,2-Trichloroethane (MW=133.42)				
m	Matter collected (µg)	0.000	0.000	0.000
Bromoform (MW=252.77)				
m	Matter collected (µg)	0.000	0.000	0.000
2-Hexanone (MW=100.16)				
m	Matter collected (µg)	0.000	0.000	0.000
1,1,2,2-Tetrachloroethane (MW=167.86)				
m	Matter collected (µg)	0.000	0.000	0.000

IT CORPORATION
FERNALD, OH

Client Reference No: 773481-1958
CAE Project No: 8705

CALIBRATION DATA

C

NOZZLE CALIBRATION SHEET

3050

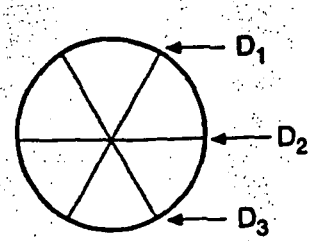
Client	IT CORPORATION	Project Number	8705
Calibrated by	G. PAVLOVICS	Unit	T.O.
Date	5.17.2000	Runs	1

Nozzle Identification	D_1 (inches)	D_2 (inches)	D_3 (inches)	ΔD (inches)	ΔD_{ave} (inches)
T.O. STACK DN	.580	.580	.580	–	.580

D_1, D_2, D_3 = three nozzle diameter measurements

ΔD = maximum difference between any two diameters
$\Delta D \leq 0.004$ inches*

ΔD_{avg} = average of D_1, D_2, D_3



* (40 CFR 60, Appendix A, Method 5, Section 5.1)

Vost Meter Full Test Calibration

ATE: 8/31/99 Operator: M . V .

eter Box No: 67-V1 | Meter Box Y_d: 1.0027 | Barometric Pressure: 28.93

				Standard Meter Gas Volume			Meter Box Gas Volume (ft³)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)					
Q	ΔH	ΔP	Y_{ds}	Initial	Final	V_{ds}	Initial	Final	V_d	Inlet	Outlet	T_{ds}	Inlet	T_o	T_d	Time	Y_d	
.032	1.80	-1.00	1.0000	0.0	1.000	1.000	3513.81	3542.41	1.0100	73.0	73.0	73.0	84.0	84.0	84.0	30.12	1.0033	
.032	1.80	-1.00	1.0000	0.0	1.000	1.000	3571.24	3599.90	1.0121	73.0	73.0	73.0	84.0	84.0	84.0	30.07	1.0012	
.032	1.80	-1.00	1.0000	0.0	1.000	1.000	3599.90	3628.47	1.0090	73.5	73.5	73.5	84.0	84.0	84.0	30.03	1.0035	
																AVERAGE	1.0027	

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Nomenclature

P_b	Barometric Pressure (in. Hg)
Q	Flow Rate (cfm)
ΔH	Orifice Pressure Differential (in. H_20)
ΔP	Inlet Pressure Differential (in. H_20)
V_d	Gas Meter Volume - Dry (ft³)
V_{ds}	Standard Meter Volume - Dry (ft³)
T_d	Average Meter Box Temperature (°F)
T_o	Outlet Meter Box Temperature (°F)
T_{ds}	Average Standard Meter Temperature (°F)
Y_d	Meter Correction Factor (unitless)
Y_{ds}	Standard Meter Correction Factor (unitless)
ΔH@	Orifice Pressure Differential giving 0.75cfm of air at 68°F and 29.92 in. Hg (in. H_20)

Vacuum Gauge

Standard (in. Hg)	Vacuum Gauge
4.6	5.0
9.5	10.0
14.6	15.0
19.9	20.0
23.5	23.0

Thermometers

Standard (°F)	Inlet	Outlet

Equations

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

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

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

Clean Air Engineering

Pyrometer Calibration Test Report

Pyrometer No.:	67-V1	Office:	Palatine, Il
Calibrated By:	M . V .	Client:	
Date:	5/12/00	Job Number:	

Calibration Reference Settings for Fahrenheit Scale	Pyrometer Reading
50 °F	51 °F
100 °F	101 °F
150 °F	151 °F
200 °F	201 °F
250 °F	251 °F
300 °F	301 °F
350 °F	351 °F
400 °F	400 °F
450 °F	450 °F
500 °F	499 °F
550 °F	550 °F
600 °F	600 °F

Calibration Reference Information

Reference Used:	Omega Cl-23	Serial No:	T-87859
Calibrated By:	J.H. Metrology Co.	Date:	6/8/98
Report No:	R022976		

Clean Air Engineering

Vost Meter Post Test Calibration

ATE: 5/12/00 Operator: M.V.

:oject Number: Client/Owner: CLEAN AIR ENG.

Meter Box No: 67-V1	Meter Box Vacuum: 1.0	Meter Box Y_d: 1.0027	Barometric Pressure: 28.93

				Standard Meter Gas Volume			Meter Box Gas Volume (ft^3)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)					
Q	ΔH	ΔP	Y_{ds}	Initial	Final	V_{ds}	Initial	Final	V_d	Inlet	Outlet	T_{ds}	Inlet	T_o	T_d	Time	Y_d	
0.032	1.80	-1.00	1.0000	0.0	1.000	1.000	3513.81	3542.41	1.0100	73.0	73.0	73.0	84.0	84.0	84.0	30.12	1.0033	
0.032	1.80	-1.00	1.0000	0.0	1.000	1.000	3571.24	3599.90	1.0121	73.0	73.0	73.0	84.0	84.0	84.0	30.07	1.0012	
0.032	1.80	-1.00	1.0000	0.0	1.000	1.000	3599.90	3628.47	1.0090	73.5	73.5	73.5	84.0	84.0	84.0	30.03	1.0035	
																AVERAGE	1.0027	

Nomenclature

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

Equations

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

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

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

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Sample Probe Calibration

Probe Type: 5FT. WATERCOOL PROBE **I.D. Number:** 10-10-94-1

Thermocouple Calibration

Reference Type: _____ Reference I.D. No: _____ *Pyrometer I.D. No:* _____ *Degrees:*

Point No.	Target Temp.	Reference Temp.	Indicated Temp.	Temp. Difference	% Difference*	Specification
1	Ice-32F					
2	Ambient-70F					%Difference ≤ 1.5
3	Hot Oil-150F					
4	Boiling H_2O-212F					
5	Hot Oil-320F					

* Based on Absolute Temperature (Rankine)

Does assembly meet specifications?

Geometric Pitot Calibration

"S" Pitot

Measurement		Specification
α1(°)=1.000	α2(°)=1.000	≤10°
β1(°)=2.000	β2(°)=0.000	≤05°
γ(°)=1.000	θ(°)=1.000	
Pa(")=0.372	Pb(")=0.372	Pa + Pb = A
A(")=0.744	Dt(")=0.250	

Calculations

Z(")= A sin γ =	0.0130	≤ 0.125"
W(")= A sin θ =	0.01298	≤ 0.03125"

Standard Pitot

Measurement (inches)		Specification
Tube O.D.	_____	(D)
Static Hole I.D.	_____	= 0.1 x (D)
Length:		
Tip to Static	_____	≥ 6 x (D)
Static to Bend	_____	≥ 8 x (D)

Does assembly meet specifications? YES → **If "Yes", "S" pitot Cp=0.84; Std. Pitot=0.99. If "No", wind tunnel calibration is required.**

Wind Tunnel Calibration

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

Pitot Side 'A':

Trial No.	Reference P	Probe P	Probe Cp*	Deviation from Average Cp*
1				
2				
3				
		Side 'A' Average Probe Cp=		

Specification: Cp Deviations ≤ 0.01

Pitot Side 'B':

Trial No.	Reference P	Probe P	Probe Cp*	Deviation from Average Cp*
1				
2				
3				
		Side 'B' Average Probe Cp=		

Specification: Cp Deviations ≤ 0.01

*Probe Cp= (Reference Cp)√(Reference ΔP/ Probe ΔP); Cp Deviation= Trial Cp - Average Probe Cp

'A' Average Cp	—	'B' Average Cp	=	Difference

|Difference| ≤ 0.01

Does assembly meet specifications? → **If "Yes", Cp= Average of Side 'A' and 'B' Cp values. If "No", Pitot must be replaced.**

All specifications are from EPA-600/9-76-005, section 3.1

Probe Cp= 0.84 Calibrated by: T.F. Date: 5/11/00

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Clean Air Engineering

Sample Probe Calibration

Probe Type: 5FT. WATERCOOL PROBE **I.D. Number:** 10-28-94-2

Thermocouple Calibration

Reference Type: _____ Reference I.D. No: _____ Pyrometer I.D. No: _____ Degrees.

Point No.	Target Temp.	Reference Temp.	Indicated Temp.	Temp. Difference	% Difference*	Specification
1	Ice-32F					
2	Ambient-70F					%Difference ≤ 1.5
3	Hot Oil-150F					
4	Boiling H_2O-212F					
5	Hot Oil-320F					

* Based on Absolute Temperature (Rankine)

Does assembly meet specifications?

Geometric Pitot Calibration

"S" Pitot

Measurement		Specification
α1(°)=0.000	α2(°)=2.000	≤10°
β1(°)=0.000	β2(°)=0.000	≤05°
γ(°)=2.000	θ(°)=1.000	
Pa(")=0.373	Pb(")=0.373	Pa + Pb = A
A(")=0.746	Dt(")=0.250	

Calculations

Z(")= A sin γ = 0.0260 ≤ 0.125"

W(")= A sin θ = 0.01302 ≤ 0.03125"

Standard Pitot

Measurement (inches)		Specification
Tube O.D.	_____	(D)
Static Hole I.D.	_____	= 0.1 x (D)
Length:		
Tip to Static	_____	≥ 6 x (D)
Static to Bend	_____	≥ 8 x (D)

Does assembly meet specifications? YES → **If "Yes", "S" pitot Cp=0.84; Std. Pitot=0.99. If "No", wind tunnel calibration is required.**

Wind Tunnel Calibration

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

Pitot Side 'A':

Trial No.	Reference P	Probe P	Probe Cp*	Deviation from Average Cp*
1				
2				
3				
		Side 'A' Average Probe Cp=		

Specification: Cp Deviations ≤ 0.01

Pitot Side 'B':

Trial No.	Reference P	Probe P	Probe Cp*	Deviation from Average Cp*
1				
2				
3				
		Side 'B' Average Probe Cp=		

Specification: Cp Deviations ≤ 0.01

*Probe Cp= (Reference Cp)√(Reference ΔP/ Probe ΔP); Cp Deviation= Trial Cp - Average Probe Cp

'A' Average Cp	—	'B' Average Cp	=	Difference

|Difference| ≤ 0.01

Does assembly meet specifications? → **If "Yes", Cp= Average of Side 'A' and 'B' Cp values. If "No", Pitot must be replaced.**

All specifications are from EPA-600/9-76-005, section 3.1

Probe Cp= 0.84 Calibrated by: T.F. Date: 5/11/00

Clean Air Engineering

Sample Probe Calibration

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Probe Type: _____ **I.D. Number:** 5-10-00-1

Thermocouple Calibration

Reference Type: _____ Reference I.D. No: _____ Pyrometer I.D. No: _____ Degrees:

Point No.	Target Temp.	Reference Temp.	Indicated Temp.	Temp. Difference	% Difference*	Specification
1	Ice-32F					
2	Ambient-70F					%Difference ≤ 1.5
3	Hot Oil-150F					
4	Boiling H_2O-212F					
5	Hot Oil-320F					

* Based on Absolute Temperature (Rankine)

Does assembly meet specifications?

Geometric Pitot Calibration

"S" Pitot

Measurement		Specification
α1(°)=0.000	α2(°)=1.000	≤10°
β1(°)=0.000	β2(°)=0.000	≤05°
γ(°)=1.000	θ(°)=0.000	
Pa(")=0.377	Pb(")=0.377	Pa + Pb = A
A(")=0.754	Dt(")=0.250	

Calculations

Z(")= A sin γ =	0.0132	≤ 0.125"
W(")= A sin θ =	0.00000	≤ 0.03125"

Standard Pitot

Measurement (inches)		Specification
Tube O.D.	_____	(D)
Static Hole I.D.	_____	≈ 0.1 x (D)
Length:		
Tip to Static	_____	≥ 6 x (D)
Static to Bend	_____	≥ 8 x (D)

Does assembly meet specifications? YES → **If "Yes", "S" pitot Cp=0.84; Std. Pitot=0.99. If "No", wind tunnel calibration is required.**

Wind Tunnel Calibration

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

Pitot Side 'A':

Trial No.	Reference P	Probe P	Probe Cp*	Deviation from Average Cp*
1				
2				
3				

Side 'A' Average Probe Cp= _____

Specification: Cp Deviations ≤ 0.01

Pitot Side 'B':

Trial No.	Reference P	Probe P	Probe Cp*	Deviation from Average Cp*
1				
2				
3				

Side 'B' Average Probe Cp= _____

Specification: Cp Deviations ≤ 0.01

*Probe Cp= (Reference Cp)√(Reference ΔP/ Probe ΔP); Cp Deviation= Trial Cp - Average Probe Cp

'A' Average Cp	—	'B' Average Cp	=	Difference	|Difference| ≤ 0.01

Does assembly meet specifications? → **If "Yes", Cp= Average of Side 'A' and 'B' Cp values. If "No", Pitot must be replaced.**

All specifications are from EPA-600/9-76-005, section 3.1

Probe Cp= 0.84 Calibrated by: T.F. Date: 5/10/00

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Clean Air Engineering

Sample Probe Calibration

Probe Type: 3FT.WATERCOOL PROBE **I.D. Number:** 4-29-93-1

Thermocouple Calibration

Reference Type: _____ Reference I.D. No: _____ Pyrometer I.D. No: _____ Degree...

Point No.	Target Temp.	Reference Temp.	Indicated Temp.	Temp. Difference	% Difference*	Specification
1	Ice-32F					
2	Ambient-70F					%Difference ≤ 1.5
3	Hot Oil-150F					
4	Boiling H_2O-212F					
5	Hot Oil-320F					

* Based on Absolute Temperature (Rankine)

Does assembly meet specifications?

Geometric Pitot Calibration

"S" Pitot

Measurement		Specification
α1(°)=0.000	α2(°)=1.000	≤10°
β1(°)=0.000	β2(°)=0.000	≤05°
γ(°)=0.000	θ(°)=2.000	
Pa(")=0.374	Pb(")=0.374	Pa + Pb = A
A(")=0.748	Dt(")=0.250	

Calculations

Z(")= A sin γ =	0.0000	≤ 0.125"
W(")= A sin θ =	0.02610	≤ 0.03125"

Standard Pitot

Measurement (Inches)		Specification
Tube O.D.	_____	(D)
Static Hole I.D.	_____	= 0.1 x (D)
Length:		
Tip to Static	_____	≥ 6 x (D)
Static to Bend	_____	≥ 8 x (D)

Does assembly meet specifications? YES → **If "Yes", "S" pitot Cp=0.84; Std. Pitot=0.99. If "No", wind tunnel calibration is required.**

Wind Tunnel Calibration

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

Pitot Side 'A':

Trial No.	Reference P	Probe P	Probe Cp*	Deviation from Average Cp*	Specification
1					Cp Deviations ≤ 0.01
2					
3					
		Side 'A' Average Probe Cp=			

Pitot Side 'B':

Trial No.	Reference P	Probe P	Probe Cp*	Deviation from Average Cp*	Specification
1					Cp Deviations ≤ 0.01
2					
3					
		Side 'B' Average Probe Cp=			

*Probe Cp= (Reference Cp)√(Reference ΔP/ Probe ΔP); Cp Deviation= Trial Cp - Average Probe Cp

'A' Average Cp	—	'B' Average Cp	=	Difference	|Difference| ≤ 0.01

Does assembly meet specifications? → **If "Yes", Cp= Average of Side 'A' and 'B' Cp values. If "No", Pitot must be replaced.**

All specifications are from EPA-600/9-76-005, section 3.1

Probe Cp= 0.84 Calibrated by: T.F. Date: 5/11/00

Clean Air Engineering

Meter Box Full Test Calibration

DATE: 4/28/00 Operator: M . V .

Meter Box No: 66-17	Meter Box ΔH@: 2.0205	Meter Box Y_d: 1.0072	Barometric Pressure: 29.32

				Standard Meter Gas Volume			Meter Box Gas Volume (ft^3)			Std. Meter Temperature (°F)			Meter Box Temperature (°F)					
Q	ΔH	ΔP	Y_{ds}	Initial	Final	V_{ds}	Initial	Final	V_d	Inlet	Outlet	T_{ds}	Inlet	T_o	T_d	Time	Y_d	H@
0.896	3.00	-2.00	1.0000	0.0	10.000	10.000	015.684	025.699	10.015	71.0	71.0	71.0	85.0	77.0	81.0	10.87	1.0046	2.0250
0.896	3.00	-2.00	1.0000	0.0	10.000	10.000	025.699	035.766	10.067	71.0	71.0	71.0	87.0	79.0	83.0	10.87	1.0032	2.0175
0.365	0.50	-1.20	1.0000	0.0	5.000	5.000	038.038	043.060	5.022	71.0	71.0	71.0	83.0	81.0	82.0	13.34	1.0119	2.0182
0.364	0.50	-1.20	1.0000	0.0	5.000	5.000	043.060	048.099	5.039	71.0	71.0	71.0	84.0	81.0	82.5	13.38	1.0094	2.0303
0.632	1.50	-1.40	1.0000	0.0	10.000	10.000	052.221	062.328	10.107	71.0	71.0	71.0	87.0	82.0	84.5	15.42	1.0072	2.0187
0.632	1.50	-1.40	1.0000	0.0	10.000	10.000	062.328	072.449	10.121	71.0	71.0	71.0	88.0	82.0	85.0	15.40	1.0067	2.0135
																AVERAGE	1.0072	2.0205

Nomenclature

P_b	Barometric Pressure (in. Hg)
Q	Flow Rate (cfm)
ΔH	Orifice Pressure Differential (in. H_2O)
ΔP	Inlet Pressure Differential (in. H_2O)
V_d	Gas Meter Volume - Dry (ft^3)
V_{ds}	Standard Meter Volume - Dry (ft^3)
T_d	Average Meter Box Temperature (°F)
T_o	Outlet Meter Box Temperature (°F)
T_{ds}	Average Standard Meter Temperature (°F)
Y_d	Meter Correction Factor (unitless)
Y_{ds}	Standard Meter Correction Factor (unitless)
ΔH@	Orifice Pressure Differential giving 0.75 cfm of air at 68°F and 29.92 in. Hg (in. H_2O)

Vacuum Gauge

Standard (in. Hg)	Vacuum Gauge
5.6	5.0
10.3	10.0
15.1	15.0
19.9	20.0
24.9	25.0

Thermometers

Standard (°F)	Inlet	Outlet

Equations

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

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

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

Clean Air Engineering

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Pyrometer Calibration Test Report

Pyrometer No.:	66-17	Office:	Palatine, Il
Calibrated By:	M . V .	Client:	
Date:	4/28/00	Job Number:	

Calibration Reference Settings for Fahrenheit Scale	Pyrometer Reading
50 °F	50 °F
100 °F	100 °F
150 °F	151 °F
200 °F	201 °F
250 °F	251 °F
300 °F	301 °F
350 °F	351 °F
400 °F	400 °F
450 °F	451 °F
500 °F	501 °F
550 °F	550 °F
600 °F	600 °F

Calibration Reference Information

Reference Used:	Omega Cl-23	Serial No:	T-87859
Calibrated By:	J.H. Metrology Co.	Date:	6/8/98
Report No:	R022976		

Clean Air Engineering

Meter Box Critical Orifice Post-Test Calibration Data

CAE Project No. 8705

Location STACK

Date 5-18-2000

Operator Name G. PAVLOVICS

Meter No. 66-17

Meter Y_d 1.0072

Meter $\Delta H_@$ 2.025

Full-Test Cal. Date

Orifice I.D. 66-A-6

Orifice K' .5760

Orifice Cal. Date

Leak Checks

Negative Pressure
No Movement of Meter in 1 minute ☒ Pass ☐ Fail

Positive Pressure
No Movement of Manometer in 1 minute ☐ Pass ☐ Fail

Important: All leak checks must pass in order for calibration to be valid.

Barom. Press. (P_b) 29.25 in. Hg

Run	Elapsed Time (minutes)	Meter Volume (dcf)	Meter Temperature Inlet (°F)	Meter Temperature Outlet (°F)	Ambient Temp. - T_{amb} (°F)	Orifice ΔH (in.W.C.)	Vacuum (in. Hg)	Net Run Time - θ (minutes)	Net Meter Volume for Run - V_m (dcf)	Avg Meter Temp. for Run - T_m	DGM Calibration Factor - Y_i	Percent Variation - ΔY_i
	0.0	633.10	81	81								
1	5	636.92	82	82	78	1.9	19.5	5				-.7 %
2	10	640.69	83	81	79	1.9	19.5	5				-.6 %
3	15	644.48	85	82	80	1.9	19.5	5				.1 %

Average Y_i 1.0002

Cal.Error -.7 %

Calculations and Specifications

$$Y_i = \frac{K' \times P_b \times (T_m + 460) \times \theta}{17.64 \times V_m \times \left(P_b + \Delta H/13.6\right) \times \sqrt{T_{amb} + 460}}$$

$$\Delta Y_i = \frac{Y_i - \overline{Y}_i}{\overline{Y}_i} \times 100 \qquad \text{Spec.: } \Delta Y_i \le \pm 2\%$$

$$Cal.Error = \frac{\overline{Y}_i - Y_d}{Y_d} \times 100 \qquad \text{Spec.: } Cal.Error \le \pm 5\%$$

Clean Air Engineering

000062

3050

CS 005 Critical Orifice
EXCL/D68.R3-10/15/95

Reference Method Sampling System

Client: I.T. Corp.
Plant: WPRAP; Fernald, Ohio
Unit: Thermal Oxidizer
Location: Stack
Run #'s: 1-3

Job #: 8705
Operator: Eric Rodriguez
Date: 5-16 & 5-17
Data Acquisition: Chart / Computer
File Names: D:\RAWDATA\8705IT\ DATE

Instrumentation Data for Reference Method:

#	Constituent	Manufacturer	Serial/Asset#	Range Used	Oper. Principle	Units Reported
1	THC	I.U.M.	2935	0-100	Flame Ionization	ppmwv
2	CO	TECO 48	1554	0-100	Gas Filter Correlation	ppm dv
3	O_2	Servomex	2978-65	0-25	Paramagnetic	%
4	CO_2	Servomex	3342	0-25	Infra Red	%
5						
6						

Reference Method System Performance Checks:

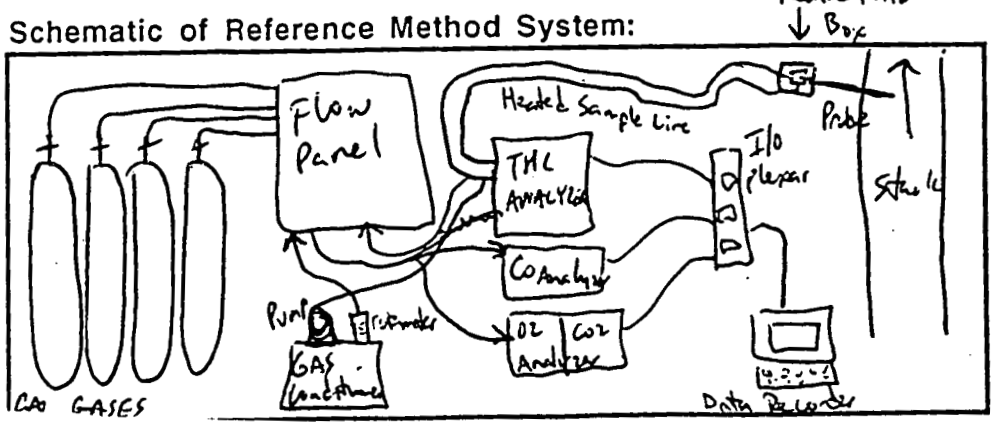
System Leak Check Passed: ✓
System Response Time: ≈ 30 seconds
Calibration Error Check Passed: ✓

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

Calibration Materials Data:

#	Constituent	Concentration	Cylinder ID	Protocol?	Comments:
1	CO	25.44	ALM 059734	YES / NO	
2	CO	59.1	ALM 059392	YES / NO	
3	CO	89.0	ALM 009200	YES / NO	
4	C_3H_8	8.56	ALM 050744	YES / NO	±5% = 0.43 ppm
5	C_3H_8	24.96	ALM 059216	YES / NO	±5% = 1.25 ppm
6	C_3H_8	55.13	ALM 031351	YES / NO	±5% = 2.76 ppm
7	C_3H_8	84.4	AAL 19110	YES / NO	±5% = 4.22 ppm
8	C_3H_8	445.7	ALM 056724	YES / NO	
9	C_3H_8	857.6	ALM 045494	YES / NO	
10	O_2 / CO_2	6.05/13.98	AAL 13539	YES / NO	
11	O_2 / CO_2	14.0/6.03	ALM 014783	YES / NO	
12				YES / NO	
13				YES / NO	
14				YES / NO	

Schematic of Reference Method System:



000063

3050

Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET,TROY,MI 48083 Phone: 248-589-2950 Fax: 248-589-213

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY,MI 48083

P.O. No.: 80058-71-65000
Project No.: 05-51601-001

Customer

CLEAN AIR ENGINEERING
DON ALLEN
500 W. WOOD STREET
PALATINE IL 60067

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: ALM059734 **Certification Date:** 10/13/99 **Exp. Date:** 10/13/2002

Cylinder Pressure*:** 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
CARBON MONOXIDE	25.44	PPM	+/- 1%	Direct NIST and NMi
NITROGEN		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997.
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1681	3/01/03	ALM015514	977.1 PPM	CARBON MONOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HORIBA/OPE-135/565607092	10/13/99	NDIR

ANALYZER READINGS

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

First Triad Analysis

CARBON MONOXIDE

Date:10/06/99	Response Unit:MV	
Z1 = 0.00000	R1 = 80.00000	T1 = 25.40000
R2 = 80.00000	Z2 = 0.00000	T2 = 25.40000
Z3 = 0.00000	T3 = 25.40000	R3 = 80.00000
Avg. Concentration:	25.40	PPM

Second Triad Analysis

Date: 10/13/99	Response Unit: MV	
Z1 = 0.00000	R1 = 80.00000	T1 = 25.40000
R2 = 80.00000	Z2 = 0.00000	T2 = 25.40000
Z3 = 0.00000	T3 = 25.40000	R3 = 80.00000
Avg. Concentration:	25.40	PPM

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4

Constants:	A =
B =	C =
D =	E =

APPROVED BY: _____

Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET,TROY,MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY,MI 48083

P.O. No.: 18935-71-65000
Project No.: 05-48783-012

Customer

CLEAN AIR ENGINEERING
DON ALLEN
500 W. WOOD STREET
PALATINE IL 60067

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards: Procedure #G1; September, 1997.

Cylinder Number: ALM059392 Certification Date: 8/18/99 Exp. Date: 8/18/2002

Cylinder Pressure***: 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
CARBON MONOXIDE	59.1	PPM	+/- 1%	Direct NIST and NMi
NITROGEN		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997.
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1681	3/01/03	ALM015514	977.1 PPM	CARBON MONOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HORIBA/OPE-135/565607092	08/18/99	NDIR

ANALYZER READINGS

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

CARBON MONOXIDE

First Triad Analysis

Date:08/10/99	Response Unit:MV	
Z1 = 0.00000	R1 = 100.0000	T1 = 45.80000
R2 = 100.0000	Z2 = 0.00000	T2 = 45.80000
Z3 = 0.00000	T3 = 45.80000	R3 = 100.0000
Avg. Concentration:	59.10	PPM

Second Triad Analysis

Date: 08/18/99	Response Unit: MV	
Z1 = 0.00000	R1 = 100.0000	T1 = 45.80000
R2 = 100.0000	Z2 = 0.00000	T2 = 45.80000
Z3 = 0.00000	T3 = 45.80000	R3 = 100.0000
Avg. Concentration:	59.10	PPM

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4

Constants:	A =
B =	C =
D =	E =

APPROVED BY: [signature]

KATA CLASS -- 3050

Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083 Phone: 248-589-2950 Fax: 248-589-213

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: 50234-71-65000
Project No.: 05-57663-023

Customer

CLEAN AIR ENGINEERING
DON ALLEN
500 W. WOOD STREET
PALATINE IL 60067

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: ALM009200 **Certification Date:** 3/06/00 **Exp. Date:** 3/06/2003

Cylinder Pressure*:** 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
CARBON MONOXIDE	89.0	PPM	+/- 1%	Direct NIST and NMi
NITROGEN		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2635	2/01/03	ALM060964	25.20 PPM	CARBON MONOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
A1A/220-2/57297601	03/06/00	NDIR

ANALYZER READINGS

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

First Triad Analysis

CARBON MONOXIDE

Date: 02/28/00	Response Unit: MV	
Z1 = 0.0000	R1 = 100.00	T1 = 93.200
R2 = 100.00	Z2 = 0.0000	T2 = 93.200
Z3 = 0.0000	T3 = 93.200	R3 = 100.00
Avg. Concentration:	89.00	PPM

Second Triad Analysis

Date: 03/06/00	Response Unit: MV	
Z1 = 0.0000	R1 = 100.00	T1 = 93.200
R2 = 100.00	Z2 = 0.0000	T2 = 93.200
Z3 = 0.0000	T3 = 93.200	R3 = 100.00
Avg. Concentration:	89.00	PPM

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4	
r = .999991	1681
Constants:	A = 2.672796E-02
B = .9400663	C = 1.566641E-04
D =	E = 0

APPROVED BY: [signature]

Scott Specialty Gases

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

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS RECERTIFICATION

Customer
CLEAN AIR ENGINEERING
ATTN DON ALLEN
500 W WOOD STREET
PALATINE, IL 60067

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

Purchase Order : DON ALLEN
Scott Project # : 538581

ANALYTICAL INFORMATION

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

Cylinder Number : ALM050744
Cylinder Pressure + : 1500 psig
Certificate Date : 1/8/99
Previous Certificate Date : 3/31/95
Expiration Date : 1/8/2002

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Propane	8.56 ppm	±1% NIST Directly Traceable

Balance Gas: Nitrogen

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

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
SRM1666b	4/28/2003	CLM011070	9.73 ppm Propane in Air

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
C3H8: Varian/1400/08982426	1/8/99	Gas Chromatography

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

Components
Propane

Previous Certification
Date: 3/31/95
Concentration: 8.58 ppm

Third Triad Analysis
Date: 1/8/99 Response Units: mv

Z1=0.00	R1=47.95	T1=42.18
R2=47.95	Z2=0.00	T2=42.06
Z3=0.00	T3=42.08	R3=47.95

Avg. Conc. of Cust. Cyl: 8.56 ppm

Calibration Curve
Concentration=$A+Bx+Cx^2+Dx^3+Ex^4$

r=1.00000	SRM1666b
Constants:	A=0.042870780
B=0.202025500	C=0.000000000
D=0.000000000	E=0.000000000

Special Notes

Cylinder

Analyst

RATA CLASS 3050

Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET,TROY,MI 48083 Phone: 248-589-2950 Fax: 248-589-2

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY,MI 48083

P.O. No.: 18566-71-65000
Project No.: 05-43076-017

Customer

CLEAN AIR ENGINEERING
DON ALLEN
500 W. WOOD STREET
PALATINE IL 60067

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: ALM059216 Certification Date: 4/08/99 Exp. Date: 4/08/2002

Cylinder Pressure***: 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
PROPANE	24.96	PPM	+/- 1%	Direct NIST and NM
NITROGEN		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1668	8/01/01	ALM009141	99.50 PPM	PROPANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN/1400/08982426	04/08/99	FLAME IONIZATION

ANALYZER READINGS

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

PROPANE

First Triad Analysis

Date:04/08/99	Response Unit:MV	
Z1=0.0000	R1=509.90	T1=127.50
R2=509.90	Z2=0.0000	T2=127.50
Z3=0.0000	T3=127.60	R3=509.90
Avg. Concentration:	24.96	PPM

Second Triad Analysis

Calibration Curve

Concentration=A+Bx+Cx2+Dx3+Ex4	
r=1.000000000b	1668
Constants:	A=0.07192835
B=0.1951483	C=
D=	E=

APPROVED BY: [signature]

Scott Specialty Gases

1290 COMBERMERE STREET, TROY, MI 48083 Phone : (248) 589-2950 Fax : (248) 589-2134

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
CLEAN AIR ENGINEERING
500 WEST WOOD STREET
ATTN: DON ALLEN
PALATINE, IL 60067

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

Purchase Order : 18092-71-65000
Scott Project # : 534978

ANALYTICAL INFORMATION

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

Cylinder Number : ALM031351
Cylinder Pressure + : 1900 psig
Certificate Date : 10/13/98
Previous Certificate Date : None
Expiration Date : 10/13/2001

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Propane	55.13 ppm	±1% NIST Directly Traceable

Balance Gas: Nitrogen

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

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM1668	8/1/2001	ALM009141	99.5 ppm Propane in Air

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
C3H8: Varian/1400/08982426	10/13/98	Gas Chromatography

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

Components
Propane

First Triad Analysis

Date: 10/13/98 Response Units: mv

Z1=0.00	R1=481.90	T1=267.30
R2=481.90	Z2=0.00	T2=266.40
Z3=0.00	T3=267.30	R3=481.90

Avg. Conc. of Cust. Cyl. 55.13 ppm

Second Triad Analysis

Calibration Curve

Concentration=A+Bx+Cx^2+Dx^3+Ex^4

r=1.00000	NTRM1668
Constants:	A=0.005597119
B=0.206462800	C=0.000000000
D=0.000000000	E=0.000000000

Special Notes

Mail

KATA CLASS 3050

Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET,TROY,MI 48083 Phone: 248-589-2950. Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY,MI 48083

P.O. No.: 18935-71-65000
Project No.: 05-48783-007

Customer

CLEAN AIR ENGINEERING
DON ALLEN
500 W. WOOD STREET
PALATINE IL 60067

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: AAL19110 Certification Date: 8/13/99 Exp. Date: 8/13/2002

Cylinder Pressure***: 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
PROPANE	84.40	PPM	+/- 1%	Direct NIST and NMi
NITROGEN		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocol procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1668	8/01/01	ALM009141	99.50 PPM	PROPANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN/1400/08982426	08/13/99	FLAME IONIZATION

ANALYZER READINGS

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

PROPANE

First Triad Analysis			Second Triad Analysis	Calibration Curve	
Date:08/13/99	Response Unit:MV			Concentration = A + Bx + Cx2 + Dx3 + Ex4	
Z1 = 0.00000	R1 = 2522.000	T1 = 2140.000		r = 1.0000000000	1668
R2 = 2522.000	Z2 = 0.00000	T2 = 2136.000		Constants:	A = 0.0185161
Z3 = 0.00000	T3 = 2136.000	R3 = 2522.000		B = 0.03944547	C =
Avg. Concentration:	84.41	PPM		D =	E =

APPROVED BY: Mary Schiele

Scott Specialty Gases

1290 COMBERMERE STREET, TROY, MI 48083 Phone : (248) 589-2950 Fax : (248) 589-2134

CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS

Customer
CLEAN AIR ENGINEERING
500 WEST WOOD STREET
ATTN: DON ALLEN
PALATINE, IL 60067

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

Purchase Order : 18092-71-65000
Scott Project # : 534978

ANALYTICAL INFORMATION

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

Cylinder Number : ALM056724 **Certificate Date :** 10/14/98 **Expiration Date :** 10/14/2001
Cylinder Pressure + : 1900 psig **Previous Certificate Date :** None

ANALYZED CYLINDER

Components	Certified Concentration	Analytical Uncertainty*
Propane	445.7 ppm	±1% NIST Directly Traceable

Balance Gas: Nitrogen

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

REFERENCE STANDARD

Type	Expiration Date	Cylinder Number	Concentration
NTRM1200	8/1/2001	AAL9557	1193 ppm Propane in Air

INSTRUMENTATION

Instrument/Model/Serial #	Last Date Calibrated	Analytical Principle
C3H8: Varian/1400/08982426	10/14/98	Flame Ionization Detector

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

Components	First Triad Analysis	Second Triad Analysis	Calibration Curve
Propane	Date: 10/14/98 Response Units: mv Z1=0.00 R1=30.34 T1=1,135.00 R2=30.34 Z2=0.00 T2=1,132.00 Z3=0.00 T3=1,133.00 R3=30.34 Avg. Conc. of Cust. Cyl. 445.7 ppm		Concentration=A+Bz+Cz^2+Dz^3+Ez^4 r=1.00000 NTRM1200 Constants: A=0.019419660 B=0.393203900 C=0.000000000 D=0.000000000 E=0.000000000

Special Notes

Mail

Analyst

000071

RATA CLASS 3050

Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083 Phone: 248-589-2950- Fax: 248-589-213

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: 18935-71-65000
Project No.: 05-48783-008

Customer

CLEAN AIR ENGINEERING
DON ALLEN
500 W. WOOD STREET
PALATINE IL 60067

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: ALM045494 Certification Date: 8/18/99 Exp. Date: 8/18/2002
Cylinder Pressure***: 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
PROPANE	857.6	PPM	+/- 1%	Direct NIST and NMi
NITROGEN		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1200	8/01/01	AAL9557	1193. PPM	PROPANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN/1400/08982426	08/18/99	FLAME IONIZATION

ANALYZER READINGS

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

PROPANE

First Triad Analysis

Date: 08/18/99 Response Unit: MV

Z1 = 0.00000	R1 = 591.7000	T1 = 425.3600
R2 = 591.7000	Z2 = 0.00000	T2 = 425.1700
Z3 = 0.00000	T3 = 425.3200	R3 = 591.7000

Avg. Concentration: 857.6 PPM

Second Triad Analysis

Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4

r = 1.0000000000 1200

Constants: A = 0.3951131

B = 2.015567 C =

D = E =

APPROVED BY: _____

000072

RATA CLASS

Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET,TROY,MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY,MI 48083

P.O. No.: 50234-71-65000
Project No.: 05-57663-042

Customer

CLEAN AIR ENGINEERING
DON ALLEN
500 W. WOOD STREET
PALATINE IL 60067

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: AAL13539 **Certification Date:** 2/25/00 **Exp. Date:** 2/24/2003
Cylinder Pressure*:** 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ANALYTICAL ACCURACY**	TRACEABILITY
CARBON DIOXIDE	13.98 %	+/- 1%	Direct NIST and NMi
OXYGEN	6.050 %	+/- 1%	Direct NIST and NMi
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997.
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1674	4/03/03	ALM027656	7.080 %	CARBON DIOXIDE
NTRM 2657	1/02/01	ALM032073	1.950 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HORIBA/PIR-2000/701022	02/25/00	NDIR
ROSEMOUNT/755R/1000430	02/25/00	PARAMAGNETIC

ANALYZER READINGS

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

CARBON DIOXIDE

First Triad Analysis			Second Triad Analysis	Calibration Curve	
Date:02/25/00	Response Unit:%			Concentration = A + Bx + Cx2 + Dx3 + Ex4	
Z1 = 0.0000	R1 = 190.00	T1 = 133.70		r = 0.999994	1674
R2 = 190.00	Z2 = 0.0000	T2 = 133.70		Constants:	A = -1.32768E-02
Z3 = 0.0000	T3 = 133.70	R3 = 190.00		B = 7.567946E-02	C = 1.485436E-04
Avg. Concentration:	13.98	%		D = 5.119923E-07	E = 0

OXYGEN

First Triad Analysis			Second Triad Analysis	Calibration Curve	
Date:02/25/00	Response Unit:%			Concentration = A + Bx + Cx2 + Dx3 + Ex4	
Z1 = 0.0000	R1 = 24.990	T1 = 6.0500		r = 0.999990	2657
R2 = 24.990	Z2 = 0.0000	T2 = 6.0500		Constants:	A = -1.95288E-02
Z3 = 0.0000	T3 = 6.0500	R3 = 24.990		B = 1.050183	C = -5.83136E-04
Avg. Concentration:	6.050	%		D = -5.63570E-05	E = 0

APPROVED BY:

RATA CLASS = 3050

Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083 Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: 50234-71-65000
Project No.: 05-58953-001

Customer

CLEAN AIR ENGINEERING
DON ALLEN
500 W. WOOD STREET
PALATINE IL 60067

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: ALM014783 **Certification Date:** 3/24/00 **Exp. Date:** 3/24/2003
Cylinder Pressure*:** 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ANALYTICAL ACCURACY**	TRACEABILITY
CARBON DIOXIDE	6.030 %	+/- 1%	Direct NIST and NMi
OXYGEN	14.00 %	+/- 1%	Direct NIST and NMi
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.

** Analytical accuracy is based on the requirements of EPA Protocal procedure G1, September 1997.
Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1674	4/03/03	ALM027656	7.080 %	CARBON DIOXIDE
NTRM 2657	1/02/01	ALM032073	1.950 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HORIBA/PIR-2000/701022	03/24/00	NDIR
ROSEMOUNT/755R/1000430	03/24/00	PARAMAGNETIC

ANALYZER READINGS

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

First Triad Analysis **Second Triad Analysis** **Calibration Curve**

CARBON DIOXIDE

Date:03/24/00	Response Unit:MV	
Z1 = 0.0000	R1 = 190.00	T1 = 68.500
R2 = 190.00	Z2 = 0.0000	T2 = 68.500
Z3 = 0.0000	T3 = 68.500	R3 = 190.00
Avg. Concentration:	6.030	%

Second Triad Analysis:

Concentration = A + Bx + Cx2 + Dx3 + Ex4	
r = 0.999994	1674
Constants:	A = -1.32768E-02
B = 7.567946E-02	C = 1.485436E-04
D = 6.119923E-07	E = 0

OXYGEN

Date:03/24/00	Response Unit:PCT	
Z1 = 0.0000	R1 = 25.000	T1 = 14.000
R2 = 25.000	Z2 = 0.0000	T2 = 14.000
Z3 = 0.0000	T3 = 14.000	R3 = 25.000
Avg. Concentration:	14.00	%

Second Triad Analysis:

Concentration = A + Bx + Cx2 + Dx3 + Ex4	
r = 0.999990	2657
Constants:	A = -1.95288E-02
B = 1.050183	C = -5.83136E-04
D = -5.63570E-05	E = 0

APPROVED BY: Michael R. [illegible]

IT CORPORATION
FERNALD, OH

Client Reference No: 773481-1958
CAE Project No: 8705

FIELD DATA

D

37.5 /30"
-10.5
27.0

CYCLONIC FLOW CHECK FIELD DATA SHEET

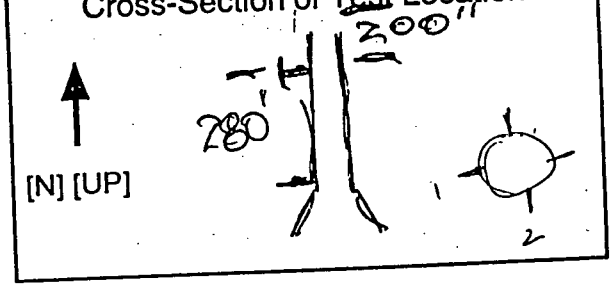
PAGE 1 OF 1

T LOCATION: Dryer Stack

T:

nt	Project No.
t Fernald, OH	Date 5.16.2000
er Operator G. Pavlovics	
pe Operator W. Graham	
e I.D. No.	Pitot Cp
Leak Check Before: ☐	After: Good ☐ Bad ☐

Cross-Section of Test Location



Amb. Temp. (°F)	Bar. Press.	[in. Hg] [mbar]

Duct Dimensions (in.) 28"			
Static Press. (in. H_2O)	Port Len. (in.) 10.5	Gas Flow [In] [Out] of page	Point No. 1 all the way [In] [Out]

Start Time: 1400	Stop Time: 1420

1400

verse oint mber	Velocity Pressure at 0° (in H_2O)	Rotation Angle α giving 0 v.p.	Traverse Point Number	Velocity Pressure at 0° (in H_2O)	Rotation Angle α giving 0 v.p.	Traverse Point Number	Velocity Pressure at 0° (in H_2O)	Rotation Angle α giving 0 v.p.	Traverse Point Number	Velocity Pressure at 0° (in H_2O)	Rotation Angle α giving 0 v.p.	Notes
	.02	0	1-	.01	2							11.1
2	.08	2		.07	0							12.38
3	.11	2		.10	2			Downstream				13.8
4	.12	2		.11	1			7.14 Dia				15.5
5	.12	2		.12	0			10 Dia				17.5
6	.11	1		.10	2			Upstream				20.5
7	.11	0	1717	.11	1	1720						28.5
8	.10	3		.10	0							31.5
9	.09	2		.09	3							33.5
10	.07	0		.08	2							35.2
11	.04	4		.06	0							36.6
12	.05	1		.03	1							37.9

3050

Total of abosulute values of α .2808 Average of abosulute values of α

rocedure: Position the pitot perpendicular to the expected direction of gas flow (0 degrees reference). Note the velocity pressure. f zero, acceptable flow condition exists, if not zero, rotate the pitot up to +/- 90 degrees (rotation angle called alpha α.) Determine and record the value of the rotation angle (α) to the nearest degree. See reference method 1, section 2.4. Calculate the average of the absolute values of α. Assign values of zero to points which require no rotation. If the average of α is ... of the flow is unacceptable and an alternative method of velocity and sample

Clean Air Engineering

DS 002C Cyclonic Check
CNVS/TRG.R2-1/12/95

ORSAT READINGS

TEST LOCATION: T.O. Stack

PAGE 1 **OF** 1

Client	IT Corp	Project Number	8705
Plant	Fernald, OH	Unit	Stack
Orsat ID	#11	Fuel Type	

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

Leak Check Passed ☐

Run Number	Method Number	Trial	Percent CO_2	Percent O_2+CO_2	Percent O_2	Fo	Analyst	Analysis Date	Analysis Time
1	MS	1	3.9	11.2	7.3		BG	5-18-00	15:26
		2	3.8	11.1	7.3		GP		
		3	3.9	11.2	7.3				
		Avg.	3.9		7.3				
		1							
		2							
		3							
		Avg.							
		1							
		2							
		3							
		Avg.							
		1							
		2							
		3							
		Avg.							
		1							
		2							
		3							
		Avg.							
		1							
		2							
		3							
		Avg.							

Repeat the analysis procedure until the results of any three analyses differ by no more than 0.2 percent by volum ...er the three acceptable values and report the results to the nearest 0.1 percent. Calculate Fo to verify results.

000077

Acceptable ranges for Fo:

Coal:	Anthracite and lignite	1.016-1.130	Gas:	Natural	1.600-1.836
	Bituminous	1.083-1.230		Propane	1.434-1.586
Oil:	Distillate	1.260-1.413		Butane	1.405-1.553
					1.000-1.120

Clean Air Engineer

Impinger Weight Sheet

3050

Client: I.T. Corporation

Unit Name: T.O. Stack

Plant: Fernald

Job #: 8705

Method: 5

Sample Box #: 67-30

Date: 5/17/00

Run #: 1

	Contents	Gross Weight	Tare Weight	Net Weight Gain	Total Weight
	Filter # 203420				
Impinger 1	100ml H_2O	1029.7	717.6		
Impinger 2	100ml H_2O	593.3	524.6		
Impinger 3	Empty	449.3	428.5		
Impinger 4					
Impinger 5					
Impinger 6					
Impinger 7	Silica Gel		714.5		

Method 4

Sample Box #: 67-56

Date: 5/17/00

Run #: 2

	Contents	Gross Weight	Tare Weight	Net Weight Gain	Total Weight
Impinger 1	100ml H_2O	581.0	531.8	49.2	
Impinger 2	100ml H_2O	579.9	555.1	24.8	
Impinger 3	Empty	432.3	427.6	4.7	
Impinger 4					
Impinger 5					78.7
Impinger 6					93.3
Impinger 7	Silica Gel	697.8	683.2	14.6	

Sample Box #: 67-30

Date: 5/18/00

Run #: 3

M5 R2

	Contents	Gross Weight	Tare Weight	Net Weight Gain	Total Weight
	Filter #203421	1036.1			
Impinger 1	100ml H_2O	724.9	724.9	311.2	
Impinger 2	100ml H_2O	708.2	527.3	180.9	
Impinger 3	Empty	450	431.0	19	
Impinger 4					
Impinger 5					511.1
Impinger 6				61.3	572.4

000078

000079

ST LOCATION: STACK

IIT: THERMAL OXIDIZER RUN: 2

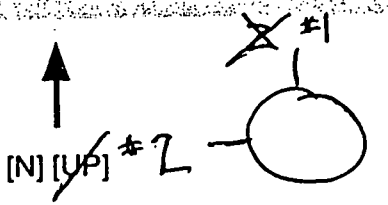
PARTICULATE TESTING FIELD DATA SHEET

METHOD: 5 PAGE 1 OF 6

ent IT CORPORATION	Project No. 8705
int FERNALD, OHIO	Date 5.18.2000
ter Operator G. PAVLOVICS	
be Operator N/A	

ter Box No. 66.17	Sample Box No.
ter Yd 1.0072	Meter ΔH@ 2.025
Factor 34.5	Pitot Cp .84
ak Rate Before .003 [cfm] [~~Lpm~~] @ 15 (in.Hg)	
ak Rate After .002 [cfm] [~~Lpm~~] @ 13 (in.Hg)	
ot Leak Check Before: ☒	After: Good ☒ Bad ☐

Cross-Section of Test Location



Duct Dimensions (in.) 28"			
Static Press. (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-.1	10.5		

Amb. Temp. (°F) 75	Bar. Press. 29.40 [in. Hg] [~~mbar~~]
Probe I.D. No. 6CP-66.1/5.10.00.1	
Liner Material GLASS	

Filter No. 203421		
Thimble No. N/A		
Nozzle Diameter .580	Nozzle I.D.	

H_2O 511.1 [ml] [gm]	Silica Gel (gm) 61.3
Total V_{lc} 572.4	

Start Time: 7:38A	Stop Time: 13:57

DOT 2 Traverse Point Number	Min/pt 30 Elapsed Time	Velocity Head ΔP's (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume - V_m Init. Vol. [ft^3] [~~L~~] 343.93	Stack Temp. T_s (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet T_{min} (°F)	DGM Outlet T_{mout} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T_t (°F)	Notes
-1	5	.05	1.7	347.38	1432	250	254	62	75	71	4	N/A	
2	10	.05	1.7	350.60	1429	250	250	47	77	71	4	N/A	
3	15	.05	1.7	353.97	1431	250	250	50	80	72	5	N/A	
4	20	.05	1.7	357.38	1431	250	250	52	81	72	5	N/A	
5	25	.06	1.7	360.77	1430	251	251	57	82	74	5	N/A	
6	30	.06	1.7	364.14	1431	250	251	60	83	74	6	N/A	
-1	35	.07	2.4	368.19	1438	252	251	47	87	76	10	N/A	
2	40	.07	2.4	372.31	1436	250	250	47	87	76	10	N/A	
3	45	.07	2.4	376.44	1439	248	250	47	89	77	10	N/A	
4	50	.07	2.4	380.56	1444	249	249	48	88	78	10	N/A	
5	55	.07	2.4	384.68	1441	250	253	50	89	78	10	N/A	
6	60	.07	2.4	388.68	1441	250	250	51	89	79	10	N/A	
	Total	2.5718	24.6	271.02	17223					1905			
	Average	.2417	2.022		1437.7				83.5				

Check correct bracketed units on data sheet.

T LOCATION: STACK

T: THERMAL OXIDIZER RUN: 2

PARTICULATE TESTING FIELD DATA SHEET

METHOD: 5 PAGE 4 OF 4

IT CORPORATION	Project No. 8705
FERNALD, OHIO	Date 5-18-2000
r Operator G. PAVLOVICS	
e Operator N/A	

r Box No.	Sample Box No.
r Yd	Meter ΔH@
ctor	Pitot Cp
k Rate Before	[cfm] [Lpm] @ (in.Hg)
k Rate After	[cfm] [Lpm] @ (in.Hg)
Leak Check Before: ☐	After: Good ☐ Bad ☐

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)			
Static Press. (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Amb. Temp. (°F)	Bar. Press. [in. Hg] [mbar]
Probe I.D. No.	
Liner Material	

Filter No.		
Thimble No.		
Nozzle Diameter	Nozzle I.D.	

H_2O [ml] [gm]	Silica Gel (gm)
Total V_{lc}	

Start Time:	Stop Time:

T 2 erse int nber	Min/pt 30 Elapsed Time	Velocity Head ΔP's (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume - V_m Init. Vol. [ft^3] [L]	Stack Temp. T_s (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet T_{min} (°F)	DGM Outlet T_{mout} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T_t (°F)	Notes
-1	65	.07	2.4	392.80	1441	250	253	53	~~94~~ 90	80	7	N/A	
2	70	.07	2.4	396.92	1443	250	251	53	90	80	7	N/A	
3	75	.07	2.4	401.04	1441	250	251	54	90	80	7	N/A	
4	80	.07	2.4	405.18	1442	250	250	54	90	80	7	N/A	
5	85	.07	2.4	409.26	1441	250	248	55	91	81	7	N/A	
6	90	.07	2.4	413.37	1440	250	251	56	91	81	7	N/A	
-1	95	.07	2.4	417.49	1443	250	250	56	91	81	7	N/A	
2	100	.07	2.4	421.60	1445	250	249	57	90	81	7	N/A	
3	105	.07	2.4	425.73	1448	249	247	59	92	81	7	N/A	
4	110	.07	2.4	429.85	1448	251	246	60	91	81	7	N/A	
5	115	.07	2.4	433.97	1447	250	246	59	90	81	7	N/A	
6	120	.07	2.4	438.10	1450	250	250	60	91	81	7	N/A	
	Total	3.1749	28.80		17329					2055			
	Average												

3050

3050

S 001 General
NVS/TRG.R3-4/6/94

* Sum of square roots.

Circle correct bracketed units on data sheet.

Clean Air Engineering

000080

000081

PARTICULATE TESTING FIELD DATA SHEET

METHOD: 5 PAGE 3 OF 6

:ST LOCATION: STACK

NIT: THERMAL OXIDIZER RUN: 2

ent IT CORPORATION	Project No. 8705
ant FERNALD, OHIO	Date 5.18.2000
ater Operator G. PAVLOVICS	
obe Operator N/A	

eter Box No.	Sample Box No.
eter Yd	Meter ΔH@
Factor	Pitot Cp
eak Rate Before	[cfm] [Lpm] @ (in.Hg)
eak Rate After	[cfm] [Lpm] @ (in.Hg)
ot Leak Check Before: ☐	After: Good ☐ Bad ☐

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)			
Static Press. (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Amb. Temp. (°F)	Bar. Press. [in. Hg] [mbar]
Probe I.D. No.	
Liner Material	

Filter No.		
Thimble No.		
Nozzle Diameter	Nozzle I.D.	

H_2O [ml] [gm]	Silica Gel (gm)
Total V_{lc}	

Start Time:	Stop Time:

ORT 2 averse Point umber	Min/pt 30 Elapsed Time	Velocity Head ΔP's (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume - V_m Init. Vol. [ft^3] [L]	Stack Temp. T_s (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet T_{min} (°F)	DGM Outlet T_{mout} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T_t (°F)	Notes
5-1	125	.06	2.1	441.94	1439	250	250	61	89	81	6	N/A	
2	130	.06	2.1	445.78	1441	250	251	62	89	81	6	N/A	
3	135	.06	2.1	449.62	1439	250	250	53	89	81	6	N/A	
4	140	.06	2.1	453.50	1441	250	250	53	90	82	6	N/A	
5	145	.06	2.1	457.38	1437	249	251	53	89	81	6	N/A	
6	150	.06	2.1	461.18	1441	249	251	53	89	81	6	N/A	
6-1	155	.04	1.4	464.43	1431	250	251	53	87	80	5	N/A	
2	160	.04	1.4	467.61	1430	250	249	53	87	80	5	N/A	
3	165	.04	1.4	470.79	1430	250	251	53	87	80	5	N/A	
4	170	.04	1.4	473.96	1427	250	251	53	87	81	5	N/A	
5	175	.04	1.4	477.16	1421	250	250	53	87	80	5	N/A	
6	180	.04	1.4	480.31	1417	250	251	55	88	80	5	N/A	
	Total	2.6697	21.0		17194					1856			
	Averag												

Circle correct bracketed units on data sheet.

Clean Air Engineering

000082

PARTICULATE TESTING FIELD DATA SHEET

METHOD: 5 PAGE 4 OF 6

T LOCATION: STACK
IT: THERMAL OXIDIZER RUN: 2

nt IT CORPORATION	Project No. 8705
t FERNALD OHIO	Date 5.18.2000
er Operator G. PAVLOVICH	
be Operator N/A	

er Box No.	Sample Box No.
er Yd	Meter ΔH@
Factor	Pitot Cp
ak Rate Before	[cfm] [Lpm] @ (in.Hg)
ak Rate After	[cfm] [Lpm] @ (in.Hg)
t Leak Check Before: ☐	After: Good ☐ Bad ☐

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)			
Static Press. (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Amb. Temp. (°F)	Bar. Press. [in. Hg] [mbar]
Probe I.D. No.	
Liner Material	

Filter No.		
Thimble No.		
Nozzle Diameter	Nozzle I.D.	

H_2O [ml] [gm]	Silica Gel (gm)
Total V_{lc}	

Start Time: 10:44 A	Stop Time:

Traverse Point Number	Min/pt 30 Elapsed Time	Velocity Head ΔP's (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume - V_m Init. Vol. [ft³] [L] 480.41	Stack Temp. T_s (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet T_{min} (°F)	DGM Outlet T_{mout} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T_t (°F)	Notes
1-1	5	.04	1.4	483.62	1437	249	253	58	86	81	2	N/A	LEAK CHECK .003215" 49
2	10	.04	1.4	486.84	1434	251	250	57	88	82	2	N/A	NEW Vlc 480.41 (-.10)
3	15	.04	1.4	490.06	1436	250	252	59	90	83	2	N/A	
4	20	.04	1.4	493.21	1434	250	249	60	90	84	2	N/A	
5	25	.04	1.4	496.30	1437	250	250	61	91	85	2	N/A	
6	30	.04	1.4	499.35	1439	250	250	56	90	85	2	N/A	
2-1	35	.06	2.1	503.17	1448	249	253	53	92	85	5	N/A	
2	40	.06	2.1	506.99	1448	251	248	53	93	86	5	N/A	
3	45	.06	2.1	510.88	1445	251	247	53	92	86	5	N/A	
4	50	.06	2.1	514.80	1445	250	250	54	92	86	5	N/A	
5	55	.06	2.1	518.71	1445	250	249	56	91	86	5	N/A	
6	60	.06	2.1	522.59	1442	250	251	56	89	85	5	N/A	
	Total	2.6694	21.0		17290					2098			
	Average	.0225											

3050

Unspecified units on data sheet

000082

:ST LOCATION: STACK

NIT: THERMAL OXIDIZER RUN: 2

PARTICULATE TESTING FIELD DATA SHEET

METHOD: 5 PAGE 5 OF 6

ient IT CORPORATION	Project No. 8705
ant FERNALD, OHIO	Date 5-18-2000
ater Operator G. PAVLOVICS	
obe Operator N/A	

eter Box No.	Sample Box No.
eter Yd	Meter ΔH@
Factor 33.6	Pitot Cp
eak Rate Before	[cfm] [Lpm] @ (in.Hg)
eak Rate After	[cfm] [Lpm] @ (in.Hg)
tot Leak Check Before: ☐	After: Good ☐ Bad ☐

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)

Static Press. (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Amb. Temp. (°F)	Bar. Press. [in. Hg] [mbar]
Probe I.D. No.	
Liner Material	

Filter No.		
Thimble No.		
Nozzle Diameter	Nozzle I.D.	

H_2O [ml] [gm]	Silica Gel (gm)
Total V_{lc}	

Start Time:	Stop Time:

ORT / averse Point umber	Min/pt 30 Elapsed Time	Velocity Head ΔP's (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume - V_m Init. Vol. [ft³] [L]	Stack Temp. T_s (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet T_{min} (°F)	DGM Outlet T_{mout} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T_t (°F)	Notes
5-1	65	.08	2.8	527.05	1424	250	254	59	87	84	6	N/A	
2	70	.08	2.8	531.49	1450	250	251	59	86	83	6	N/A	
3	75	.07	2.4	535.64	1456	249	259	60	86	83	6	N/A	
4	80	.07	2.4	539.80	1451	249	255	60	87	83	6	N/A	
5	85	.08	2.8	544.20	1449	250	258	61	87	83	7	N/A	
6	90	.08	2.8	548.68	1453	250	262	54	88	83	7	N/A	
4-1	95	.07	2.4	552.82	1451	250	265	54	86	83	6	N/A	
2	100	.07	2.4	556.95	1449	249	254	55	88	82	6	N/A	
3	105	.07	2.4	561.09	1451	250	254	56	87	82	6	N/A	*
4	110	.07	2.4	565.21*	1454	248	252	53	87	83	6	N/A	STOP 12:34 START 12:46
5	115	.07	2.4	569.34	1422	252	253	56	84	83	6	N/A	
6	120	.07	2.4	573.43	1449	251	254	55	85	82	6	N/A	
	Total	3.2480	30.40		17359					2036			
	Averag	.2707											

Circle correct brack[illegible] units on data sheet.

9950

000084

PARTICULATE TESTING FIELD DATA SHEET

METHOD: 5 PAGE 6 OF 6

T LOCATION: STACK

T: THERMAL OXIDIZER RUN: 2

nt IT CORPORATION	Project No. 8705
t FERNALD, OHIO	Date 5-18-2000
er Operator G. PAVLOVICS	
pe Operator N/A	

er Box No.	Sample Box No.
er Yd	Meter ΔH@
actor	Pitot Cp
k Rate Before	[cfm] [Lpm] @ (in.Hg)
k Rate After	[cfm] [Lpm] @ (in.Hg)
t Leak Check Before: ☐	After: Good ☐ Bad ☐

Cross-Section of Test Location

[N] [UP]

Duct Dimensions (in.)

Static Press. (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]

Amb. Temp. (°F)	Bar. Press. [in. Hg] [mbar]
Probe I.D. No.	
Liner Material	

Filter No.		
Thimble No.		
Nozzle Diameter	Nozzle I.D.	

H_2O [ml] [gm]	Silica Gel (gm)
Total V_{lc}	

Start Time:	Stop Time: 13:57

LT / verse oint mber	Min/pt 30 Elapsed Time	Velocity Head ΔP's (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume - V_m Init. Vol. [ft^3] [✓]	Stack Temp. T_s (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet T_{min} (°F)	DGM Outlet T_{mout} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T_t (°F)	Notes
-1	125	.06	2.0	577.19	1439	250	245	55	88	82	5	N/A	
2	130	.06	2.0	580.99	1437	251	250	56	90	83	5	N/A	
3	135	.06	2.0	584.81	1438	250	250	57	88	84	5	N/A	
4	140	.06	2.0	588.60	1433	250	252	58	89	84	5	N/A	
5	145	.06	2.0	592.42	1433	251	251	58	88	84	5	N/A	
6	150	.06	2.0	596.21	1434	252	251	59	89	84	5	N/A	
-1	155	.04	1.3	599.35	1419	250	244	55	88	84	3	N/A	
2	160	.04	1.3	602.50	1421	250	247	55	88	84	3	N/A	
3	165	.04	1.3	605.67	1417	250	248	55	90	86	3	N/A	
4	170	.04	1.3	608.80	1419	249	249	56	90	86	3	N/A	
5	175	.04	1.3	611.92	1415	249	250	55	89	86	3	N/A	
6	180	.04	1.3	615.05	1413	250	250	55	89	86	3	N/A	
	Total	2.6697	19.8		17118					2079			
	Average												

3050

Circle correct bracketed units on data sheet

000085

MOISTURE TESTING FIELD DATA SHEET

METHOD: 1-4 PAGE 1 OF 1

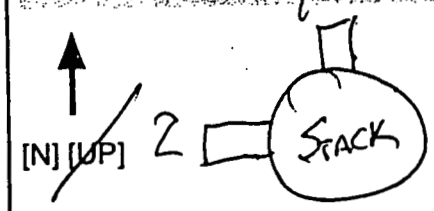
:ST LOCATION: STACK

NIT: THERMAL OXIDIZER RUN:

ient IT CORPORATION	Project No. 8705
ant FERNALD, OHIO	Date 5/17/2000
eter Operator G. PAVLOVICH	
obe Operator N/A	

eter Box No. 66-17	Sample Box No.
eter Yd 1.0072	Meter ΔH@ 2.025
Factor N/A	Pitot Cp .84
eak Rate Before .005	[cfm] [~~Lpm~~] @ 15 (in.Hg)
eak Rate After .001	[cfm] [~~Lpm~~] @ 5 (in.Hg)
tot Leak Check Before: ☒	After: Good ☐ Bad ☐

Cross-Section of Test Location



Duct Dimensions (in.) 28

Static Press. (in. H_2O)	Port Len. (in.)	Gas Flow [In] [Out] of page	First point all the way [In] [Out]
-.2	10.5		

Amb. Temp. (°F) 68	Bar. Press. 29.40 [in. Hg] [~~mbar~~]
Probe I.D. No.	
Liner Material GLASS	

Filter No. N/A		
Thimble No. N/A		
Nozzle Diameter N/A	Nozzle I.D.	

H_2O 78.7 [ml] [gm]	Silica Gel (gm) 14.6
Total V_{lc} 93.3	

Start Time: 17:36	Stop Time: 18:36

Traverse Point Number	Min/pt 5 Elapsed Time	Velocity Head ΔP's (in. H_2O)	Orifice Setting ΔH (in. H_2O)	Gas Sample Volume - V_m Init. Vol. [ft^3] [L] 299.17	Stack Temp. T_s (°F)	Probe T_p (°F) Set Points 250	Filter T_f (°F) Set Points 250	Cond. Temp. T_c (°F)	DGM Inlet T_{min} (°F)	DGM Outlet T_{mout} (°F)	Pump Vacuum (in. Hg)	XAD Trap Temp T_t (°F)	Notes
1-1	5	.08	2.0	302.90	1441	251	249	61	79	71	1	N/A	8.5 O_2
2	10	.07	2.0	306.51	1443	251	248	55	80	71	1	N/A	4.0 CO_2
3	15	.08	2.0	310.16	1445	250	250	53	80	71	1	N/A	
4	20	.08	2.0	313.88	1447	248	250	55	79	71	1	N/A	
5	25	.07	2.0	317.58	1431	250	249	56	78	71	1	N/A	V_{mSTD} 43.656
6	30	.06	2.0	321.37	1420	250	249	57	79	72	1	N/A	V_{wSTD} 4.39
2-1	35	.04	2.0	325.03	1424	250	249	57	80	72	1	N/A	B_{wo} = .091
2	40	.08	2.0	328.76	1432	246	250	57	80	71	1	N/A	
3	45	.08	2.0	332.46	1445	251	249	57	82	72	1	N/A	
4	50	.08	2.0	336.20	1443	250	250	58	82	72	1	N/A	
5	55	.07	2.0	339.94	1440	250	250	57	82	72	1	N/A	
6	60	.05	2.0	343.64	1434	250	250	59	82	73	1	N/A	
	Total	31.53		44.47									
	Avera	.2633	2.0		1435				75				

* Sum of square roots

Circle correct bracketed units on data sheet.

Clean Air Engineering

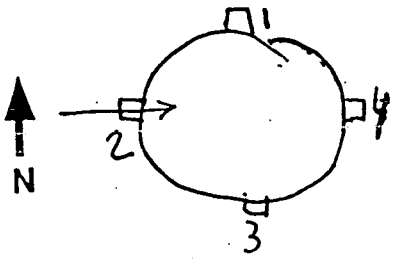
UNIT: 1 RUN: 1A

VOST FIELD DATA SHEET

3050

TEST LOCATION: Stack

Client	IT Corp
Project Number	8705
Date	5-17-2000
Plant	IT WPRAP
Location	Fernald, OH
Operator	Bill Graham
Field Blank I.D.	18A+B
Tenax	15A
Tenax/Charcoal	15B



Schematic of Testing Location

Bar. Press. (in. Hg)	29.40
VOST Box Number	~~67-V~~ 66
Meter Box Number	67-V1
Meter Yd	1.0027
Meter ΔH@	
Probe Heater Setting	NA
Probe Material	Quartz
Probe Number	66
Probe Length	3'

DATA SET # A

Start Time 10:36 Stop Time 11:16

Leak Rate Before .000 LPM@ 12 "Hg

Leak Rate After .000 LPM@ 12 "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume 3634.20 / Sample Gas Volume V_m (liters) 3639.48	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
5	.5	34	NA	50	50	56	77	8	2.0	3639.80	Stack temp ≈ 1450°F
10	.5	19	|	50	50	52	78	4	1.6	3643.31	
15	.5	19	|	51	51	54	79	4	1.7	3647.17	
20	.5	26	|	53	52	55	80	7	1.8	3651.55	
25	.5	15	|	55	59	56	81	5	1.7	3656.75	
Average											

~~DATA SET # B~~

Start Time Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
30	.5	15	NA	56	58	55	82	4	1.6	3659.67	
35	.5	15	|	54	55	56	82	4	1.6	3662.41	
40	.5	15	|	53	56	55	84	4	1.6	3665.30	
Average	.5						80		1.7	31.60	

DATA SET # C

Start Time Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes

UNIT: 1 RUN: 1B

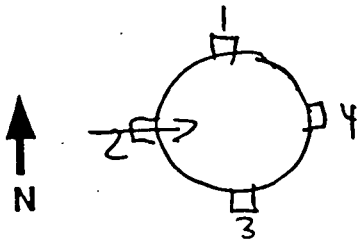
VOST FIELD DATA SHEET

PAGE 1 OF 1

TEST LOCATION: Stack

Client	IT Corp
Project Number	8705
Date	5-17-2000
Plant	ITWPRAP
Location	Fernald, OH
Operator	Bill Graham

Field Blank I.D.	18A+B
Tenax	13A
Tenax/Charcoal	13B



Schematic of Testing Location

Bar. Press. (in. Hg)	29.40
VOST Box Number	66
Meter Box Number	67-U1
Meter Yd	1.0027
Meter ΔH@	
Probe Heater Setting	NA
Probe Material	Quartz
Probe Number	66
Probe Length	3'

DATA SET # A

Start Time 11:28 Stop Time 12:08

Leak Rate Before .0000 LPM@ 12 "Hg

Leak Rate After .0000 LPM@ 10 "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume 3665.75 / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
5	.5	15	NA	54	55	55	86	7	1.6	3668.85	
10	.5	16	|	55	56	55	87	8	1.7	3671.65	
15	.5	16	|	54	55	56	87	8	1.6	3674.42	
20	.5	16	|	55	56	56	86	8	1.6	3677.22	
25	.5	16	|	57	58	58	87	8	1.6	3679.69	
Average											

~~DATA SET # B~~

Start Time Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
30	.5	16	NA	55	56	56	88	10	1.6	3682.22	
35	.5	15	|	54	56	56	88	10	1.6	3684.68	
40	.5	15	|	55	56	57	89	10	1.6	3687.31	
Average	.5						87		1.6	21.47	

DATA SET # C

Start Time Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes

000087

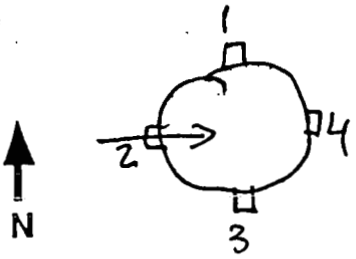
UNIT: 1 RUN: 1D

VOST FIELD DATA SHEET

TEST LOCATION: Stack

Client	IT Corp
Project Number	8705
Date	5-17-2000
Plant	ITW PRAP
Location	Fernald, OH
Operator	Bill Graham

Field Blank I.D.	15A+B
Tenax	20A
Tenax/Charcoal	20B



Schematic of Testing Location

Bar. Press. (in. Hg)	29.40
VOST Box Number	66
Meter Box Number	67-V1
Meter Yd	1.0027
Meter ΔH@	

Probe Heater Setting	NA
Probe Material	Quartz
Probe Number	66
Probe Length	31

DATA SET # A

Start Time 13:09 | Stop Time 13:49

Leak Rate Before .000 LPM@ 12 "Hg | Leak Rate After .000 LPM@ 8 "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume 3709.46 / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
5	.5	16	NA	55	55	59	93	5	1.6	3712.09	
10	.5	16		56	55	60	94	5	1.6	3714.82	
15	.5	16		55	55	60	93	5	1.6	3717.44	
20	.5	16		55	56	59	94	6	1.6	3720.15	
25	.5	16		55	55	58	94	6	1.6	3723.05	
Average											

DATA SET # B

Start Time | Stop Time

Leak Rate Before LPM@ "Hg | Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
30	.5	16	NA	54	54	56	93	6	1.6	3725.91	
35	.5	15		54	55	57	92	5	1.6	3728.80	
40	.5	16		54	55	56	91	5	1.6	3731.51	
Average	.5						93		1.6		

DATA SET # C

Start Time | Stop Time

Leak Rate Before LPM@ "Hg | Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
										000088	
										[redacted]	
Average											

UNIT: 1 RUN: 1C

VOST FIELD DATA SHEET

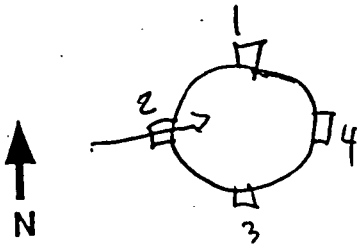
PAGE 1 OF 1

3050

TEST LOCATION: Stack

Client	IT Corp
Project Number	8705
Date	5-17-2000
Plant	~~[illegible]~~ ITWPRAP
Location	~~[illegible]~~ Fernald, OH
Operator	B. McGraham

Field Blank I.D.	18A+B
Tenax	12A
Tenax/Charcoal	12B



Schematic of Testing Location

Bar. Press. (in. Hg)	29.40
VOST Box Number	66
Meter Box Number	67-V1
Meter Yd	1.0027
Meter ΔH@	

Probe Heater Setting	NA
Probe Material	Quartz
Probe Number	66
Probe Length	3'

DATA SET # A

Start Time 12:20 Stop Time 13:00

Leak Rate Before .000 LPM@ 12 "Hg

Leak Rate After .000 LPM@ 8 "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume 3687.56 / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
5	.5	16	NA	55	54	55	90	5	1.6	3690.35	
10	.5	16		56	55	55	90	4	1.6	3693.30	
15	.5	16		54	54	55	90	5	1.6	3696.27	
20	.5	16		55	55	56	90	4	1.6	3698.61	
25	.5	16		55	55	58	91	5	1.6	3701.05	
Average											

~~DATA SET # B~~

Start Time Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
30	.5	15	NA	55	55	58	91	5	1.6	3703.61	
35	.5	16		53	55	56	91	5	1.6	3706.30	
40	.5	16		56	55	60	92	5	1.6	3709.00	
Average	.5						91		1.6	21.44	

DATA SET # C

Start Time Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes

000089

UNIT: 1 RUN: 2A

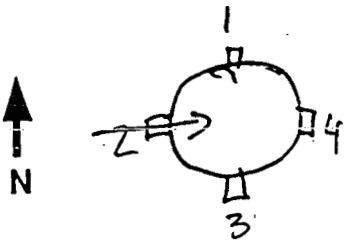
VOST FIELD DATA SHEET

PAGE 1 OF 1

TEST LOCATION: Stack

Client	IT Corp
Project Number	8705
Date	5-17-2000
Plant	ITWRAP
Location	Fernald, OH
Operator	Bill Graham

Field Blank I.D.	18A+B
Tenax	19A
Tenax/Charcoal	19B



Schematic of Testing Location

Bar. Press. (in. Hg)	29.40 3050
VOST Box Number	66
Meter Box Number	67-U1
Meter Yd	1.0027
Meter ΔH@	

Probe Heater Setting	NA
Probe Material	Quartz
Probe Number	66
Probe Length	31

DATA SET # A

Start Time 14:24 Stop Time 15:04

Leak Rate Before .000 LPM@ 12 "Hg

Leak Rate After .000 LPM@ 8 "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume 3738.22 / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
5	.5	16	NA	59	59	61	87	8	1.6	~~3740.29~~	3740.89
10	.5	16		60	60	60	87	8	1.6	3745.51	
15	.5	16		61	61	60	88	8	1.6	3749.00	
20	.5	16		62	62	60	88	8	1.6	3752.23	
25	.5	16		63	62	60	89	8	1.6	3755.37	
Average											

~~DATA SET # B~~

Start Time Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
30	.5	16	NA	59	58	60	88	8	1.6	3758.50	
35	.5	16		59	59	60	87	8	1.6	3760.87	
40	.5	16		60	59	60	87	8	1.5	3763.32	
Average	.5						88		1.6	25.10	

DATA SET # C

Start Time Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes

000090

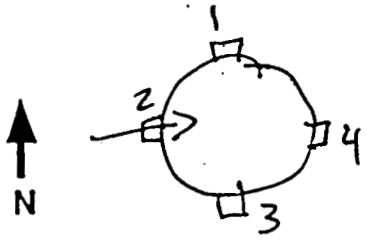
UNIT: 1 RUN: 2B

VOST FIELD DATA SHEET

TEST LOCATION: Stack

Client	IT Corp
Project Number	8705
Date	5-17-2000
Plant	ITWPLAP
Location	Fernald, OH
Operator	Bill Graham

Field Blank I.D.	18A+B
Tenax	17A
Tenax/Charcoal	17B



Schematic of Testing Location

Bar. Press. (in. Hg)	29.40
VOST Box Number	66
Meter Box Number	67-V1
Meter Yd	1.0027
Meter ΔH@	

Probe Heater Setting	NA
Probe Material	Quartz
Probe Number	66
Probe Length	3'

DATA SET # A

Start Time 15:24 | Stop Time 17:01

Leak Rate Before .000 LPM@ 17 "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume 3772.23 / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
5	.5	16	NA	61	60	62	85	5	1.6	3775.39	stop 15:28
10	.5	16		62	60	63	80	8	1.6	3779.83	due to
15	.5	16		59	59	56	80	8	1.6	3782.55	weather
20	.5	16		58	57	59	79	8	1.6	3785.54	restart: 16:53
25	.5	16		55	54	55	78	8	1.6	3789.65	
Average											

~~DATA SET # B~~

Start Time | Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
30	.5	16	NA	54	54	55	77	8	1.6	3791.87	
35	.5	15		53	52	50	77	8	1.6	3794.63	
40	.5	15		53	53	51	77	8	1.5	3797.33	
Average	.5						79		1.6	25.1	

DATA SET # C

Start Time | Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
Average											

UNIT: 1 RUN: 2C

VOST FIELD DATA SHEET

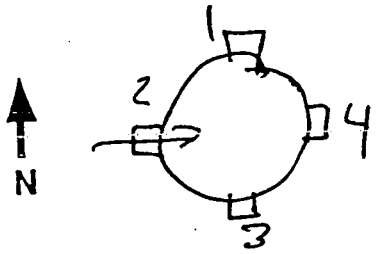
PAGE 1 OF 1

TEST LOCATION: Stack

3050

Client	IT Corp
Project Number	8705
Date	5-17-2000
Plant	ITWPRA
Location	Fernald, OH
Operator	BM Graham

Field Blank I.D.	1BA+B
Tenax	6A
Tenax/Charcoal	6B



Schematic of Testing Location

Bar. Press. (in. Hg)	29.40
VOST Box Number	66
Meter Box Number	67-V1
Meter Yd	1.0027
Meter ΔH@	

Probe Heater Setting	NA
Probe Material	Quartz
Probe Number	66
Probe Length	3'

DATA SET # A

Start Time 17:10 Stop Time 17:50

Leak Rate Before .000 LPM@ 14 "Hg

Leak Rate After .000 LPM@ 9 "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume 3797.50 / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
5	.5	16	NA	51	52	53	79	8	1.6	3799.89	
10	.5	16		50	52	53	79	8	1.6	3802.48	
15	.5	15		49	52	53	79	8	1.6	3805.17	
20	.5	16		52	53	57	80	8	1.6	3808.09	
25	.5	16		52	54	55	80	8	1.6	3810.65	
Average											

~~DATA SET # B~~

Start Time Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
30	.5	16	NA	54	55	57	81	8	1.6	3813.17	
35	.5	15		55	55	57	81	8	1.6	3815.67	
40	.5	15		54	53	54	82	9	1.6	3818.29	
Average	.5						80		1.6	20.79	

DATA SET # C

Start Time Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes

000092

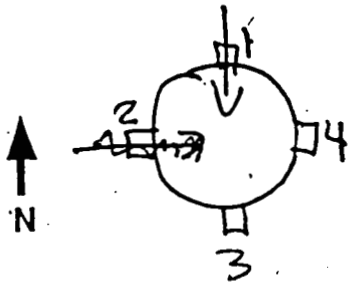
UNIT: 1 RUN: 20

VOST FIELD DATA SHEET

PAGE 1 OF 1

TEST LOCATION: Stack

Client	IT Corp
Project Number	8705
Date	5-12-00
Plant	ITWPRAP
Location	Fernald, OH
Operator	Bill Graham
Field Blank I.D.	18A+B
Tenax	5A
Tenax/Charcoal	5B



Schematic of Testing Location

Bar. Press. (in. Hg)	29.40
VOST Box Number	66
Meter Box Number	67-01
Meter Yd	6.0027
Meter ΔH@	
Probe Heater Setting	NA
Probe Material	Quartz
Probe Number	6C
Probe Length	31

DATA SET # A

Start Time 18:39 Stop Time 18:39

Leak Rate Before .000 LPM@ 12 "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume 3819.95 / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
5	.5	16	NA	51	50	52	83	4	1.6	3822.05	
10	.5	16		51	50	52	83	4	1.6	3824.49	
15	.5	16		50	50	51	83	5	1.6	3827.36	
20	.5	16		50	51	51	84	5	1.6	3830.60	
25	.5	16		51	50	53	84	5	1.6	3833.85	
Average											

~~DATA SET # B~~

Start Time Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg.

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
30	.5	16	NA	53	54	55	84	5	1.6	3837.01	
35	.5	16		54	55	55	84	5	1.6	3840.08	
40	.5	16		56	55	56	85	4	1.6	3842.59	
Average	.5						84		1.6	32.64	

DATA SET # C

Start Time Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
Average											

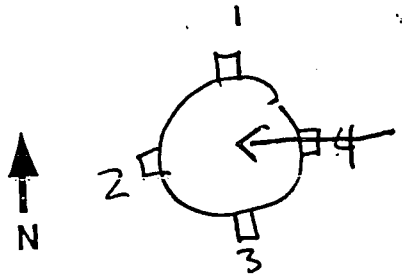
UNIT: 1 RUN: 3A

VOST FIELD DATA SHEET

3050

TEST LOCATION: Stack

Client	IT Corp
Project Number	8705
Date	5-18-00
Plant	ITWPCAP
Location	Fernald, OH
Operator	Bill Graham
Field Blank I.D.	18A/B
Tenax	4A
Tenax/Charcoal	4B



Schematic of Testing Location

Bar. Press. (in. Hg)	29.40
VOST Box Number	66
Meter Box Number	67-V1
Meter Yd	1.0027
Meter ΔH@	
Probe Heater Setting	NA
Probe Material	Quartz
Probe Number	66
Probe Length	3'

DATA SET # A

Start Time 7:43 Stop Time 8:23

Leak Rate After .000 LPM@ 10 "Hg

Leak Rate Before .000 LPM@ 14 "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume 3844.21 / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
5	.5	16	NA	59	60	60	73	6	1.5	3846.75	
10	.5	16		60	60	55	74	6	1.5	3849.57	
15	.5	16		57	58	55	75	6	1.6	3852.38	
20	.5	16		56	55	56	77	6	1.6	3855.96	
25	.5	16		57	56	57	78	6	1.6	3857.37	
Average											

~~DATA SET # B~~

Start Time Stop Time

Leak Rate After LPM@ "Hg

Leak Rate Before LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
30	.5	16	NA	58	57	57	79	6	1.6	3859.77	
35	.5	15		59	58	58	81	6	1.6	3862.25	
40	.5	15		57	55	55	82	6	1.6	3864.97	
Average	.5						77		1.6	20.76	

DATA SET # C

Start Time Stop Time

Leak Rate After LPM@ "Hg

Leak Rate Before LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes

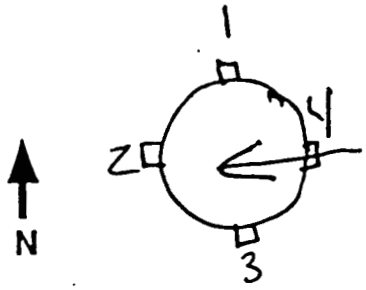
UNIT: 1 RUN: 3B

VOST FIELD DATA SHEET

TEST LOCATION: Stack

Client	IT Corp
Project Number	8705
Date	5-18-2000
Plant	ITWPRAP
Location	Fernald, OH
Operator	Bill Cracham

Field Blank I.D.	18A/B
Tenax	3A
Tenax/Charcoal	3B



Schematic of Testing Location

Bar. Press. (in. Hg)	29.40
VOST Box Number	66
Meter Box Number	67-11
Meter Yd	1.0027
Meter ΔH@	

Probe Heater Setting	NA
Probe Material	Quartz
Probe Number	66
Probe Length	31

DATA SET # A

Start Time 8:32 Stop Time 9:12

Leak Rate Before .000 LPM@ 12 "Hg

Leak Rate After .000 LPM@ 8 "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume 3865.52 / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
5	.5	16	NA	49	49	47	85	6	1.6	3868.30	
10	.5	16		50	50	49	86	6	1.6	3871.32	
15	.5	16		50	51	49	87	6	1.6	3873.99	
20	.5	16		50	50	49	88	6	1.6	3877.00	
25	.5	15		51	50	49	88	6	1.6	3879.58	
Average											

~~DATA SET # B~~

Start Time Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
30	.5	15	NA	50	51	51	89	6	1.6	3882.23	
35	.5	16		50	50	49	89	7	1.6	3884.70	
40	.5	16		50	50	48	90	7	1.6	3887.20	
Average	.5						88		1.6	21.68	

DATA SET # C

Start Time Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
Average											

UNIT: 1 RUN: 3C

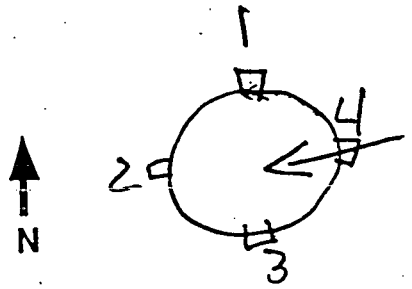
VOST FIELD DATA SHEET

3050

TEST LOCATION: Stack

Client	IT Corp
Project Number	8705
Date	5-18-2000
Plant	ITWPRAP
Location	Fernald, OH
Operator	BW Graham

Field Blank I.D.	18A/B
Tenax	2A
Tenax/Charcoal	2B



Schematic of Testing Location

Bar. Press. (in. Hg)	29.40
VOST Box Number	66
Meter Box Number	67-V1
Meter Yd	1.0027
Meter ΔH@	

Probe Heater Setting	NA
Probe Material	Quartz
Probe Number	66
Probe Length	31

DATA SET # A

Start Time 9:20 Stop Time 10:00

Leak Rate Before .000 LPM@ 12 "Hg

Leak Rate After .000 LPM@ 12 "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
										3887.53	
5	.5	16	NA	51	50	53	91	10	1.6	3890.50	
10	.5	16		50	50	52	91	10	1.6	3893.49	
15	.5	16		49	50	50	91	10	1.6	3896.31	
20	.5	16		48	49	49	91	10	1.6	3898.77	
25	.5	16		50	50	50	91	9	1.6	3901.04	
Average											

~~DATA SET # B~~

Start Time Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
30	.5	15	NA	50	50	49	91	9	1.6	3903.13	
35	.5	15		49	49	49	91	9	1.6	3905.30	
40	.5	15		49	49	48	91	9	1.6	3907.89	
Average	.5						91		1.6	20.36	

DATA SET # C

Start Time Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes

UNIT: 1 RUN: 30

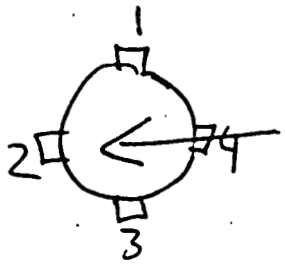
VOST FIELD DATA SHEET

TEST LOCATION: Stack

Client	IT Corp
Project Number	8705
Date	5-18-2000
Plant	ITWPRAP
Location	Fernald, OH
Operator	B. M. Graham

Field Blank I.D.	18A/B
Tenax	1A
Tenax/Charcoal	1B

N



Schematic of Testing Location

Bar. Press. (in. Hg)	29.40
VOST Box Number	66
Meter Box Number	67-U1
Meter Yd	1.0027
Meter ΔH@	

Probe Heater Setting	NA
Probe Material	Quartz
Probe Number	66
Probe Length	31

DATA SET # A

Start Time 10:06 | Stop Time 10:46

Leak Rate Before .000 LPM@ 13 "Hg

Leak Rate After .000 LPM@ 10 "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures, (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume 3908.25 / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
5	.5	16	NA	50	50	51	91	4	1.6	3911.47	
10	.5	16		49	49	50	91	4	1.6	3914.40	
15	.5	16		49	49	49	91	4	1.6	3916.91	
20	.5	16		50	50	50	91	4	1.6	3919.16	
25	.5	16		50	50	51	91	4	1.6	3921.30	
Average											

~~DATA SET # B~~

Start Time | Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures, (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
30	.5	16	NA	51	50	51	91	4	1.6	3923.56	
35	.5	16		51	51	52	91	4	1.6	3925.85	
40	.5	16		51	52	54	92	4	1.6	3929.28	
Average	.5						91		1.6	2.03	

DATA SET # C

Start Time | Stop Time

Leak Rate Before LPM@ "Hg

Leak Rate After LPM@ "Hg

Time (min.)	SAMPLING RATE L/min	SAMPLING RATE ss ball	Gas Temperatures, (°F) Probe Temp.	Trap 1 Temp.	Trap 2 Temp.	Cond. Temp.	Meter Temp.	Pump Vacuum (in. Hg)	Meter Pressure ΔH (in. H_2O)	Initial Volume / Sample Gas Volume V_m (liters)	Cartridge I.D. Tenax / Tenax/Charcoal / Notes
Average											

000097

3050

FIELD DATA PRINTOUTS

E

Field Data Printout

Location: Thermal Oxidizer Stack
Test Run: 2
Client: IT Corporation
Project No: 8705
Test Date: 5/18/00
Meter ΔH@: 2.0250
Meter Y_d: 1.0072
Pitot C_p: 0.84
Static P: -0.1
Leak Rate Before: 0.003 cfm @ 15 "Hg
Leak Rate After: 0.002 cfm @ 13 "Hg

Method: M5
Testing Type: Particulate
Area (ft²): 4.28
Filter No: 203421
Thimble No: NA
Beaker No:

Bar. Press. (in. Hg): 29.40
Actual Moisture (%): 9.3
Nozzle Diameter (D_n): 0.58
O_2 (dry volume %): 7.3
CO_2 (dry volume %): 3.9
Start Time (approx.): 07:38
Stop Time (approx.): 13:57
H_2O (condensate, ml): 511.1
H_2O (silica, g): 61.3

Traverse Point	Run Time	Pitot ΔP_s	Sample ΔH	Metered	Stack T_s	Dry Gas Meter		$\sqrt{\Delta P_s}$ (calculated)	Volume (calculated)	Isokinetics (calculated)
						T_{in}	T_{out}			
	0.0	(in. H_2O)	(in. H_2O)	343.93	(°F)	(°F)	(°F)	($\sqrt{in.}$ H_2O)	(ft³)	(%)
2-01-01	5.0	0.05	1.70	347.38	1,432	75	71	0.22	3.45	101.8
2-01-02	10.0	0.05	1.70	350.60	1,429	77	71	0.22	3.22	94.8
2-01-03	15.0	0.05	1.70	353.97	1,431	80	72	0.22	3.37	98.9
2-01-04	20.0	0.05	1.70	357.38	1,431	81	72	0.22	3.41	100.0
2-01-05	25.0	0.06	1.70	360.77	1,430	82	74	0.24	3.39	90.4
2-01-06	30.0	0.06	1.70	364.14	1,431	83	74	0.24	3.37	89.8*
2-02-01	35.0	0.07	2.40	368.19	1,438	87	76	0.26	4.05	99.8
2-02-02	40.0	0.07	2.40	372.31	1,436	87	76	0.26	4.12	101.4
2-02-03	45.0	0.07	2.40	376.44	1,439	89	77	0.26	4.13	101.5
2-02-04	50.0	0.07	2.40	380.56	1,444	88	78	0.26	4.12	101.4
2-02-05	55.0	0.07	2.40	384.68	1,441	89	78	0.26	4.12	101.2
2-02-06	60.0	0.07	2.40	388.68	1,441	89	79	0.26	4.00	98.2
2-03-01	65.0	0.07	2.40	392.80	1,441	90	80	0.26	4.12	100.9
2-03-02	70.0	0.07	2.40	396.92	1,443	90	80	0.26	4.12	101.0
2-03-03	75.0	0.07	2.40	401.04	1,441	90	80	0.26	4.12	100.9
2-03-04	80.0	0.07	2.40	405.18	1,442	90	80	0.26	4.14	101.4
2-03-05	85.0	0.07	2.40	409.26	1,441	91	81	0.26	4.08	99.8
2-03-06	90.0	0.07	2.40	413.37	1,440	91	81	0.26	4.11	100.5
2-04-01	95.0	0.07	2.40	417.49	1,443	91	81	0.26	4.12	100.8
2-04-02	100.0	0.07	2.40	421.60	1,445	90	81	0.26	4.11	100.7
2-04-03	105.0	0.07	2.40	425.73	1,448	92	81	0.26	4.13	101.1
2-04-04	110.0	0.07	2.40	429.85	1,448	91	81	0.26	4.12	100.9
2-04-05	115.0	0.07	2.40	433.97	1,447	90	81	0.26	4.12	101.0
2-04-06	120.0	0.07	2.40	438.10	1,450	91	81	0.26	4.13	101.2
2-05-01	125.0	0.06	2.10	441.94	1,439	89	81	0.24	3.84	101.5
2-05-02	130.0	0.06	2.10	445.78	1,441	89	81	0.24	3.84	101.5
2-05-03	135.0	0.06	2.10	449.62	1,439	89	81	0.24	3.84	101.5
2-05-04	140.0	0.06	2.10	453.50	1,441	90	82	0.24	3.88	102.4
2-05-05	145.0	0.06	2.10	457.38	1,437	89	81	0.24	3.88	102.5
2-05-06	150.0	0.06	2.10	461.18	1,441	89	81	0.24	3.80	100.5
2-06-01	155.0	0.04	1.40	464.43	1,431	87	80	0.20	3.25	105.1
2-06-02	160.0	0.04	1.40	467.61	1,430	87	80	0.20	3.18	102.8
2-06-03	165.0	0.04	1.40	470.79	1,430	87	80	0.20	3.18	102.8
2-06-04	170.0	0.04	1.40	473.96	1,427	87	81	0.20	3.17	102.3
2-06-05	175.0	0.04	1.40	477.16	1,421	87	80	0.20	3.20	103.2
2-06-06	180.0	0.04	1.40	480.31	1,417	88	80	0.20	3.15	101.4
LEAK CHECK	180.0			480.41						
1-01-01	185.0	0.04	1.40	483.62	1,437	86	81	0.20	3.21	103.9
1-01-02	190.0	0.04	1.40	486.84	1,434	88	82	0.20	3.22	103.9
1-01-03	195.0	0.04	1.40	490.06	1,436	90	83	0.20	3.22	103.7
1-01-04	200.0	0.04	1.40	493.21	1,434	90	84	0.20	3.15	101.3
1-01-05	205.0	0.04	1.40	496.30	1,437	91	85	0.20	3.09	99.2
1-01-06	210.0	0.04	1.40	499.35	1,439	90	85	0.20	3.05	98.1
1-02-01	215.0	0.06	2.10	503.17	1,448	92	85	0.24	3.82	100.5
1-02-02	220.0	0.06	2.10	506.99	1,448	93	86	0.24	3.82	100.3
1-02-03	225.0	0.06	2.10	510.88	1,445	92	86	0.24	3.89	102.2
1-02-04	230.0	0.06	2.10	514.80	1,445	92	86	0.24	3.92	103.0
1-02-05	235.0	0.06	2.10	518.71	1,445	91	86	0.24	3.91	102.8
1-02-06	240.0	0.06	2.10	522.59	1,442	89	85	0.24	3.88	102.2
1-03-01	245.0	0.08	2.80	527.05	1,424	87	84	0.28	4.46	101.7
1-03-02	250.0	0.08	2.80	531.49	1,450	86	83	0.28	4.44	102.2
1-03-03	255.0	0.07	2.40	535.64	1,456	86	83	0.26	4.15	102.1
1-03-04	260.0	0.07	2.40	539.80	1,451	87	83	0.26	4.16	102.2
1-03-05	265.0	0.08	2.80	544.20	1,449	87	83	0.28	4.40	101.1
1-03-06	270.0	0.08	2.80	548.68	1,453	88	83	0.28	4.48	103.0
1-04-01	275.0	0.07	2.40	552.82	1,451	86	83	0.26	4.14	101.8
1-04-02	280.0	0.07	2.40	556.95	1,449	88	82	0.26	4.13	101.4
1-04-03	285.0	0.07	2.40	561.09	1,451	87	82	0.26	4.14	101.8
1-04-04	290.0	0.07	2.40	565.21	1,454	87	83	0.26	4.12	101.3
1-04-05	295.0	0.07	2.40	569.34	1,422	84	83	0.26	4.13	100.9
1-04-06	300.0	0.07	2.40	573.43	1,449	85	82	0.26	4.09	100.7
1-05-01	305.0	0.06	2.00	577.19	1,439	88	82	0.24	3.76	99.3
1-05-02	310.0	0.06	2.00	580.99	1,437	90	83	0.24	3.80	100.1
1-05-03	315.0	0.06	2.00	584.81	1,438	88	84	0.24	3.82	100.7
1-05-04	320.0	0.06	2.00	588.60	1,433	89	84	0.24	3.79	99.7
1-05-05	325.0	0.06	2.00	592.42	1,433	88	84	0.24	3.82	100.6
1-05-06	330.0	0.06	2.00	596.21	1,434	89	84	0.24	3.79	99.7
1-06-01	335.0	0.04	1.30	599.35	1,419	88	84	0.20	3.14	100.7
1-06-02	340.0	0.04	1.30	602.50	1,421	88	84	0.20	3.15	101.1
1-06-03	345.0	0.04	1.30	605.67	1,417	90	86	0.20	3.17	101.2
1-06-04	350.0	0.04	1.30	608.80	1,419	90	86	0.20	3.13	100.0
1-06-05	355.0	0.04	1.30	611.92	1,415	89	86	0.20	3.12	99.7
1-06-06	360.0	0.04	1.30	615.05	1,413	89	86	0.20	3.13	99.9
Final	360.0	0.24	2.02	271.02	1438	85				

Field Data Printout

Location: Thermal Oxidizer Stack
Test Run: 1
Client: IT Corporation
Project No: 8705
Test Date: 5/17/00
Meter ΔH@: 2.0250
Meter Y_d: 1.0072
Pitot C_p: 0.84
Static P: -0.2
Leak Rate Before: 0.005 cfm @ 15"Hg
Leak Rate After: 0.001 cfm @ 5"Hg

Method: M1-4
Testing Type: Velocity & Moisture
Area (ft^2): 4.28
Filter No: NA
Thimble No: NA
Beaker No: NA

Bar. Press. (in. Hg): 29.40
Actual Moisture (%): 9.2
O_2 (dry volume %): 8.5
CO_2 (dry volume %): 4.0
Start Time (approx.): 17:36
Stop Time (approx.): 18:36
H_2O (condensate, ml): 78.7
H_2O (silica, g): 14.6

Traverse Point	Run Time	Pitot ΔP_s	Sample ΔH	Metered	Stack T_s	Dry Gas Meter		$\sqrt{\Delta P_s}$ (calculated)	Volume (calculated)
				(ft^3)		$T_{m\,in}$	$T_{m\,out}$		
	0.0	(in. H_2O)	(in. H_2O)	299.17	(°F)	(°F)	(°F)	($\sqrt{in.\ H_2O}$)	(ft^3)
1-01	5.0	0.08	2.00	302.90	1,441	79	71	0.28	3.73
1-02	10.0	0.07	2.00	306.51	1,443	80	71	0.26	3.61
1-03	15.0	0.08	2.00	310.16	1,445	80	71	0.28	3.65
1-04	20.0	0.08	2.00	313.88	1,447	79	71	0.28	3.72
1-05	25.0	0.07	2.00	317.58	1,431	78	71	0.26	3.70
1-06	30.0	0.06	2.00	321.37	1,420	79	72	0.24	3.79
2-01	35.0	0.04	2.00	325.03	1,424	80	72	0.20	3.66
2-02	40.0	0.08	2.00	328.76	1,432	80	71	0.28	3.73
2-03	45.0	0.08	2.00	332.46	1,445	82	72	0.28	3.70
2-04	50.0	0.08	2.00	336.20	1,443	82	72	0.28	3.74
2-05	55.0	0.07	2.00	339.94	1,440	82	72	0.26	3.74
2-06	60.0	0.05	2.00	343.64	1,434	82	73	0.22	3.70
Final	60.0	0.26	2.00	44.47	1437	76			

Field Data Printout

Location: Stack
Test Run: 1A
Client: IT Corporation
Project No: 8705
Test Date: 5/17/00
Meter Yd: 1.0027
Static P: N/A
Leak Rate Before: 0.00 LPM @ 12 "Hg
Leak Rate After: 0.00 LPM @ 12 "Hg

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

Bar. Press. (in. Hg): 29.4
O2 (dry volume %)1: 8.5
CO2 (dry volume %)1: 4.0
Start Time (approx.): 10:36
Stop Time (approx.): 11:16

Run Time	Sample ΔH (in. H2O)	Metered (liters)	Dry Gas Meter Tm (°F)	Volume (calculated) (liters)
0.0		3634.20		
5.0	2.00	3639.80	77	5.60
10.0	1.60	3643.31	78	3.51
15.0	1.70	3647.17	79	3.86
20.0	1.80	3651.55	80	4.38
25.0	1.70	3656.75	81	5.20
30.0	1.60	3659.67	82	2.92
35.0	1.60	3662.41	82	2.74
40.0	1.60	3665.30	84	2.89
40.0	1.70	31.10	80	

/Oxygen and carbon dioxide concentrations were obtained from the Particulate Parameters.

Field Data Printout

Location: Stack
Test Run: 1B
Client: IT Corporation
Project No: 8705
Test Date: 5/17/00
Meter Yd: 1.0027
Static P: N/A
Leak Rate Before: 0.00 LPM @ 12 "Hg
Leak Rate After: 0.00 LPM @ 10 "Hg

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

Bar. Press. (in. Hg): 29.4
O2 (dry volume %)1: 8.5
CO2 (dry volume %)1: 4.0
Start Time (approx.): 11:28
Stop Time (approx.): 12:08

Run Time	Sample ΔH (in. H2O)	Metered (liters)	Dry Gas Meter Tm (°F)	Volume (calculated) (liters)
0.0		3665.75		
5.0	1.60	3668.85	86	3.10
10.0	1.70	3671.65	87	2.80
15.0	1.60	3674.42	87	2.77
20.0	1.60	3677.22	86	2.80
25.0	1.60	3679.69	87	2.47
30.0	1.60	3682.22	88	2.53
35.0	1.60	3684.68	88	2.46
40.0	1.60	3687.31	89	2.63
40.0	1.61	21.56	87	

/Oxygen and carbon dioxide concentrations were obtained from the Particulate Parameters.

Field Data Printout

Location: Stack
Test Run: 1C
Client: IT Corporation
Project No: 8705
Test Date: 5/17/00
Meter Yd: 1.0027
Static P: N/A

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

Bar. Press. (in. Hg): 29.4
O2 (dry volume %)1: 8.5
CO2 (dry volume %)1: 4.0
Start Time (approx.): 12:20
Stop Time (approx.): 13:00

Leak Rate Before: 0.00 LPM @ 12 "Hg
Leak Rate After: 0.00 LPM @ 8 "Hg

Run Time	Sample ΔH (in. H2O)	Metered (liters)	Dry Gas Meter Tm (°F)	Volume (calculated) (liters)
0.0		3687.56		
5.0	1.60	3690.35	90	2.79
10.0	1.60	3693.30	90	2.95
15.0	1.60	3696.27	90	2.97
20.0	1.60	3698.61	90	2.34
25.0	1.60	3701.05	91	2.44
30.0	1.60	3703.61	91	2.56
35.0	1.60	3706.30	91	2.69
40.0	1.60	3709.00	92	2.70
40.0	1.60	21.44	91	

/Oxygen and carbon dioxide concentrations were obtained from the Particulate Parameters.

Field Data Printout

Location: Stack
Test Run: 1D
Client: IT Corporation
Project No: 8705
Test Date: 5/17/00
Meter Yd: 1.0027
Static P: N/A
Leak Rate Before: 0.00 LPM @ 12 "Hg
Leak Rate After: 0.00 LPM @ 8 "Hg

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

Bar. Press. (in. Hg): 29.4
O2 (dry volume %)1: 8.5
CO2 (dry volume %)1: 4.0
Start Time (approx.): 13:09
Stop Time (approx.): 13:49

Run Time	Sample ΔH (in. H2O)	Metered (liters)	Dry Gas Meter Tm (°F)	Volume (calculated) (liters)
0.0		3709.46		
5.0	1.60	3712.09	93	2.63
10.0	1.60	3714.82	94	2.73
15.0	1.60	3717.44	93	2.62
20.0	1.60	3720.15	94	2.71
25.0	1.60	3723.05	94	2.90
30.0	1.60	3725.91	93	2.86
35.0	1.60	3728.80	92	2.89
40.0	1.60	3731.51	91	2.71
40.0	1.60	22.05	93	

/Oxygen and carbon dioxide concentrations were obtained from the Particulate Parameters.

Field Data Printout

Location: Stack
Test Run: 2A
Client: IT Corporation
Project No: 8705
Test Date: 5/17/00
Meter Yd: 1.0027
Static P: N/A

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

Bar. Press. (in. Hg): 29.4
O2 (dry volume %)1: 8.5
CO2 (dry volume %)1: 4.0
Start Time (approx.): 14:24
Stop Time (approx.): 15:04

Leak Rate Before: 0.00 LPM @ 12 "Hg
Leak Rate After: 0.00 LPM @ 8 "Hg

Run Time	Sample ΔH (in. H2O)	Metered (liters)	Dry Gas Meter Tm (°F)	Volume (calculated) (liters)
0.0		3738.22		
5.0	1.60	3740.89	87	2.67
10.0	1.60	3745.51	87	4.62
15.0	1.60	3749.00	88	3.49
20.0	1.60	3752.23	88	3.23
25.0	1.60	3755.37	89	3.14
30.0	1.60	3758.50	88	3.13
35.0	1.60	3760.87	87	2.37
40.0	1.50	3763.32	87	2.45
40.0	1.59	25.10	88	

/Oxygen and carbon dioxide concentrations were obtained from the Particulate Parameters.

Field Data Printout

Location: Stack
Test Run: 2B
Client: IT Corporation
Project No: 8705
Test Date: 5/17/00
Meter Yd: 1.0027
Static P: N/A
Leak Rate Before: 0.00 LPM @ 12 "Hg
Leak Rate After: 0.00 LPM @ 12 "Hg

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

Bar. Press. (in. Hg): 29.4
O2 (dry volume %)1: 8.5
CO2 (dry volume %)1: 4.0
Start Time (approx.): 15:24
Stop Time (approx.): 17:01

Run Time	Sample ΔH (in. H2O)	Metered (liters)	Dry Gas Meter Tm (°F)	Volume (calculated) (liters)
0.0		3772.23		
5.0	1.60	3775.39	85	3.16
10.0	1.60	3779.83	80	4.44
15.0	1.60	3782.55	80	2.72
20.0	1.60	3785.54	79	2.99
25.0	1.60	3789.65	78	4.11
30.0	1.60	3791.87	77	2.22
35.0	1.60	3794.63	77	2.76
40.0	1.50	3797.33	77	2.70
40.0	1.59	25.10	79	

/Oxygen and carbon dioxide concentrations were obtained from the Particulate Parameters.

Field Data Printout

Location: Stack
Test Run: 2C
Client: IT Corporation
Project No: 8705
Test Date: 5/17/00
Meter Yd: 1.0027
Static P: N/A

Method: SW846-0030
Testing Type: VOCs

Area (ft°): N/A

Bar. Press. (in. Hg): 29.4
O2 (dry volume %)1: 8.5
CO2 (dry volume %)1: 4.0
Start Time (approx.): 17:10
Stop Time (approx.): 17:50

Leak Rate Before: 0.00 LPM @ 14 "Hg
Leak Rate After: 0.00 LPM @ 9 "Hg

Run Time	Sample ΔH (in. H2O)	Metered (liters)	Dry Gas Meter Tm (°F)	Volume (calculated) (liters)
0.0		3797.50		
5.0	1.60	3799.89	79	2.39
10.0	1.60	3802.48	79	2.59
15.0	1.60	3805.17	79	2.69
20.0	1.60	3808.09	80	2.92
25.0	1.60	3810.65	80	2.56
30.0	1.60	3813.17	81	2.52
35.0	1.60	3815.67	81	2.50
40.0	1.60	3818.29	82	2.62
40.0	1.60	20.79	80	

/Oxygen and carbon dioxide concentrations were obtained from the Particulate Parameters.

Field Data Printout

Location: Stack
Test Run: 2D
Client: IT Corporation
Project No: 8705
Test Date: 5/17/00
Meter Yd: 1.0027
Static P: N/A
Leak Rate Before: 0.00 LPM @ 12 "Hg
Leak Rate After: 0.00 LPM @ 12 "Hg

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

Bar. Press. (in. Hg): 29.4
O2 (dry volume %)1: 8.5
CO2 (dry volume %)1: 4.0
Start Time (approx.): 17:59
Stop Time (approx.): 18:39

Run Time	Sample ΔH (in. H2O)	Metered (liters)	Dry Gas Meter Tm (°F)	Volume (calculated) (liters)
0.0		3819.95		
5.0	1.60	3822.05	83	2.10
10.0	1.60	3824.49	83	2.44
15.0	1.60	3827.36	83	2.87
20.0	1.60	3830.60	84	3.24
25.0	1.60	3837.85	84	7.25
30.0	1.60	3837.01	84	-0.84
35.0	1.60	3840.08	84	3.07
40.0	1.60	3842.59	85	2.51
40.0	1.60	22.64	84	

/Oxygen and carbon dioxide concentrations were obtained from the Particulate Parameters.

Field Data Printout

Location: Stack
Test Run: 3A
Client: IT Corporation
Project No: 8705
Test Date: 5/18/00
Meter Yd: 1.0027
Static P: N/A

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

Bar. Press. (in. Hg): 29.4
O2 (dry volume %)1: 7.3
CO2 (dry volume %)1: 3.9
Start Time (approx.): 07:43
Stop Time (approx.): 08:23

Leak Rate Before: 0.00 LPM @ 14 "Hg
Leak Rate After: 0.00 LPM @ 10 "Hg

Run Time	Sample ΔH (in. H2O)	Metered (liters)	Dry Gas Meter Tm (°F)	Volume (calculated) (liters)
0.0		3844.21		
5.0	1.50	3846.75	73	2.54
10.0	1.50	3849.51	74	2.76
15.0	1.60	3852.38	75	2.87
20.0	1.60	3855.96	77	3.58
25.0	1.60	3857.37	78	1.41
30.0	1.60	3859.77	79	2.40
35.0	1.60	3862.25	81	2.48
40.0	1.60	3864.97	82	2.72
40.0	1.58	20.76	77	

/Oxygen and carbon dioxide concentrations were obtained from the Particulate Parameters.

Field Data Printout

Location: Stack
Test Run: 3B
Client: IT Corporation
Project No: 8705
Test Date: 5/18/00
Meter Yd: 1.0027
Static P: N/A
Leak Rate Before: 0.00 LPM @ 12 "Hg
Leak Rate After: 0.00 LPM @ 8 "Hg

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

Bar. Press. (in. Hg): 29.4
O2 (dry volume %)1: 7.3
CO2 (dry volume %)1: 3.9
Start Time (approx.): 08:32
Stop Time (approx.): 09:12

Run Time	Sample ΔH (in. H2O)	Metered (liters)	Dry Gas Meter Tm (°F)	Volume (calculated) (liters)
0.0		3865.52		
5.0	1.60	3868.30	85	2.78
10.0	1.60	3871.32	86	3.02
15.0	1.60	3873.99	87	2.67
20.0	1.60	3877.00	88	3.01
25.0	1.60	3879.58	88	2.58
30.0	1.60	3882.23	89	2.65
35.0	1.60	3884.70	89	2.47
40.0	1.60	3887.20	90	2.50
40.0	1.60	21.68	88	

/Oxygen and carbon dioxide concentrations were obtained from the Particulate Parameters.

Field Data Printout

Location: Stack
Test Run: 3C
Client: IT Corporation
Project No: 8705
Test Date: 5/18/00
Meter Yd: 1.0027
Static P: N/A
Leak Rate Before: 0.00 LPM @ 12 "Hg
Leak Rate After: 0.00 LPM @ 12 "Hg

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

Bar. Press. (in. Hg): 29.4
O2 (dry volume %)1: 7.3
CO2 (dry volume %)1: 3.9
Start Time (approx.): 09:20
Stop Time (approx.): 10:00

Run Time	Sample ΔH (in. H2O)	Metered (liters)	Dry Gas Meter Tm (°F)	Volume (calculated) (liters)
0.0		3887.53		
5.0	1.60	3890.50	91	2.97
10.0	1.60	3893.49	91	2.99
15.0	1.60	3896.31	91	2.82
20.0	1.60	3898.77	91	2.46
25.0	1.60	3901.04	91	2.27
30.0	1.60	3903.13	91	2.09
35.0	1.60	3905.30	91	2.17
40.0	1.60	3907.89	91	2.59
40.0	1.60	20.36	91	

/Oxygen and carbon dioxide concentrations were obtained from the Particulate Parameters.

Field Data Printout

Location: Stack
Test Run: 3D
Client: IT Corporation
Project No: 8705
Test Date: 5/18/00
Meter Yd: 1.0027
Static P: N/A

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

Bar. Press. (in. Hg): 29.4
O2 (dry volume %)1: 7.3
CO2 (dry volume %)1: 3.9
Start Time (approx.): 10:06
Stop Time (approx.): 10:46

Leak Rate Before: 0.00 LPM @ 13 "Hg
Leak Rate After: 0.00 LPM @ 10 "Hg

Run Time	Sample ΔH (in. H2O)	Metered (liters)	Dry Gas Meter Tm (°F)	Volume (calculated) (liters)
0.0		3908.25		
5.0	1.60	3911.47	91	3.22
10.0	1.60	3914.40	91	2.93
15.0	1.60	3916.91	91	2.51
20.0	1.60	3919.16	91	2.25
25.0	1.60	3921.30	91	2.14
30.0	1.60	3923.56	91	2.26
35.0	1.60	3925.85	91	2.29
40.0	1.60	3929.28	92	3.43
40.0	1.60	21.03	91	

/Oxygen and carbon dioxide concentrations were obtained from the Particulate Parameters.

IT Corporation @ WPRAP; Fernald, Ohio
CAE Project No: 8705
Thermal Oxidizer Stack
May 17, 2000

INSTRUMENT CALIBRATION

Time	THC (ppmwv)	CO (ppmdv)	O_2 (%)	CO_2 (%)
10:28:16	0.9	-0.1	0.0	0.0
10:28:26	0.8	-0.1	0.0	0.0
10:28:35	0.7	-0.1	0.0	0.0
10:28:46	0.7	-0.1	0.0	0.0
10:28:56	0.8	-0.1	0.0	0.0
10:29:05	0.7	-0.1	0.0	0.0
10:29:15	0.8	-0.1	0.0	0.0
10:29:26	0.7	-0.1	0.0	0.0
10:29:36	0.8	-0.1	0.0	0.0
10:29:45	0.8	-0.1	0.0	0.0
10:29:55	0.8	-0.1	0.0	0.0
10:30:06	0.8	-0.1	0.0	0.0
10:30:15	0.7	-0.1	0.0	0.0
10:30:25	0.8	-0.1	0.0	0.0
10:30:36	0.8	-0.2	0.0	0.0
10:30:46	0.7	-0.2	0.0	0.0
10:30:55	0.7	-0.2	0.0	0.0
10:31:05	0.7	-0.2	0.0	0.0
10:31:16	0.8	-0.1	0.0	0.0
10:31:25	0.7	-0.1	0.0	0.0
10:31:35	0.8	-0.1	0.0	0.0
10:31:46	0.7	-0.1	0.0	0.0
10:31:56	0.8	-0.2	0.0	0.0
10:32:05	0.8	-0.2	0.0	0.0
10:32:15	0.7	-0.1	0.0	0.0
10:32:26	0.8	-0.1	0.0	0.0
10:32:36	0.7	-0.1	0.0	0.0
10:32:45	0.8	-0.1	0.0	0.0
10:32:56	0.7	-0.1	0.0	0.0
10:33:06	0.7	-0.1	0.0	0.0
10:33:15	0.8	-0.1	0.0	0.0
10:33:25	0.8	-0.1	0.0	0.0
10:33:36	0.7	-0.1	0.0	0.0
10:33:46	0.8	-0.1	0.0	0.0
10:33:55	0.7	-0.1	0.0	0.0
10:34:06	0.8	-0.1	0.0	0.0
10:34:16	0.7	-0.1	0.0	0.0
10:34:25	0.7	-0.1	0.0	0.0
10:34:35	0.8	-0.1	0.0	0.0
10:34:46	0.7	-0.1	0.0	0.0
10:34:56	0.7	-0.1	0.0	0.0
10:35:05	0.7	0.0	0.0	0.0
10:35:15	0.8	0.1	0.0	0.0
10:35:26	0.7	0.4	9.4	5.8
10:35:35	0.7	1.1	14.0	5.8
10:35:45	0.8	1.9	14.1	5.9
10:35:56	0.7	2.3	14.1	5.9
10:36:06	0.8	2.1	14.1	5.9
10:36:15	0.7	1.6	14.1	5.9
10:36:25	0.7	1.1	14.1	5.9
10:36:36	0.7	0.7	14.1	5.9
10:36:45	0.7	0.5	14.1	5.9
10:36:55	0.8	0.4	8.7	13.8
10:37:06	0.7	0.5	6.1	13.9
10:37:16	0.6	0.6	6.1	14.0
10:37:25	0.7	0.6	6.1	14.0

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IT Corporation @ WPRAP; Fernald, Ohio
CAE Project No: 8705
Thermal Oxidizer Stack
May 17, 2000

INSTRUMENT CALIBRATION

Time	THC (ppmwv)	CO (ppmdv)	O_2 (%)	CO_2 (%)
10:37:35	0.7	0.5	6.1	14.0
10:37:46	0.6	0.4	6.1	14.0
10:37:56	0.7	0.2	6.0	14.0
10:38:05	0.7	0.1	5.8	0.6
10:38:16	0.7	2.0	0.6	0.1
10:38:26	0.7	9.8	0.1	0.1
10:38:35	0.7	25.5	0.0	0.0
10:38:45	0.6	45.6	0.0	0.0
10:38:56	0.7	63.9	0.0	0.0
10:39:06	0.7	76.7	0.0	0.0
10:39:15	0.6	83.9	0.0	0.0
10:39:26	0.7	87.3	0.0	0.0
10:39:36	0.7	88.5	0.0	0.0
10:39:45	0.7	88.6	0.0	0.0
10:39:55	0.7	88.6	0.0	0.0
10:40:06	0.6	88.5	0.2	9.9
10:40:16	0.7	87.2	0.7	0.1
10:40:25	0.7	81.4	0.1	0.1
10:40:36	0.6	69.8	0.0	0.0
10:40:46	0.7	54.7	0.0	0.0
10:40:55	0.7	40.8	0.0	0.0
10:41:05	0.7	31.6	0.0	0.0
10:41:16	0.7	27.1	0.0	0.0
10:41:26	0.6	25.7	0.0	0.0
10:41:35	0.7	25.4	0.0	0.0
10:41:45	0.7	25.3	0.0	0.0
10:41:56	0.7	25.3	0.0	0.0
10:42:05	0.7	25.3	0.0	0.0
10:42:15	0.6	25.3	0.0	0.0
10:42:26	0.7	25.3	0.0	0.0
10:42:36	0.7	25.8	0.0	0.0
10:42:45	0.6	28.3	0.0	0.0
10:42:55	0.6	33.9	0.0	0.0
10:43:06	0.7	41.8	0.0	0.0
10:43:15	0.7	49.7	0.0	0.0
10:43:25	0.6	55.2	0.0	0.0
10:43:36	0.7	58.0	0.0	0.0
10:43:46	0.6	59.1	0.0	0.0
10:43:55	0.6	59.4	0.0	0.0
10:44:05	0.6	59.5	0.0	0.0
10:44:16	0.6	59.5	0.0	0.0
10:44:26	0.6	59.5	0.0	0.0
10:44:35	0.6	59.5	0.0	0.0
10:44:46	0.6	59.4	0.0	0.0
10:44:56	0.5	59.1	12.5	0.1

Zero Gas	N/A	-0.1	0.0	0.0
Low Gas	N/A	25.3	6.1	5.9
Mid Gas	N/A	59.5	N/A	N/A
High Gas	N/A	88.6	14.1	14.0

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IT Corporation @ WPRAP; Fernald, Ohio
CAE Project No: 8705
Thermal Oxidizer Stack
May 17, 2000

CALIBRATION BIAS 0

Time	THC (ppmwv)	CO (ppmdv)	O_2 (%)	CO_2 (%)
10:45:10	54.3	53.3	21.0	0.1
10:45:20	13.9	43.6	19.8	1.4
10:45:29	4.1	40.0	4.6	0.1
10:45:39	3.3	51.6	0.2	0.0
10:45:50	2.9	67.3	0.1	0.0
10:45:59	2.6	68.8	0.1	0.0
10:46:09	2.3	49.4	0.1	0.0
10:46:20	2.1	26.0	0.0	0.0
10:46:30	2.0	9.3	0.0	0.0
10:46:39	2.0	2.5	0.0	0.0
10:46:49	1.8	0.9	0.0	0.0
10:47:00	1.7	0.7	0.0	0.0
10:47:10	1.6	0.6	0.0	0.0
10:47:19	0.6	0.6	0.0	0.0
10:47:30	0.1	0.6	0.0	0.0
10:47:40	0.1	0.6	0.0	0.0
10:47:49	0.0	0.6	0.0	0.0
10:47:59	0.0	0.6	0.0	0.0
10:48:10	0.0	0.6	0.0	0.0
10:48:20	0.2	0.6	0.0	0.0
10:48:29	0.1	0.6	0.0	0.0
10:48:40	0.0	0.6	0.0	0.0
10:48:50	0.1	0.6	0.0	0.0
10:48:59	0.0	0.6	0.0	0.0
10:49:09	-0.3	0.6	1.6	3.8
10:49:20	-0.3	0.7	12.4	5.8
10:49:30	-0.4	1.0	13.9	5.8
10:49:39	-0.4	1.3	14.0	5.8
10:49:49	-0.5	1.5	14.0	5.8
10:50:00	-0.5	1.4	14.0	5.8
10:50:09	-0.5	1.2	14.0	5.8
10:50:19	-0.4	1.0	14.0	5.8
10:50:30	-0.6	0.9	14.0	5.9
10:50:40	-0.6	0.9	14.0	5.9
10:50:49	-0.2	0.8	13.9	6.6
10:50:59	-0.2	0.8	8.2	13.7
10:51:10	-0.2	0.9	6.1	13.8
10:51:19	-0.2	0.9	6.1	13.8
10:51:29	-0.2	0.8	6.0	13.9
10:51:40	-0.3	0.7	6.0	13.9
10:51:50	-0.3	0.6	6.0	13.9
10:51:59	-0.3	0.4	6.1	13.9
10:52:09	-0.4	0.3	6.0	13.9
10:52:20	1.3	0.4	6.3	11.6
10:52:30	-0.1	0.4	5.9	2.0
10:52:39	-0.4	1.6	0.5	0.2
10:52:50	-0.4	9.5	0.1	0.2
10:53:00	-0.6	25.5	0.1	0.1
10:53:09	-0.5	47.0	0.0	0.1
10:53:19	-0.5	65.5	0.0	0.1
10:53:30	-0.5	78.1	0.0	0.1
10:53:40	-0.6	85.0	0.0	0.1
10:53:49	-0.7	88.2	0.0	0.0
10:54:00	-0.7	89.2	0.0	0.0
10:54:10	-0.7	89.2	0.0	0.0
10:54:19	-0.7	89.1	0.0	0.0

IT Corporation @ WPRAP; Fernald, Ohio
CAE Project No: 8705
Thermal Oxidizer Stack
May 17, 2000

CALIBRATION BIAS 0

Time	THC (ppmwv)	CO (ppmdv)	O_2 (%)	CO_2 (%)
10:54:29	-0.6	89.1	0.0	0.0
10:54:40	-0.7	89.0	0.0	0.0
10:54:50	-0.7	89.1	0.0	0.0
10:54:59	-0.6	89.2	0.0	0.0
10:55:10	0.7	89.4	0.0	0.3
10:55:20	-0.5	89.0	0.1	0.0
10:55:29	-0.7	84.2	0.0	0.0
10:55:39	-0.8	73.0	-0.1	-0.1
10:55:50	-0.7	56.6	-0.1	0.0
10:56:00	-0.8	41.6	0.0	0.0
10:56:09	-0.8	31.7	0.0	0.0
10:56:19	-0.8	27.3	0.0	0.0
10:56:30	-0.8	26.0	0.0	0.0
10:56:39	-0.9	25.8	0.0	0.0
10:56:49	-0.8	25.7	0.0	0.0
10:57:00	-0.9	25.7	0.0	0.0
10:57:10	-0.9	25.6	0.0	0.0
10:57:19	-0.9	25.6	0.0	0.0
10:57:29	-0.9	25.6	0.0	0.0
10:57:40	-0.7	25.7	0.0	0.0
10:57:49	-0.6	25.9	0.0	0.0
10:57:59	-0.7	28.2	0.0	0.0
10:58:10	-0.7	33.9	0.0	0.0
10:58:20	-0.7	42.6	0.0	0.0
10:58:29	-0.8	50.9	0.0	0.0
10:58:39	-0.7	56.5	0.0	0.0
10:58:50	-0.8	59.1	0.0	0.0
10:59:00	-0.8	59.8	0.0	0.0
10:59:09	-0.8	59.9	0.0	0.0
10:59:20	-0.9	59.9	0.0	0.0
10:59:30	-0.8	59.8	0.0	0.0
10:59:39	-0.9	59.7	0.0	0.0
10:59:49	-0.9	59.5	0.0	0.0
11:00:00	-0.9	59.7	0.0	0.0
11:00:10	-0.9	59.8	0.0	0.0
11:00:19	0.2	59.9	0.0	0.0
11:00:30	6.4	59.9	5.1	0.1
11:00:40	78.1	58.6	10.2	0.1
11:00:49	85.9	53.8	0.5	0.0
11:00:59	85.8	44.5	0.0	0.0
11:01:10	84.8	31.7	0.0	0.0
11:01:20	84.5	19.1	0.0	0.1
11:01:29	84.5	9.3	0.0	0.0
11:01:39	84.7	3.7	0.0	0.0
11:01:50	84.5	1.3	0.0	0.1
11:01:59	84.5	0.7	0.0	0.1
11:02:09	84.5	0.6	0.0	0.0
11:02:20	84.5	0.6	0.0	0.0
11:02:30	84.4	0.6	0.0	0.0
11:02:39	84.6	0.6	0.0	0.0
11:02:49	84.6	0.6	0.0	0.0
11:03:00	84.5	0.7	0.0	0.0
11:03:09	84.6	0.6	0.0	0.0
11:03:19	53.3	0.6	0.0	0.1
11:03:30	25.1	0.6	0.1	0.1
11:03:40	24.6	0.6	0.0	0.0

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IT Corporation @ WPRAP; Fernald, Ohio
CAE Project No: 8705
Thermal Oxidizer Stack
May 17, 2000

CALIBRATION BIAS 0

Time	THC (ppmwv)	CO (ppmdv)	O_2 (%)	CO_2 (%)
11:03:49	24.5	1.0	0.0	0.1
11:03:59	24.4	1.5	0.0	0.1
11:04:10	24.4	2.1	0.0	0.1
11:04:20	24.4	2.4	0.0	0.0
11:04:29	24.3	2.5	0.0	0.0
11:04:40	24.3	2.5	0.0	0.0
11:04:50	24.3	2.5	0.0	0.1
11:04:59	24.2	2.5	0.0	0.1
11:05:09	24.2	2.6	0.0	0.0
11:05:20	24.3	2.6	0.0	0.0
11:05:30	24.6	2.6	0.0	0.0
11:05:39	50.4	2.6	0.0	0.0
11:05:50	54.7	2.5	0.1	0.0
11:06:00	54.8	2.4	0.0	0.0
11:06:09	54.8	2.1	0.0	0.0
11:06:19	54.7	1.6	0.0	0.0
11:06:30	54.8	1.2	0.0	0.0
11:06:40	54.7	0.9	0.0	0.0
11:06:49	54.7	0.8	0.0	0.0
11:06:59	54.7	0.7	0.0	0.0
11:07:10	54.8	0.7	0.0	0.0
11:07:19	54.7	0.7	0.0	0.0
11:07:29	54.7	0.7	0.0	0.0
11:07:40	54.6	0.8	0.0	0.0
11:07:50	54.7	0.8	0.0	0.0
11:07:59	42.0	0.8	0.0	0.0
11:08:09	8.7	0.7	-0.1	0.0
11:08:20	8.0	0.9	0.0	0.0
11:08:29	7.9	1.3	0.0	0.0
11:08:39	7.8	1.7	0.0	0.0
11:08:50	7.8	1.8	0.0	0.0
11:09:00	7.8	1.6	0.0	0.0
11:09:09	8.3	1.4	0.0	0.0
11:09:19	8.3	1.3	0.0	0.0
11:09:30	8.3	1.2	0.0	0.0
11:09:40	8.3	1.2	0.0	0.0
11:09:49	8.2	1.1	0.0	0.0
11:10:00	12.5	1.1	0.0	0.0
11:10:10	25.6	1.1	0.0	0.0
11:10:19	25.9	1.2	0.0	0.0
11:10:29	25.9	1.4	0.0	0.0
11:10:40	26.0	1.8	0.0	0.0

Zero Gas	0.1	0.6	0.0	0.0
Low Gas	24.4	25.6	6.0	5.9
Mid Gas	54.7	59.6	N/A	N/A
High Gas	84.6	89.1	14.0	13.9
Extra Gas	8.3	N/A	N/A	N/A

Gas to be used for Bias	24.4	25.6	6.0	5.9

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RUN 1

Time	THC (ppmwv)	CO (ppmdv)	O_2 (%)	CO_2 (%)
11:15	2.1	1.2	7.4	4.2
11:16	1.6	1.0	7.4	4.2
11:17	1.4	1.4	7.4	4.2
11:18	1.3	1.4	7.3	4.2
11:19	1.1	1.3	7.4	4.2
11:20	1.0	1.1	7.5	4.1
11:21	1.0	1.3	7.5	4.2
11:22	0.8	1.6	7.4	4.2
11:23	0.9	1.9	7.4	4.2
11:24	0.8	2.6	7.4	4.2
11:25	0.7	4.1	7.4	4.2
11:26	0.7	7.0	7.4	4.1
11:27	0.7	10.2	7.4	4.1
11:28	0.6	12.5	7.4	4.1
11:29	0.6	10.5	7.4	4.2
11:30	0.6	8.7	7.4	4.2
11:31	0.6	7.2	7.4	4.2
11:32	0.5	6.5	7.5	4.2
11:33	0.5	5.7	7.5	4.2
11:34	0.5	4.7	7.5	4.2
11:35	0.5	3.6	7.5	4.2
11:36	0.5	2.7	7.6	4.2
11:37	0.5	2.2	7.6	4.1
11:38	0.5	1.6	7.7	4.1
11:39	0.5	1.3	7.6	4.1
11:40	0.5	0.9	7.7	4.1
11:41	0.5	0.8	7.6	4.1
11:42	0.4	0.7	7.5	4.1
11:43	0.5	0.6	7.6	4.1
11:44	0.5	0.6	7.6	4.1
11:45	0.5	0.6	7.5	4.1
11:46	0.5	0.5	7.5	4.1
11:47	0.5	0.5	7.5	4.1
11:48	0.5	0.5	7.5	4.1
11:49	0.5	0.5	7.6	4.1
11:50	0.5	0.5	7.6	4.1
11:51	0.5	0.5	7.6	4.1
11:52	0.5	0.4	7.6	4.1
11:53	0.5	0.4	7.5	4.1
11:54	0.5	0.4	7.7	4.1
11:55	0.5	0.4	7.6	4.1
11:56	0.5	0.4	7.6	4.1
11:57	0.5	0.4	7.6	4.1
11:58	0.6	0.4	7.7	4.1
11:59	0.5	0.5	7.7	4.1
12:00	0.5	0.4	7.7	4.1
12:01	0.5	0.4	7.7	4.1
12:02	0.5	0.5	7.7	4.1
12:03	0.5	0.4	7.6	4.1
12:04	0.5	0.4	7.6	4.1
12:05	0.6	0.4	7.6	4.1
12:06	0.6	0.4	7.7	4.1
12:07	0.6	0.4	7.6	4.1
12:08	0.6	0.4	7.6	4.1
12:09	0.6	0.4	7.6	4.1
12:10	0.6	0.4	7.6	4.1

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RUN 1

Time	THC (ppmwv)	CO (ppmdv)	O_2 (%)	CO_2 (%)
12:11	0.6	0.4	7.6	4.1
12:12	0.6	0.4	7.7	4.1
12:13	0.6	0.4	7.6	4.1
12:14	0.6	0.4	7.6	4.1
12:15	0.6	0.4	7.7	4.1
Average	**0.6**	**2.0**	**7.5**	**4.1**

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CALIBRATION BIAS 1

Time	THC (ppmwv)	CO (ppmdv)	O_2 (%)	CO_2 (%)
12:19:11	0.5	2.0	0.0	0.0
12:19:21	0.4	1.0	0.0	0.0
12:19:31	0.1	0.6	0.0	0.0
12:19:41	0.1	0.5	0.0	0.0
12:19:51	0.0	0.4	0.0	0.0
12:20:01	0.0	0.4	0.0	0.0
12:20:11	0.0	0.4	0.0	0.0
12:20:21	-0.2	0.5	0.5	1.8
12:20:31	-0.2	0.6	11.1	5.8
12:20:41	-0.2	0.8	13.9	5.8
12:20:51	-0.3	1.1	14.0	5.8
12:21:01	-0.2	1.3	14.0	5.9
12:21:11	-0.3	1.3	14.0	5.9
12:21:21	-0.4	1.1	14.0	5.9
12:21:31	-0.2	0.9	14.0	5.9
12:21:41	0.0	0.8	13.3	9.7
12:21:51	0.0	0.8	7.1	13.8
12:22:01	0.0	0.9	6.1	13.8
12:22:11	0.0	0.8	6.0	13.9
12:22:21	-0.2	0.8	6.0	13.9
12:22:31	-0.1	0.6	6.0	13.9
12:22:41	-0.2	0.5	6.0	13.9
12:22:51	-0.1	0.4	6.0	13.9
12:23:01	-0.1	0.4	6.0	13.9
12:23:11	-0.2	0.5	6.0	13.9
12:23:21	-0.1	0.5	6.0	13.9
12:23:31	-0.2	0.5	6.0	12.1
12:23:41	-0.3	0.7	1.9	0.4
12:23:51	-0.2	2.2	0.1	0.2
12:24:01	-0.3	6.0	0.1	0.1
12:24:11	-0.2	11.7	0.0	0.1
12:24:21	-0.4	17.4	0.0	0.1
12:24:31	-0.3	21.6	0.0	0.1
12:24:41	-0.3	24.0	0.0	0.1
12:24:51	-0.4	25.1	0.0	0.1
12:25:01	-0.3	25.4	0.0	0.1
12:25:11	-0.3	25.5	0.0	0.1
12:25:21	-0.4	25.5	0.0	0.1
12:25:31	-0.3	25.5	0.0	0.0
12:25:41	-0.3	25.5	0.0	0.0
12:25:51	-0.3	25.6	0.0	0.0
12:26:01	-0.4	25.6	0.0	0.0
12:26:11	-0.3	25.6	0.0	0.0
12:26:21	36.6	25.6	0.0	0.0
12:26:31	57.6	25.3	0.0	0.0
12:26:41	57.8	23.6	0.0	0.0
12:26:51	57.9	19.7	0.0	0.0
12:27:01	58.0	13.8	0.0	0.0
12:27:11	58.1	7.8	0.0	0.0
12:27:21	58.0	3.6	0.0	0.0
12:27:31	57.6	1.5	0.0	0.0
12:27:41	56.4	0.8	0.0	0.0
12:27:51	56.0	0.7	0.0	0.0
12:28:01	55.9	0.7	0.0	0.0
12:28:11	55.8	0.7	0.0	0.0

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CALIBRATION BIAS 1

Time	THC (ppmwv)	CO (ppmdv)	O_2 (%)	CO_2 (%)
12:28:21	55.8	0.7	0.0	0.0
12:28:31	52.0	0.7	0.0	0.0
12:28:41	26.6	0.7	0.0	0.0
12:28:51	25.3	0.8	0.0	0.0
12:29:01	25.2	0.9	0.0	0.0
12:29:11	25.2	1.2	0.0	0.0
12:29:21	25.2	1.7	0.0	0.0
12:29:31	25.1	2.1	0.0	0.0
12:29:41	25.2	2.4	0.0	0.0
12:29:51	25.1	2.5	0.0	0.0
12:30:01	25.1	2.6	0.0	0.0
12:30:11	25.1	2.5	0.0	0.0
12:30:21	18.0	2.5	0.0	0.0
12:30:31	8.8	2.5	0.3	0.1
12:30:41	8.7	2.8	0.1	0.0
12:30:51	8.6	3.1	0.0	0.0
12:31:01	8.6	3.2	0.0	0.0
12:31:11	8.6	2.9	0.0	0.0
12:31:21	8.6	2.2	0.0	0.0
Zero Gas	0.0	0.4	0.0	0.0
Bias Gas	25.1	25.6	6.0	5.9

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RUN 2

Time	THC (ppmwv)	CO (ppmdv)	O_2 (%)	CO_2 (%)
12:33	0.6	0.4	7.5	4.1
12:34	0.3	0.4	7.6	4.0
12:35	0.2	0.4	7.6	4.0
12:36	0.1	0.4	7.7	4.0
12:37	0.1	0.4	7.7	4.0
12:38	0.0	0.4	7.6	4.1
12:39	0.0	0.4	7.5	4.1
12:40	0.0	0.4	7.4	4.1
12:41	0.0	0.4	7.4	4.1
12:42	0.0	0.4	7.5	4.0
12:43	0.1	0.5	7.5	4.1
12:44	0.1	0.4	7.5	4.1
12:45	0.1	0.4	7.5	4.1
12:46	0.1	0.3	7.6	4.0
12:47	0.1	0.5	7.6	4.1
12:48	0.1	0.4	7.6	4.1
12:49	0.1	0.4	7.4	4.1
12:50	0.1	0.3	7.6	4.1
12:51	0.1	0.4	7.6	4.1
12:52	0.1	0.4	7.6	4.1
12:53	0.1	0.4	7.6	4.1
12:54	0.1	0.3	7.7	4.0
12:55	0.0	0.4	7.6	4.1
12:56	0.1	0.4	7.7	4.0
12:57	0.1	0.4	7.7	4.0
12:58	0.1	0.3	7.6	4.1
12:59	0.1	0.3	7.7	4.1
13:00	0.1	0.3	7.6	4.1
13:01	0.0	0.3	7.6	4.0
13:02	0.0	0.3	7.7	4.1
13:03	0.1	0.3	7.6	4.1
13:04	0.1	0.3	7.6	4.1
13:05	0.1	0.3	7.6	4.1
13:06	0.1	0.3	7.6	4.1
13:07	0.0	0.3	7.7	4.1
13:08	0.0	0.3	7.7	4.1
13:09	0.0	0.2	7.9	4.0
13:10	0.1	0.3	7.9	4.0
13:11	0.0	0.3	7.8	4.1
13:12	0.1	0.3	7.6	4.1
13:13	0.0	0.3	7.7	4.1
13:14	0.0	0.3	7.8	4.1
13:15	0.1	0.3	7.8	4.1
13:16	0.1	0.3	7.7	4.1
13:17	0.1	0.2	7.8	4.1
13:18	0.1	0.3	7.7	4.1
13:19	0.1	0.3	7.8	4.1
13:20	0.1	0.3	7.9	4.1
13:21	0.1	0.3	7.9	4.1
13:22	0.1	0.3	7.8	4.1
13:23	0.0	0.3	7.7	4.1
13:24	0.1	0.3	7.8	4.1
13:25	0.1	0.3	7.7	4.1
13:26	0.1	0.3	7.7	4.1
13:27	0.1	0.3	7.8	4.1
13:28	0.1	0.3	7.6	4.1

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RUN 2

Time	THC (ppmwv)	CO (ppmdv)	O_2 (%)	CO_2 (%)
13:29	0.1	0.2	7.7	4.1
13:30	0.1	0.3	7.7	4.1
13:31	0.1	0.3	7.6	4.1
13:32	0.1	0.2	7.6	4.1
13:33	0.0	0.2	7.7	4.1
Average	**0.1**	**0.3**	**7.7**	**4.1**

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CALIBRATION BIAS 2

Time	THC (ppmwv)	CO (ppmdv)	O_2 (%)	CO_2 (%)
13:36:57	0.0	0.9	0.0	0.0
13:37:07	-0.1	0.6	0.0	0.0
13:37:17	-0.2	0.5	0.0	0.0
13:37:27	-0.1	0.4	0.0	0.0
13:37:37	0.1	0.3	0.0	0.0
13:37:47	-0.1	0.3	0.0	0.0
13:37:57	-0.1	0.2	0.0	0.0
13:38:07	-0.1	0.2	0.0	0.0
13:38:17	-0.2	0.2	1.3	3.4
13:38:27	-0.3	0.5	12.2	5.8
13:38:37	-0.2	0.8	13.9	5.8
13:38:47	-0.2	1.0	14.0	5.8
13:38:57	-0.3	1.1	14.0	5.8
13:39:07	-0.3	1.1	14.0	5.9
13:39:17	-0.2	1.0	14.0	5.9
13:39:27	0.5	0.8	14.0	5.9
13:39:37	0.1	0.8	11.8	12.8
13:39:47	0.0	0.8	6.4	13.8
13:39:57	0.0	0.7	6.1	13.8
13:40:07	-0.1	0.6	6.0	13.9
13:40:17	-0.1	0.6	6.0	13.9
13:40:27	0.0	0.6	6.0	13.9
13:40:37	0.0	0.5	6.0	13.9
13:40:47	-0.1	0.4	6.0	13.9
13:40:57	0.0	0.4	6.0	13.9
13:41:07	-0.1	0.4	6.0	13.9
13:41:17	-0.1	0.4	4.4	1.3
13:41:27	-0.1	1.7	0.4	0.2
13:41:37	-0.2	5.4	0.1	0.1
13:41:47	-0.2	11.2	0.1	0.1
13:41:57	-0.1	17.7	0.1	0.1
13:42:07	-0.2	21.5	0.0	0.1
13:42:17	-0.2	24.0	0.0	0.1
13:42:27	-0.3	25.0	0.0	0.1
13:42:37	-0.2	25.3	0.0	0.1
13:42:47	-0.2	25.3	0.0	0.0
13:42:57	-0.2	25.3	0.0	0.0
13:43:07	-0.3	25.4	0.0	0.0
13:43:17	-0.2	25.4	0.0	0.0
13:43:27	-0.2	25.5	0.0	0.0
13:43:37	29.6	25.5	0.0	0.0
13:43:47	54.1	25.5	0.1	0.0
13:43:57	54.6	24.0	0.0	0.0
13:44:07	54.6	20.2	0.0	0.0
13:44:17	54.7	14.2	0.0	0.0
13:44:27	54.7	8.0	0.0	0.0
13:44:37	54.8	3.8	0.0	0.0
13:44:47	54.9	1.6	0.0	0.0
13:44:57	54.8	0.9	0.0	0.0
13:45:07	32.5	0.7	0.0	0.0
13:45:17	25.0	0.7	0.0	0.0
13:45:27	24.8	0.8	0.0	0.0
13:45:37	24.9	1.1	0.0	0.0
13:45:47	24.9	1.5	0.0	0.0
13:45:57	24.8	2.0	0.0	0.0

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CALIBRATION BIAS 2

Time	THC (ppmwv)	CO (ppmdv)	O_2 (%)	CO_2 (%)
13:46:07	24.8	2.3	0.0	0.0
13:46:17	24.8	2.5	0.0	0.0
13:46:27	24.7	2.6	0.0	0.0
13:46:37	23.7	2.5	0.0	0.0
13:46:47	9.7	2.5	0.0	0.0
13:46:57	8.7	2.7	0.0	0.0
13:47:07	8.5	3.0	0.0	0.0
13:47:17	8.5	3.3	0.0	0.0
13:47:27	8.5	3.1	0.0	0.0
13:47:37	8.5	2.5	0.0	0.0
13:47:47	8.4	1.8	0.0	0.0
Zero Gas	-0.1	0.2	0.0	0.0
Bias Gas	24.8	25.5	6.0	5.9

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RUN 3

Time	THC (ppmwv)	CO (ppmdv)	O2 (%)	CO2 (%)	
13:51	0.4	0.3	7.6	4.1	
13:52	0.1	0.3	7.7	4.0	
13:53	0.1	0.2	7.5	4.1	
13:54	0.1	0.3	7.5	4.1	
13:55	0.1	0.2	7.4	4.1	
13:56	0.1	0.2	8.1	3.9	
13:57	0.1	0.3	9.0	3.7	
13:58	0.1	0.2	8.3	3.9	Data not included in average
13:59	0.1	0.2	8.4	3.8	Port change of CEM probe
14:00	0.1	0.2	8.3	3.9	
14:01	0.1	0.2	8.4	3.9	
14:02	0.1	0.2	8.7	3.8	
14:03	0.1	0.2	8.6	3.8	
14:04	0.1	0.2	8.5	3.8	
14:05	0.1	0.3	8.6	3.8	
14:06	0.1	0.2	8.8	3.7	
14:07	0.1	0.3	8.0	4.0	
14:08	0.1	0.2	6.8	4.3	
14:09	0.1	0.2	6.8	4.4	
14:10	0.1	0.2	6.8	4.3	
14:11	0.1	0.3	6.9	4.3	
14:12	0.2	0.4	6.8	4.3	
14:13	0.2	0.4	6.8	4.3	
14:14	0.2	0.5	6.7	4.3	
14:15	0.2	0.4	6.7	4.3	
14:16	0.2	0.4	6.7	4.4	
14:17	0.2	0.4	6.7	4.4	
14:18	0.2	0.5	6.7	4.3	
14:19	0.2	0.5	6.7	4.3	
14:20	0.2	0.5	6.7	4.3	
14:21	0.1	0.6	6.8	4.3	
14:22	0.2	0.7	6.8	4.3	
14:23	0.1	0.7	6.8	4.3	
14:24	0.1	0.7	6.8	4.3	
14:25	0.1	0.7	6.8	4.3	
14:26	0.1	0.7	6.8	4.3	
14:27	0.1	0.7	6.8	4.3	
14:28	0.1	0.8	6.8	4.3	
14:29	0.1	0.8	6.8	4.3	
14:30	0.1	0.8	6.9	4.3	
14:31	0.1	0.8	6.8	4.3	
14:32	0.1	0.8	6.9	4.3	
14:33	0.1	0.8	6.8	4.3	
14:34	0.1	0.8	6.8	4.3	
14:35	0.1	0.8	6.8	4.3	
14:36	0.1	0.8	6.8	4.3	
14:37	0.1	0.8	6.8	4.3	
14:38	0.1	0.8	6.8	4.3	
14:39	0.1	0.8	6.8	4.3	
14:40	0.1	0.8	6.8	4.3	
14:41	0.1	0.7	6.8	4.3	
14:42	0.1	0.8	6.8	4.3	
14:43	0.1	0.7	6.8	4.3	
14:44	0.4	0.7	6.8	4.3	
14:45	0.4	0.7	6.8	4.3	

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May 17, 2000

RUN 3

Time	THC (ppmwv)	CO (ppmdv)	O2 (%)	CO2 (%)
14:46	0.4	0.7	6.8	4.3
14:47	0.4	0.7	6.8	4.3
14:48	0.3	0.9	6.9	4.3
14:49	0.3	0.8	6.9	4.3
14:50	0.3	0.7	6.9	4.3
14:51	0.4	0.7	6.9	4.3
14:52	0.4	0.6	6.9	4.3
14:53	0.3	0.6	6.9	4.3
14:54	0.4	0.6	6.8	4.3
14:55	0.4	0.6	6.8	4.3
14:56	0.5	0.5	6.8	4.3
14:57	0.5	0.6	6.8	4.3
14:58	0.5	0.6	6.8	4.3
14:59	0.5	0.6	6.8	4.4
15:00	0.4	0.6	6.8	4.4
15:01	0.4	0.5	6.9	4.3
15:02	0.4	0.5	6.9	4.3
15:03	0.4	0.5	6.9	4.3
15:04	0.4	0.5	7.0	4.3
Average	**0.2**	**0.6**	**6.9**	**4.3**

IT Corporation @ WPRAP; Fernald, Ohio
CAE Project No: 8705
Thermal Oxidizer Stack
May 17, 2000

CALIBRATION BIAS 3

Time	THC (ppmwv)	CO (ppmdv)	O_2 (%)	CO_2 (%)
15:07:51	0.1	0.7	0.0	0.0
15:08:01	0.0	0.5	0.0	0.0
15:08:11	0.1	0.5	0.0	0.0
15:08:21	0.1	0.5	0.0	0.0
15:08:31	0.0	0.5	0.0	0.0
15:08:41	0.1	0.3	0.0	-0.1
15:08:51	0.0	0.4	0.0	0.0
15:09:01	0.0	0.5	0.0	0.0
15:09:11	0.0	0.5	0.0	0.0
15:09:21	0.1	0.5	0.0	0.0
15:09:31	-0.1	0.5	1.1	3.1
15:09:41	-0.1	0.6	12.1	5.8
15:09:51	0.0	0.9	13.9	5.8
15:10:01	0.0	1.1	14.0	5.8
15:10:11	-0.1	1.4	14.0	5.9
15:10:21	-0.1	1.3	14.0	5.9
15:10:31	0.0	1.1	14.0	5.9
15:10:41	-0.1	0.9	14.0	5.9
15:10:51	-0.1	0.8	14.0	5.9
15:11:01	0.0	0.8	14.0	5.9
15:11:11	-0.1	0.8	14.0	5.9
15:11:21	-0.1	0.8	14.0	5.9
15:11:31	-0.1	0.8	14.0	5.9
15:11:41	-0.1	0.8	14.0	5.9
15:11:51	-0.1	0.8	14.0	5.9
15:12:01	0.3	0.8	13.9	6.9
15:12:11	0.2	0.8	8.1	13.7
15:12:21	0.2	0.8	6.1	13.9
15:12:31	0.2	0.8	6.1	13.9
15:12:41	0.1	0.7	6.1	13.9
15:12:51	0.2	0.6	6.0	13.9
15:13:01	0.1	0.5	6.0	13.9
15:13:11	0.0	0.5	6.0	13.9
15:13:21	0.1	0.5	6.0	13.9
15:13:31	0.1	0.5	6.0	13.9
15:13:41	0.2	0.5	6.0	13.9
15:13:51	0.1	0.5	6.0	13.9
15:14:01	0.1	0.5	6.0	13.9
15:14:11	0.2	0.5	6.0	13.9
15:14:21	0.2	0.3	6.0	13.9
15:14:31	0.1	0.3	6.0	13.9
15:14:41	0.0	0.4	6.0	13.9
15:14:51	0.1	0.5	6.0	13.9
15:15:01	0.2	0.5	6.0	13.9
15:15:11	0.0	0.5	6.1	13.9
15:15:21	0.1	0.5	6.0	13.9
15:15:31	0.0	0.3	6.0	14.0
15:15:41	-0.1	0.3	6.2	9.2
15:15:51	-0.1	0.5	1.8	0.3
15:16:01	0.0	2.2	0.1	0.2
15:16:11	-0.1	6.4	0.1	0.1
15:16:21	-0.1	12.5	0.1	0.1
15:16:31	0.0	18.1	0.1	0.1
15:16:41	-0.1	22.0	0.0	0.1
15:16:51	-0.1	24.2	0.0	0.1

IT Corporation @ WPRAP; Fernald, Ohio
CAE Project No: 8705
Thermal Oxidizer Stack
May 17, 2000

CALIBRATION BIAS 3

Time	THC (ppmwv)	CO (ppmdv)	O_2 (%)	CO_2 (%)
15:17:01	-0.1	25.0	0.0	0.1
15:17:11	-0.2	25.3	0.0	0.1
15:17:21	-0.1	25.4	0.0	0.1
15:17:31	31.6	25.5	0.0	0.1
15:17:41	54.6	25.5	0.1	0.1
15:17:51	54.9	24.2	0.0	0.0
15:18:01	55.1	20.2	0.0	0.0
15:18:11	55.0	14.0	0.0	0.0
15:18:21	55.1	7.7	0.0	0.0
15:18:31	55.1	3.4	0.0	0.0
15:18:41	55.2	1.4	0.0	0.0
15:18:51	55.1	0.8	0.0	0.0
15:19:01	55.1	0.7	0.0	0.0
15:19:11	55.2	0.6	0.0	0.0
15:19:21	55.2	0.7	0.0	0.0
15:19:31	40.7	0.6	0.0	0.0
15:19:41	25.4	0.6	0.0	0.0
15:19:51	25.1	0.7	0.0	0.0
15:20:01	25.0	0.9	0.0	0.0
15:20:11	25.0	1.4	0.0	0.0
15:20:21	25.1	1.9	0.0	0.0
15:20:31	25.0	2.2	0.0	0.0
15:20:41	25.0	2.4	0.0	0.0
15:20:51	18.6	2.5	0.0	0.0
15:21:01	8.8	2.5	0.3	0.1
15:21:11	8.6	2.9	0.1	0.0
15:21:21	8.6	3.3	0.0	0.0
15:21:31	8.6	3.6	0.0	0.0
15:21:41	8.6	3.1	0.0	0.0
15:21:51	8.5	2.4	0.0	0.0
15:22:01	8.6	1.6	0.0	0.0
Zero Gas	0.0	0.5	0.0	0.0
Bias Gas	25.0	25.5	6.0	5.9

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IT CORPORATION
FERNALD, OH

Client Reference No: 773481-1958
CAE Project No: 8705

LABORATORY DATA

F

Particulate Testing Weight Sheet

3050

Client	CAE Engineering Services	Project Number	8705	Analyst	Doug Rhoades
Plant	IT Corp	Unit	Thermal Oxidizer Stack	Balance	Ohaus GA110/GA200D
Test Date	5/18/00	Method	5		

Description		I.D. and Sample Description*	Sample volume (ml)**	Date/Time		Gross Weight (g)	Tare Weight (g)	Date/Time		Net Weight (g)
Type	Filter	203423		5/31	13:10	0.3161	0.3159	6/10	13:55	
Run	Blank	Clean		6/1	09:00	0.3160				
Location	TO Stack	-01	Filter			0.3160				0.0001
Type	Filter	203421		5/31	13:10	0.3181	0.3162	6/10	13:55	
Run	2	Clean		6/1	09:00	0.3180				
Location	TO Stack	-02	Filter			0.3180				0.0018
Type	F1/2 Acetone	XX18	200	5/31	13:15	107.7209	107.7209	5/30	11:35	
Run	Blank	Clean		6/1	09:00	107.7210				
Location	TO Stack	-03	Beaker			107.7210				0.0001
Type	F1/2 Acetone	F55	150	5/31	13:15	124.8321	124.8304	5/30	11:35	
Run	2	Light Grey Particulate		6/1	09:00	124.8321				
Location	TO Stack	-04	Beaker			124.8321				0.0017
Type										
Run										
Location										
Type										
Run										
Location										
Type										
Run										
Location										
Type										
Run										
Location										
Type										
Run										
Location										

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*Description of Particulate

Analyst Signature:

** Two volumes (e.g. 500/100) indicate an aliquot was taken.

CHAIN OF CUSTODY FORM

IT Corporation
WPRAP @ Fernald, Ohio
CT MANAGER Mark Roach
EADER Georg Pavlovics

PROJECT NO. 8705
DEPT. 66
RECOVERY PERSON: Eric Rodriguez

PAGE 1 OF 1
REVISION NO. ____

O.	RUN NO.	TEST LOCATION	DATE	SAMPLE MATRIX	NO. OF CONTAINERS	ORIGINAL VOLUME	Method 5 Gravimetric	Archive			ADDITIONAL INFORMATION
	1	T.O. Stack	5/17	Filter #203420	1	—	X				
	1			Front-Half Acetone Rinse	1		X				
	1			Back-Half D.I. H_2O	1			X			
	3	T.O. Stack	5/18	Filter # 203421	1		X				
	3			Front-Half Acetone Rinse	1		X				
	3			Back-Half D.I. H_2O	1			X			
	Blank		5/18	Filter Blank #203423	1		X				
	Blank			Acetone Blank	1		X				

inquished by:(Signature)	Date/Time	Received by:(Signature)	Date/Time	Relinquished by:(Signature)	Date/Time
	5.19.2000 1440				
urier:	Date/Time	Relinquished by:(Signature)	Date/Time	Rec'd for Analysis by:	Date/Time

ecial Handling Instructions

Forwarding Lab:

This form was completed by: Eric Rodrigu[illegible]
Signature Date

Clean Air Engineering
500 West Wood Street
Palatine, IL 60067
(847) 991-3300 phone
(847) 991-3385 fax

000132

IT CORPORATION
CAE Project No: 8705
Stack

VOLATILE ORGANIC COMPOUNDS ANALYSIS

Run No.		1A	1B	1C
Date (2000)		May 17	May 17	May 17
Start Time (approx.)		10:36	11:28	12:20
Stop Time (approx.)		11:16	12:08	13:00
Chloromethane (MW=50.49)				
m1	Matter collected (µg) TN	0.000		
m2	Matter collected (µg) TN/C	0.480		
m	Matter collected (µg)	0.480	0.000	0.000
Vinyl Chloride (MW=62.50)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Bromomethane (MW=94.95)				
m1	Matter collected (µg) TN	0.029	0.000	0.021
m2	Matter collected (µg) TN/C	0.110	0.031	0.031
m	Matter collected (µg)	0.139	0.031	0.052
1,1-Dichloroethane (MW=98.97)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Trichlorofluoromethane (MW=137.37)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
1,1-Dichloroethene (MW=96.94)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Carbon disulfide (MW=76.14)				
m1	Matter collected (µg) TN			0.230
m2	Matter collected (µg) TN/C			0.000
m	Matter collected (µg)	0.000	0.000	0.230
Acetone(MW=58.08)				
m1	Matter collected (µg) TN	0.055	0.000	0.069
m2	Matter collected (µg) TN/C	0.052	0.000	0.000
m	Matter collected (µg)	0.107	0.000	0.069
Methylene chloride (MW=84.94)				
m1	Matter collected (µg) TN	0.053	0.064	0.000
m2	Matter collected (µg) TN/C	0.049	0.040	0.023
m	Matter collected (µg)	0.102	0.104	0.023

IT CORPORATION
CAE Project No: 8705
Stack

VOLATILE ORGANIC COMPOUNDS ANALYSIS

Run No.		1A	1B	1C
Date (2000)		May 17	May 17	May 17
Start Time (approx.)		10:36	11:28	12:20
Stop Time (approx.)		11:16	12:08	13:00
1,2-Dichloroethene(total) (MW=96.95)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Chloroform (MW=119.39)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
2-Butanone (MW=72.11)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Carbon tetrachloride (MW=153.84)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Benzene (MW=78.11)				
m1	Matter collected (µg) TN	0.052	0.031	0.041
m2	Matter collected (µg) TN/C	0.015	0.012	0.009
m	Matter collected (µg)	0.067	0.043	0.050
Trichloroethene (MW=131.40)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
1,2-Dichloropropane (MW=112.99)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
1,2-Dichloroethane (MW=98.96)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Bromodichloromethane (MW=163.83)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000

IT CORPORATION
CAE Project No: 8705
Stack

VOLATILE ORGANIC COMPOUNDS ANALYSIS

Run No.	1A	1B	1C
Date (2000)	May 17	May 17	May 17
Start Time (approx.)	10:36	11:28	12:20
Stop Time (approx.)	11:16	12:08	13:00
cis-1,3-Dichloropropene (MW=110.98)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
trans-1,3-Dichloropropene (MW=110.98)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
4-Methyl-2-pentanone (MW=100.16)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
Toluene (MW=92.13)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
Tetrachloroethene (MW=165.85)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
Chlorobenzene (MW=112.56)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
Ethylbenzene (MW=106.16)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
Xylene(total) (MW=106.16)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
1,1,1-Trichloroethane (MW=133.42)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
Styrene (MW=104.14)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000

IT CORPORATION
CAE Project No: 8705
Stack

VOLATILE ORGANIC COMPOUNDS ANALYSIS

Run No.	1A	1B	1C
Date (2000)	May 17	May 17	May 17
Start Time (approx.)	10:36	11:28	12:20
Stop Time (approx.)	11:16	12:08	13:00
Dibromochloromethane (MW=208.28)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
1,1,2-Trichloroethane (MW=133.42)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
Bromoform (MW=252.77)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
2-Hexanone (MW=100.16)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
1,1,2,2-Tetrachloroethane (MW=167.86)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000

IT CORPORATION
CAE Project No: 8705
Stack

VOLATILE ORGANIC COMPOUNDS ANALYSIS

Run No.	Condensate 1A - 1D
Volume of Condensate (ml)	40
Chloromethane (MW=50.49)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Vinyl Chloride (MW=62.50)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Bromomethane (MW=94.95)	
Concentration (ug/L)	
Matter collected (µg)	0.000
1,1-Dichloroethane (MW=98.97)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Trichlorofluoromethane (MW=137.37)	
Concentration (ug/L)	
Matter collected (µg)	0.000
1,1-Dichloroethene (MW=96.94)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Carbon disulfide (MW=76.14)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Acetone(MW=58.08)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Methylene chloride (MW=84.94)	
Concentration (ug/L)	19
Matter collected (µg)	0.760

IT CORPORATION
CAE Project No: 8705
Stack

VOLATILE ORGANIC COMPOUNDS ANALYSIS

Run No.	Condensate 1A - 1D
1,2-Dichloroethene(total) (MW=96.95)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Chloroform (MW=119.39)	
Concentration (ug/L)	
Matter collected (µg)	0.000
2-Butanone (MW=72.11)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Carbon tetrachloride (MW=153.84)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Benzene (MW=78.11)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Trichloroethene (MW=131.40)	
Concentration (ug/L)	0.8
Matter collected (µg)	0.032
1,2-Dichloropropane (MW=112.99)	
Concentration (ug/L)	
Matter collected (µg)	0.000
1,2-Dichloroethane (MW=98.96)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Bromodichloromethane (MW=163.83)	
Concentration (ug/L)	
Matter collected (µg)	0.000

IT CORPORATION
CAE Project No: 8705
Stack

VOLATILE ORGANIC COMPOUNDS ANALYSIS

Run No.	Condensate 1A - 1D
cis-1,3-Dichloropropene (MW=110.98)	
Concentration (ug/L)	
Matter collected (µg)	0.000
trans-1,3-Dichloropropene (MW=110.98)	
Concentration (ug/L)	
Matter collected (µg)	0.000
4-Methyl-2-pentanone (MW=100.16)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Toluene (MW=92.13)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Tetrachloroethene (MW=165.85)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Chlorobenzene (MW=112.56)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Ethylbenzene (MW=106.16)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Xylene(total) (MW=106.16)	
Concentration (ug/L)	
Matter collected (µg)	0.000
1,1,1-Trichloroethane (MW=133.42)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Styrene (MW=104.14)	
Concentration (ug/L)	
Matter collected (µg)	0.000

IT CORPORATION
CAE Project No: 8705
Stack

VOLATILE ORGANIC COMPOUNDS ANALYSIS

	Condensate
Run No.	**1A - 1D**

Dibromochloromethane (MW=208.28)

Concentration (ug/L)	
Matter collected (µg)	0.000

1,1,2-Trichloroethane (MW=133.42)

Concentration (ug/L)	
Matter collected (µg)	0.000

Bromoform (MW=252.77)

Concentration (ug/L)	
Matter collected (µg)	0.000

2-Hexanone (MW=100.16)

Concentration (ug/L)	
Matter collected (µg)	0.000

1,1,2,2-Tetrachloroethane (MW=167.86)

Concentration (ug/L)	
Matter collected (µg)	0.000

IT CORPORATION
CAE Project No: 8705
Stack

VOLATILE ORGANIC COMPOUNDS ANALYSIS

Run No.		2A	2B	2C
Date (2000)		May 17	May 17	May 17
Start Time (approx.)		14:24	15:24	17:10
Stop Time (approx.)		15:04	17:01	17:50
Chloromethane (MW=50.49)				
m1	Matter collected (µg) TN			0.000
m2	Matter collected (µg) TN/C			0.058
m	Matter collected (µg)	0.000	0.000	0.058
Vinyl Chloride (MW=62.50)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Bromomethane (MW=94.95)				
m1	Matter collected (µg) TN	0.013	0.022	0.000
m2	Matter collected (µg) TN/C	0.040	0.070	0.031
m	Matter collected (µg)	0.053	0.092	0.031
1,1-Dichloroethane (MW=98.97)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Trichlorofluoromethane (MW=137.37)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
1,1-Dichloroethene (MW=96.94)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Carbon disulfide (MW=76.14)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Acetone(MW=58.08)				
m1	Matter collected (µg) TN	0.076	0.055	0.120
m2	Matter collected (µg) TN/C	0.150	0.120	0.048
m	Matter collected (µg)	0.226	0.175	0.168
Methylene chloride (MW=84.94)				
m1	Matter collected (µg) TN	0.021	0.055	0.020
m2	Matter collected (µg) TN/C	0.086	0.023	0.000
m	Matter collected (µg)	0.107	0.078	0.020

IT CORPORATION
CAE Project No: 8705
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VOLATILE ORGANIC COMPOUNDS ANALYSIS

Run No.		2A	2B	2C
Date (2000)		May 17	May 17	May 17
Start Time (approx.)		14:24	15:24	17:10
Stop Time (approx.)		15:04	17:01	17:50
1,2-Dichloroethene(total) (MW=96.95)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Chloroform (MW=119.39)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
2-Butanone (MW=72.11)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Carbon tetrachloride (MW=153.84)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Benzene (MW=78.11)				
m1	Matter collected (µg) TN	0.030	0.050	0.055
m2	Matter collected (µg) TN/C	0.021	0.000	0.018
m	Matter collected (µg)	0.051	0.050	0.073
Trichloroethene (MW=131.40)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
1,2-Dichloropropane (MW=112.99)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
1,2-Dichloroethane (MW=98.96)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Bromodichloromethane (MW=163.83)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
cis-1,3-Dichloropropene (MW=110.98)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000

IT CORPORATION
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Stack

VOLATILE ORGANIC COMPOUNDS ANALYSIS

Run No.	2A	2B	2C
Date (2000)	May 17	May 17	May 17
Start Time (approx.)	14:24	15:24	17:10
Stop Time (approx.)	15:04	17:01	17:50
trans-1,3-Dichloropropene (MW=110.98)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
4-Methyl-2-pentanone (MW=100.16)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
Toluene (MW=92.13)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
Tetrachloroethene (MW=165.85)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
Chlorobenzene (MW=112.56)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
Ethylbenzene (MW=106.16)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
Xylene(total) (MW=106.16)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
1,1,1-Trichloroethane (MW=133.42)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
Styrene (MW=104.14)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000
Dibromochloromethane (MW=208.28)			
m1 Matter collected (µg) TN			
m2 Matter collected (µg) TN/C			
m Matter collected (µg)	0.000	0.000	0.000

IT CORPORATION
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VOLATILE ORGANIC COMPOUNDS ANALYSIS

Run No.		2A	2B	2C
Date (2000)		May 17	May 17	May 17
Start Time (approx.)		14:24	15:24	17:10
Stop Time (approx.)		15:04	17:01	17:50
1,1,2-Trichloroethane (MW=133.42)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Bromoform (MW=252.77)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
2-Hexanone (MW=100.16)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
1,1,2,2-Tetrachloroethane (MW=167.86)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000

IT CORPORATION
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VOLATILE ORGANIC COMPOUNDS ANALYSIS

Run No.	Condensate 2A - 2D
Volume of Condensate (ml)	40
Chloromethane (MW=50.49)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Vinyl Chloride (MW=62.50)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Bromomethane (MW=94.95)	
Concentration (ug/L)	
Matter collected (µg)	0.000
1,1-Dichloroethane (MW=98.97)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Trichlorofluoromethane (MW=137.37)	
Concentration (ug/L)	
Matter collected (µg)	0.000
1,1-Dichloroethene (MW=96.94)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Carbon disulfide (MW=76.14)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Acetone(MW=58.08)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Methylene chloride (MW=84.94)	
Concentration (ug/L)	17
Matter collected (µg)	0.680

IT CORPORATION
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VOLATILE ORGANIC COMPOUNDS ANALYSIS

Run No.	Condensate 2A - 2D
1,2-Dichloroethene(total) (MW=96.95)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Chloroform (MW=119.39)	
Concentration (ug/L)	
Matter collected (µg)	0.000
2-Butanone (MW=72.11)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Carbon tetrachloride (MW=153.84)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Benzene (MW=78.11)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Trichloroethene (MW=131.40)	
Concentration (ug/L)	0.6
Matter collected (µg)	0.024
1,2-Dichloropropane (MW=112.99)	
Concentration (ug/L)	
Matter collected (µg)	0.000
1,2-Dichloroethane (MW=98.96)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Bromodichloromethane (MW=163.83)	
Concentration (ug/L)	
Matter collected (µg)	0.000
cis-1,3-Dichloropropene (MW=110.98)	
Concentration (ug/L)	
Matter collected (µg)	0.000

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VOLATILE ORGANIC COMPOUNDS ANALYSIS

Run No.	Condensate 2A - 2D
trans-1,3-Dichloropropene (MW=110.98)	
Concentration (ug/L)	
Matter collected (µg)	0.000
4-Methyl-2-pentanone (MW=100.16)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Toluene (MW=92.13)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Tetrachloroethene (MW=165.85)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Chlorobenzene (MW=112.56)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Ethylbenzene (MW=106.16)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Xylene(total) (MW=106.16)	
Concentration (ug/L)	
Matter collected (µg)	0.000
1,1,1-Trichloroethane (MW=133.42)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Styrene (MW=104.14)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Dibromochloromethane (MW=208.28)	
Concentration (ug/L)	
Matter collected (µg)	0.000

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VOLATILE ORGANIC COMPOUNDS ANALYSIS

	Condensate
Run No.	**2A - 2D**

1,1,2-Trichloroethane (MW=133.42)

Concentration (ug/L)	
Matter collected (µg)	0.000

Bromoform (MW=252.77)

Concentration (ug/L)	
Matter collected (µg)	0.000

2-Hexanone (MW=100.16)

Concentration (ug/L)	
Matter collected (µg)	0.000

1,1,2,2-Tetrachloroethane (MW=167.86)

Concentration (ug/L)	
Matter collected (µg)	0.000

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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.		3A	3B	3C
Date (2000)		May 18	May 18	May 18
Start Time (approx.)		07:43	08:32	09:20
Stop Time (approx.)		08:23	09:12	10:00
Chloromethane (MW=50.49)				
m1	Matter collected (µg) TN		0.000	
m2	Matter collected (µg) TN/C		0.082	
m	Matter collected (µg)	0.000	0.082	0.000
Vinyl Chloride (MW=62.50)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Bromomethane (MW=94.95)				
m1	Matter collected (µg) TN	0.000	0.000	0.000
m2	Matter collected (µg) TN/C	0.024	0.036	0.038
m	Matter collected (µg)	0.024	0.036	0.038
1,1-Dichloroethane (MW=98.97)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Trichlorofluoromethane (MW=137.37)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
1,1-Dichloroethene (MW=96.94)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Carbon disulfide (MW=76.14)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Acetone(MW=58.08)				
m1	Matter collected (µg) TN	0.076	0.160	0.065
m2	Matter collected (µg) TN/C	0.120	0.060	0.000
m	Matter collected (µg)	0.196	0.220	0.065
Methylene chloride (MW=84.94)				
m1	Matter collected (µg) TN	0.046	0.075	0.000
m2	Matter collected (µg) TN/C	0.076	0.025	0.027
m	Matter collected (µg)	0.122	0.100	0.027

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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.		3A	3B	3C
Date (2000)		May 18	May 18	May 18
Start Time (approx.)		07:43	08:32	09:20
Stop Time (approx.)		08:23	09:12	10:00
1,2-Dichloroethene(total) (MW=96.95)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Chloroform (MW=119.39)				
m1	Matter collected (µg) TN			0.014
m2	Matter collected (µg) TN/C			0.012
m	Matter collected (µg)	0.000	0.000	0.026
2-Butanone (MW=72.11)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Carbon tetrachloride (MW=153.84)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Benzene (MW=78.11)				
m1	Matter collected (µg) TN	0.045	0.037	0.032
m2	Matter collected (µg) TN/C	0.013	0.020	0.013
m	Matter collected (µg)	0.058	0.057	0.045
Trichloroethene (MW=131.40)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
1,2-Dichloropropane (MW=112.99)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
1,2-Dichloroethane (MW=98.96)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Bromodichloromethane (MW=163.83)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000

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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.		3A	3B	3C
Date (2000)		May 18	May 18	May 18
Start Time (approx.)		07:43	08:32	09:20
Stop Time (approx.)		08:23	09:12	10:00
cis-1,3-Dichloropropene (MW=110.98)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
trans-1,3-Dichloropropene (MW=110.98)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
4-Methyl-2-pentanone (MW=100.16)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Toluene (MW=92.13)				
m1	Matter collected (µg) TN	0.000		
m2	Matter collected (µg) TN/C	0.010		
m	Matter collected (µg)	0.010	0.000	0.000
Tetrachloroethene (MW=165.85)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Chlorobenzene (MW=112.56)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Ethylbenzene (MW=106.16)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Xylene(total) (MW=106.16)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
1,1,1-Trichloroethane (MW=133.42)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Styrene (MW=104.14)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000

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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.		3A	3B	3C
Date (2000)		May 18	May 18	May 18
Start Time (approx.)		07:43	08:32	09:20
Stop Time (approx.)		08:23	09:12	10:00
Dibromochloromethane (MW=208.28)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
1,1,2-Trichloroethane (MW=133.42)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
Bromoform (MW=252.77)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
2-Hexanone (MW=100.16)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000
1,1,2,2-Tetrachloroethane (MW=167.86)				
m1	Matter collected (µg) TN			
m2	Matter collected (µg) TN/C			
m	Matter collected (µg)	0.000	0.000	0.000

IT CORPORATION
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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.	Condensate 3A - 3D
Volume of Condensate (ml)	40
Chloromethane (MW=50.49)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Vinyl Chloride (MW=62.50)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Bromomethane (MW=94.95)	
Concentration (ug/L)	
Matter collected (µg)	0.000
1,1-Dichloroethane (MW=98.97)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Trichlorofluoromethane (MW=137.37)	
Concentration (ug/L)	
Matter collected (µg)	0.000
1,1-Dichloroethene (MW=96.94)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Carbon disulfide (MW=76.14)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Acetone(MW=58.08)	
Concentration (ug/L)	13
Matter collected (µg)	0.520
Methylene chloride (MW=84.94)	
Concentration (ug/L)	18
Matter collected (µg)	0.720

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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.	Condensate 3A - 3D
1,2-Dichloroethene(total) (MW=96.95)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Chloroform (MW=119.39)	
Concentration (ug/L)	
Matter collected (µg)	0.000
2-Butanone (MW=72.11)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Carbon tetrachloride (MW=153.84)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Benzene (MW=78.11)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Trichloroethene (MW=131.40)	
Concentration (ug/L)	0.6
Matter collected (µg)	0.024
1,2-Dichloropropane (MW=112.99)	
Concentration (ug/L)	
Matter collected (µg)	0.000
1,2-Dichloroethane (MW=98.96)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Bromodichloromethane (MW=163.83)	
Concentration (ug/L)	
Matter collected (µg)	0.000

IT CORPORATION
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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.	Condensate 3A - 3D
cis-1,3-Dichloropropene (MW=110.98)	
Concentration (ug/L)	
Matter collected (µg)	0.000
trans-1,3-Dichloropropene (MW=110.98)	
Concentration (ug/L)	
Matter collected (µg)	0.000
4-Methyl-2-pentanone (MW=100.16)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Toluene (MW=92.13)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Tetrachloroethene (MW=165.85)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Chlorobenzene (MW=112.56)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Ethylbenzene (MW=106.16)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Xylene(total) (MW=106.16)	
Concentration (ug/L)	
Matter collected (µg)	0.000
1,1,1-Trichloroethane (MW=133.42)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Styrene (MW=104.14)	
Concentration (ug/L)	
Matter collected (µg)	0.000

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VOLATILE ORGANIC COMPOUNDS PARAMETERS

Run No.	Condensate 3A - 3D
Dibromochloromethane (MW=208.28)	
Concentration (ug/L)	
Matter collected (µg)	0.000
1,1,2-Trichloroethane (MW=133.42)	
Concentration (ug/L)	
Matter collected (µg)	0.000
Bromoform (MW=252.77)	
Concentration (ug/L)	
Matter collected (µg)	0.000
2-Hexanone (MW=100.16)	
Concentration (ug/L)	
Matter collected (µg)	0.000
1,1,2,2-Tetrachloroethane (MW=167.86)	
Concentration (ug/L)	
Matter collected (µg)	0.000

PHILIP SERVICES

3050

Certificate of Analysis

CLIENT INFORMATION

Attention:	Mark Roach
Client Name:	Clean Air Engineering
Project:	8705
Project Desc:	VOST analysis
Address:	500 W. Wood Street Palatine, IL IL 60067
Fax Number:	847-991-3385
Phone Number:	847-991-3300

LABORATORY INFORMATION

Contact:	Ron McLeod
Project:	AN000515
Date Received:	00/05/19
Date Reported:	00/06/01
Submission No.:	0E0842
Sample No.:	024694-024720

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: R. McLeod

000157

PASC - Certificate of Analysis

			Method Blank 1	Method Blank 2	LCS	LCS	Trip Blank	Field Blank
	Client ID:							
	Lab No.:		024694 00	024694 00	024694 00	024694 00	024695 00	024696 00
	Date Sampled:		-	-	-	-	00/05/17	00/05/17
Component	**MDL**	**Units**				% Recoveries		
Chloromethane	0.007	ug	<	<	0.29	120	<	<
Bromomethane	0.005	"	0.027	<	0.24	96	0.015	0.015
Vinyl Chloride	0.013	"	<	<	0.23	90	<	<
Chloroethane	0.007	"	<	<	0.21	84	<	<
Methylene Chloride	0.019	"	<	<	0.24	94	0.022	0.041
Acetone	0.045	"	<	<	0.19	76	<	0.10
Carbon Disulfide	0.018	"	<	<	0.29	110	<	0.26
1,1-Dichloroethene	0.007	"	<	<	0.26	110	<	<
1,1-Dichloroethane	0.004	"	<	<	0.28	110	<	<
1,2-Dichloroethene(total)	0.007	"	<	<	0.52	100	<	<
Chloroform	0.008	"	<	<	0.25	100	<	<
1,2-Dichloroethane	0.006	"	<	<	0.25	100	<	<
2-Butanone	0.036	"	<	<	0.29	110	<	<
1,1,1-Trichloroethane	0.014	"	<	<	0.25	100	<	<
Carbon Tetrachloride	0.016	"	<	<	0.28	110	<	<
Bromodichloromethane	0.011	"	<	<	0.26	100	<	<
1,2-Dichloropropane	0.008	"	<	<	0.26	100	<	<
cis-1,3-Dichloropropene	0.007	"	<	<	0.26	100	<	<
Trichloroethene	0.009	"	<	<	0.26	110	<	<
Dibromochloromethane	0.008	"	<	<	0.33	130	<	<
1,1,2-Trichloroethane	0.016	"	<	<	0.28	110	<	<
Benzene	0.009	"	<	0.020	0.27	110	<	0.010
trans-1,3-Dichloropropene	0.007	"	<	<	0.27	110	<	<
Bromoform	0.012	"	<	<	0.34	140	<	<
4-Methyl-2-Pentanone	0.019	"	<	<	0.32	130	<	<
2-Hexanone	0.031	"	<	<	0.29	120	<	<
Tetrachloroethene	0.008	"	<	<	0.26	100	<	<
1,1,2,2-Tetrachloroethane	0.014	"	<	<	0.37	150	<	<
Toluene	0.009	"	<	<	0.26	100	<	0.014
Chlorobenzene	0.009	"	<	<	0.26	110	<	<
Ethylbenzene	0.006	"	<	<	0.27	110	<	<
Styrene	0.007	"	<	<	0.25	100	<	<
Xylene(total)	0.015	"	<	<	0.58	120	<	<
Trichlorofluoromethane	0.010		<	<	0.30	118	<	<
Surrogate Recoveries		%						
d4-1,2-Dichloroethane			84	91	95	95	85	87
d8-Toluene			91	89	96	96	100	92
Bromofluorobenzene			85	98	100	100	84	91
Field Spike		%						
d10-Ethylbenzene			95	92	107	107	113	108

PASC - Certificate of Analysis

3050

			Run 1A TN	Run 1A TN/C	Run 1B TN	Run 1B TN/C	Run 1C TN	Run 1C TN/C
	Client ID:							
	Lab No.:		024697 00	024698 00	024699 00	024700 00	024701 00	024702 00
	Date Sampled:		00/05/17	00/05/17	00/05/17	00/05/17	00/05/17	00/05/17
Component	**MDL**	**Units**						
Chloromethane	0.007	ug	<	0.48	<	<	<	<
Bromomethane	0.005	"	0.029	0.11	<	0.031	0.021	0.031
Vinyl Chloride	0.013	"	<	<	<	<	<	<
Chloroethane	0.007	"	<	<	<	<	<	<
Methylene Chloride	0.019	"	0.053	0.049	0.064	0.040	<	0.023
Acetone	0.045	"	0.055	0.052	<	<	0.069	<
Carbon Disulfide	0.018	"	<	<	<	<	0.023	<
1,1-Dichloroethene	0.007	"	<	<	<	<	<	<
1,1-Dichloroethane	0.004	"	<	<	<	<	<	<
1,2-Dichloroethene(total)	0.007	"	<	<	<	<	<	<
Chloroform	0.008	"	<	<	<	<	<	<
1,2-Dichloroethane	0.006	"	<	<	<	<	<	<
2-Butanone	0.036	"	<	<	<	<	<	<
1,1,1-Trichloroethane	0.014	"	<	<	<	<	<	<
Carbon Tetrachloride	0.016	"	<	<	<	<	<	<
Bromodichloromethane	0.011	"	<	<	<	<	<	<
1,2-Dichloropropane	0.008	"	<	<	<	<	<	<
cis-1,3-Dichloropropene	0.007	"	<	<	<	<	<	<
Trichloroethene	0.009	"	<	<	<	<	<	<
Dibromochlormethane	0.008	"	<	<	<	<	<	<
1,1,2-Trichloroethane	0.016	"	<	<	<	<	<	<
Benzene	0.009	"	0.052	0.015	0.031	0.012	0.041	0.009
trans-1,3-Dichloropropene	0.007	"	<	<	<	<	<	<
Bromoform	0.012	"	<	<	<	<	<	<
4-Methyl-2-Pentanone	0.019	"	<	<	<	<	<	<
2-Hexanone	0.031	"	<	<	<	<	<	<
Tetrachloroethene	0.008	"	<	<	<	<	<	<
1,1,2,2-Tetrachloroethane	0.014	"	<	<	<	<	<	<
Toluene	0.009	"	<	<	<	<	<	<
Chlorobenzene	0.009	"	<	<	<	<	<	<
Ethylbenzene	0.006	"	<	<	<	<	<	<
Styrene	0.007	"	<	<	<	<	<	<
Xylene(total)	0.015	"	<	<	<	<	<	<
Trichlorofluoromethane	0.010		<	<	<	<	<	<
Surrogate Recoveries		%						
d4-1,2-Dichloroethane			84	84	86	86	85	88
d8-Toluene			95	96	95	96	97	94
Bromofluorobenzene			90	91	82	96	88	97
Field Spike		%						
d10-Ethylbenzene			95	-	118	-	104	-

000159

			Run	Run 2A	Run	Run 2B	Run	Run 2C
Client ID:			2A TN	TN/C	2B TN	TN/C	2C TN	TN/C
Lab No.:			024705 00	024706 00	024707 00	024708 00	024709 00	024710 00
Date Sampled:			00/05/17	00/05/17	00/05/17	00/05/17	00/05/17	00/05/17
Component	**MDL**	**Units**						
Chloromethane	0.007	ug	<	<	<	<	<	0.058
Bromomethane	0.005	"	0.013	0.040	0.022	0.070	<	0.031
Vinyl Chloride	0.013	"	<	<	<	<	<	<
Chloroethane	0.007	"	<	<	<	<	<	<
Methylene Chloride	0.019	"	0.021	0.086	0.055	0.023	0.020	<
Acetone	0.045	"	0.076	0.15	0.055	0.12	0.12	0.048
Carbon Disulfide	0.018	"	<	<	<	<	<	<
1,1-Dichloroethene	0.007	"	<	<	<	<	<	<
1,1-Dichloroethane	0.004	"	<	<	<	<	<	<
1,2-Dichloroethene(total)	0.007	"	<	<	<	<	<	<
Chloroform	0.008	"	<	<	<	<	<	<
1,2-Dichloroethane	0.006	"	<	<	<	<	<	<
2-Butanone	0.036	"	<	<	<	<	<	<
1,1,1-Trichloroethane	0.014	"	<	<	<	<	<	<
Carbon Tetrachloride	0.016	"	<	<	<	<	<	<
Bromodichloromethane	0.011	"	<	<	<	<	<	<
1,2-Dichloropropane	0.008	"	<	<	<	<	<	<
cis-1,3-Dichloropropene	0.007	"	<	<	<	<	<	<
Trichloroethene	0.009	"	<	<	<	<	<	<
Dibromochlormethane	0.008	"	<	<	<	<	<	<
1,1,2-Trichloroethane	0.016	"	<	<	<	<	<	<
Benzene	0.009	"	0.030	0.021	0.050	<	0.055	0.018
trans-1,3-Dichloropropene	0.007	"	<	<	<	<	<	<
Bromoform	0.012	"	<	<	<	<	<	<
4-Methyl-2-Pentanone	0.019	"	<	<	<	<	<	<
2-Hexanone	0.031	"	<	<	<	<	<	<
Tetrachloroethene	0.008	"	<	<	<	<	<	<
1,1,2,2-Tetrachloroethane	0.014	"	<	<	<	<	<	<
Toluene	0.009	"	<	<	<	<	<	<
Chlorobenzene	0.009	"	<	<	<	<	<	<
Ethylbenzene	0.006	"	<	<	<	<	<	<
Styrene	0.007	"	<	<	<	<	<	<
Xylene(total)	0.015	"	<	<	<	<	<	<
Trichlorofluoromethane	0.010		<	<	<	<	<	<
Surrogate Recoveries		%						
d4-1,2-Dichloroethane			91	91	88	84	93	88
d8-Toluene			96	94	92	102	88	93
Bromofluorobenzene			98	100	88	85	99	95
Field Spike		%						
d10-Ethylbenzene			111	-	103	-	102	-

PASC - Certificate of Analysis

3050

			Run 3A TN	Run 3A TN/C	Run 3B TN	Run 3B TN/C	Run 3C TN	Run 3C TN/C
Client ID:								
Lab No.:			024713 00	024714 00	024715 00	024716 00	024717 00	024718 00
Date Sampled:			00/05/17	00/05/17	00/05/17	00/05/17	00/05/17	00/05/17
Component	**MDL**	**Units**						
Chloromethane	0.007	ug	<	<	<	0.082	<	<
Bromomethane	0.005	"	<	0.024	<	0.036	<	0.038
Vinyl Chloride	0.013	"	<	<	<	<	<	<
Chloroethane	0.007	"	<	<	<	<	<	<
Methylene Chloride	0.019	"	0.046	0.076	0.075	0.025	<	0.027
Acetone	0.045	"	0.076	0.12	0.16	0.060	0.065	<
Carbon Disulfide	0.018	"	<	<	<	<	<	<
1,1-Dichloroethene	0.007	"	<	<	<	<	<	<
1,1-Dichloroethane	0.004	"	<	<	<	<	<	<
1,2-Dichloroethene(total)	0.007	"	<	<	<	<	<	<
Chloroform	0.008	"	<	<	<	<	0.014	0.012
1,2-Dichloroethane	0.006	"	<	<	<	<	<	<
2-Butanone	0.036	"	<	<	<	<	<	<
1,1,1-Trichloroethane	0.014	"	<	<	<	<	<	<
Carbon Tetrachloride	0.016	"	<	<	<	<	<	<
Bromodichloromethane	0.011	"	<	<	<	<	<	<
1,2-Dichloropropane	0.008	"	<	<	<	<	<	<
cis-1,3-Dichloropropene	0.007	"	<	<	<	<	<	<
Trichloroethene	0.009	"	<	<	<	<	<	<
Dibromochlormethane	0.008	"	<	<	<	<	<	<
1,1,2-Trichloroethane	0.016	"	<	<	<	<	<	<
Benzene	0.009	"	0.045	0.013	0.037	0.020	0.032	0.013
trans-1,3-Dichloropropene	0.007	"	<	<	<	<	<	<
Bromoform	0.012	"	<	<	<	<	<	<
4-Methyl-2-Pentanone	0.019	"	<	<	<	<	<	<
2-Hexanone	0.031	"	<	<	<	<	<	<
Tetrachloroethene	0.008	"	<	<	<	<	<	<
1,1,2,2-Tetrachloroethane	0.014	"	<	<	<	<	<	<
Toluene	0.009	"	<	0.010	<	<	<	<
Chlorobenzene	0.009	"	<	<	<	<	<	<
Ethylbenzene	0.006	"	<	<	<	<	<	<
Styrene	0.007	"	<	<	<	<	<	<
Xylene(total)	0.015	"	<	<	<	<	<	<
Trichlorofluoromethane	0.010		<	<	<	<	<	<
Surrogate Recoveries		%						
d4-1,2-Dichloroethane			89	85	89	91	89	89
d8-Toluene			93	92	95	92	94	97
Bromofluorobenzene			89	93	95	104	86	95
Field Spike		%						
d10-Ethylbenzene			106	-	127	-	98	-

PASC - Summary of Analysis Pre. Dates

Batch Code:	**0530EG01**	**0529EG01**	**0530EG02**
VOST via 5041	024694 00	024695 00	024707 00
		024696 00	024709 00
		024697 00	024710 00
		024698 00	024713 00
		024699 00	024714 00
		024700 00	024715 00
		024701 00	024716 00
		024702 00	024717 00
		024705 00	024718 00
		024706 00	
		024708 00	
Run Date:	00/05/30	00/05/29	00/05/30
Date of Sample Prep:	00/05/30	00/05/29	00/05/30

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PHILIP SERVICES

Certificate of Analysis

CLIENT INFORMATION

Attention:	Mark Roach
Client Name:	Clean Air Engineering
Project:	8705
Project Desc:	VOST analysis
Address:	500 W. Wood Street Palatine, IL IL 60067
Fax Number:	847-991-3385
Phone Number:	847-991-3300

LABORATORY INFORMATION

Contact:	Ron McLeod
Project:	AN000515
Date Received:	00/05/19
Date Reported:	00/06/01
Submission No.:	0E0842
Sample No.:	024721-024725

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.

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COMMENTS:

Certified by:

PASC - Certificate of Analysis

			Method Blank	Blank Spike	Blank Spike	Condensate Blank	Run 1 Condensate
	Client ID:						
	Lab No.:		024721 00	024721 00	024721 00	024722 00	024723 00
	Date Sampled:		-	-	-	00/05/17	00/05/17
Component	**MDL**	**Units**			% Recoveries		
Chloromethane	1.1	ug/L	<	40	80	<	<
Bromomethane	3.0	"	<	37	74	<	<
Vinyl Chloride	0.9	"	<	48	96	<	<
Chloroethane	1.0	"	<	47	94	<	<
Methylene Chloride	2.3	"	<	45	89	22	19
Acetone	12.7	"	<	61	120	<	<
Carbon Disulfide	0.9	"	<	60	120	<	<
1,1-Dichloroethene	0.7	"	<	48	95	<	<
1,1-Dichloroethane	0.6	"	<	47	94	<	<
trans-1,2-Dichloroethene	0.4	"	<	47	95	<	<
cis-1,2-Dichloroethene	0.6	"	<	47	94	<	<
Chloroform	0.3	"	<	46	91	<	<
1,2-Dichloroethane	0.7	"	<	45	91	<	<
2-Butanone	2.2	"	<	56	110	<	<
1,1,1-Trichloroethane	0.8	"	<	51	100	<	<
Carbon Tetrachloride	0.7	"	<	51	100	<	<
Bromodichloromethane	0.5	"	<	48	95	<	<
1,2-Dichloropropane	0.5	"	<	45	89	<	<
cis-1,3-Dichloropropene	0.6	"	<	51	100	<	<
Trichloroethene	0.2	"	<	48	95	0.8	0.8
Dibromochloromethane	0.7	"	<	51	100	<	<
1,1,2-Trichloroethane	0.4	"	<	50	100	<	<
Benzene	0.5	"	<	48	97	<	<
trans-1,3-Dichloropropene	1.0	"	<	50	100	<	<
Bromoform	0.7	"	<	56	110	<	<
4-Methyl-2-Pentanone	1.0	"	<	49	99	<	<
2-Hexanone	5.0	"	<	56	110	<	<
Tetrachloroethene	0.5	"	<	52	110	<	<
1,1,2,2-Tetrachloroethane	0.8	"	<	55	110	<	<
Toluene	1.3	"	<	50	100	<	<
Chlorobenzene	0.6	"	<	51	100	<	<
Ethylbenzene	0.5	"	<	50	100	<	<
Styrene	0.6	"	<	52	100	<	<
m&p-Xylene	0.8	"	<	100	100	<	<
o-xylene	0.4	"	<	51	100	<	<
Trichlorofluoromethane	1.9		<	-	-	<	<
Surrogate Recoveries		%					
d4-1,2-Dichloroethane			83	95	95	81	79
d8-Toluene			95	92	92	96	97
Bromofluorobenzene			101	105	105	105	105

PASC - Certificate of Analysis

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			Run 2	Run 3
	Client ID:		Condensate	Condensate
	Lab No.:		024724 00	024725 00
	Date Sampled:		00/05/17	00/05/17
Component	**MDL**	**Units**		
Chloromethane	1.1	ug/L	<	<
Bromomethane	3.0	"	<	<
Vinyl Chloride	0.9	"	<	<
Chloroethane	1.0	"	<	<
Methylene Chloride	2.3	"	17	18
Acetone	12.7	"	<	13
Carbon Disulfide	0.9	"	<	<
1,1-Dichloroethene	0.7	"	<	<
1,1-Dichloroethane	0.6	"	<	<
trans-1,2-Dichloroethene	0.4	"	<	<
cis-1,2-Dichloroethene	0.6	"	<	<
Chloroform	0.3	"	<	<
1,2-Dichloroethane	0.7	"	<	<
2-Butanone	2.2	"	<	<
1,1,1-Trichloroethane	0.8	"	<	<
Carbon Tetrachloride	0.7	"	<	<
Bromodichloromethane	0.5	"	<	<
1,2-Dichloropropane	0.5	"	<	<
cis-1,3-Dichloropropene	0.6	"	<	<
Trichloroethene	0.2	"	0.6	0.6
Dibromochloromethane	0.7	"	<	<
1,1,2-Trichloroethane	0.4	"	<	<
Benzene	0.5	"	<	<
trans-1,3-Dichloropropene	1.0	"	<	<
Bromoform	0.7	"	<	<
4-Methyl-2-Pentanone	1.0	"	<	<
2-Hexanone	5.0	"	<	<
Tetrachloroethene	0.5	"	<	<
1,1,2,2-Tetrachloroethane	0.8	"	<	<
Toluene	1.3	"	<	<
Chlorobenzene	0.6	"	<	<
Ethylbenzene	0.5	"	<	<
Styrene	0.6	"	<	<
m&p-Xylene	0.8	"	<	<
o-xylene	0.4	"	<	<
Trichlorofluoromethane	1.9		<	<
Surrogate Recoveries		%		
d4-1,2-Dichloroethane			78	79
d8-Toluene			97	96
Bromofluorobenzene			104	102

6/14/00

PASC - Summary of Analysis Pre. Dates

Batch Code:	**0530SM01**
Volatiles via 8260	024721 00
	024722 00
	024723 00
	024724 00
	024725 00
Run Date:	00/05/30
Date of Sample Prep:	00/05/30

Client:Clean Air Engineering Project:8705

PHILIP SERVICES
ANALYTICAL SERVICES
5555 North Service Road
Burlington, Ontario
Canada L7L 5H7

Phone: (905) 332-8788
Fax: (905) 332-9169

3050

FAX

DATE: JUNE 6, 2000

NO. OF PAGES (including cover) : 28

TO: MARK ROACH	**From:** SHARI TYPER ext. 255
CLEAN AIR ENGINEERING	
Fax: 847-991-3385	
Tel: 847-991-6200 ext. 2099	

Remarks: 8705 - VOST / VOST CONDENSATE TICS

☐ Urgent ☐ Please Review ☐ Reply ASAP ☐ Please Comment

Hello Mark:

Here are the TICS for the VOST and VOST Condensate samples you submitted.

The data package should be completed by the end of the week.

Regards,

Shari

000167

Original To Follow: ____ YES X NO ____ IF REQUESTED

NOTICE: *The information contained in this fax transmittal is confidential and may also be subject to the attorney-client privileged work product. The information is intended only for the use of the intended recipient. If you have received this fax transmittal in error, please notify us by telephone and destroy the original. Thank you.*

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: BL0529 00

MBLANK 0529 00

Concentration Units
UG

Number of TICs found:_ 0

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

3050

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: METHOD BLANK

024694 00

Concentration Units
UG

Number of TICs found: 0

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: TRIP BLANK

024695 00

Number of TICs found: 1

Concentration Units
UG

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.	000078-78-4	BUTANE,2-METHYL-	2.25	0.117	86
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

3050

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: FIELD BLANK

024696 00

Concentration Units
UG

Number of TICs found: 0

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: RUN 1A TN

024697 00

Concentration Units
UG

Number of TICs found: 2

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		UNKNOWN	3.20	0.093	
2.	000110-83-8	CYLOHEXENE	5.32	0.058	
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

3050

Client ID: RUN 1A TN/C

024698 00

Number of TICs found: 2

Concentration Units
UG

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		UNKNOWN	3.10	0.282	
2.		UNKNOWN	3.30	0.213	
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: RUN 1B TN

024699 00

Concentration Units
UG

Number of TICs found: 0

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

3050

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: RUN 1B TN/C

024700 00

Concentration Units
UG

Number of TICs found: 1

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		UNKNOWN	3.22	0.123	
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: RUN 1C TN

024701 00

Number of TICs found: 2

Concentration Units
UG

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		UNKNOWM	3.22	0.069	
2.	0002597-49-1	CYCLOBUTANE,ETHENYL-	5.34	0.053	91
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

3050

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: RUN 1C TN/C

024702 00

Concentration Units
UG

Number of TICs found: 0

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		UNKNOWN	3.25	0.064	
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: RUN 2A TN

024705 00

Number of TICs found:_ 0

Concentration Units
UG

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

3050

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: RUN 2A TN/C

024706 00

Concentration Units
UG

Number of TICs found: 1

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		UNKNOWN	3.23	0.112	
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: RUN 2B TN

024707 00

Concentration Units
UG

Number of TICs found: 2

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		UNKNOWN	3.19	0.075	
2.	002597-49-1	CYCLOBUTANE,ETHENYL-	5.33	0.069	91
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

3050

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: RUN 2B TN/C

024708 00

Number of TICs found: 1

Concentration Units
UG

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		UNKNOWM	3.30	0.101	
2.					91
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: RUN 2C TN

024709 00

Concentration Units
UG

Number of TICs found: 1

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		UNKNOWN	3.19	0.112	
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

30.50

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: RUN 2C TN/C

024710 00

Concentration Units
UG

Number of TICs found: 1

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		UNKNOWN	3.22	0.149	
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: RUN 3A TN

024713 00

Number of TICs found: 2

Concentration Units
UG

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		UNKNOWN	3.24	0.101	
2.	002597-49-1	CYCLOBUTANE,ETHENYL-	5.29	0.098	91
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

3050

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: RUN 3A TN/C

024714 00

Concentration Units
UG

Number of TICs found: 2

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.	000109-87-5	METHANE,DIMETHOXY-	2.71	0.083	83
2.		UNKNOWN	3.40	0.187	
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: RUN 3B TN/C

024716 00

Concentration Units
UG

Number of TICs found:_ 2

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.	000109-87-5	METHANE,DIMETHOXY-	2.73	0.090	90
2.		UNKNOWN	3.32	0.414	
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

3050

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: RUN 3B TN

024715 00

Number of TICs found: 2

Concentration Units
UG

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		UNKNOWN	3.26	0.210	
2.	002597-49-1	CYCLOBUTANE,ETHENYL-	5.32	0.054	
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: RUN 3C TN/C

024718 00

Number of TICs found: 1

Concentration Units
UG

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.		UNKNOWN	3.20	0.085	
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

3050

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: RUN 3C TN

024717 00

Concentration Units
UG

Number of TICs found: 0

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: CLEANAIR

SAMPLE ID:: Method Blank

PASI ID: 024721 00

Number of TICs found:_ 0

Concentration Units (ug/L or mg/kg or ug)__ug/L____

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					

3050

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: CLEANAIR

SAMPLE ID:: Condensate Blank

PASI ID: 024722 00

Number of TICs found: 0

Concentration Units (ug/L or mg/kg or ug) ug/L

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: CLEANAIR

SAMPLE ID:: Run 1 Condensate

PASI ID: 024723 00

Number of TICs found: 0

Concentration Units (ug/L or mg/kg or ug) ug/L

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

3050

Client ID: CLEANAIR

SAMPLE ID:: Run 2 Condensate

PASI ID: 024724 00

Number of TICs found: 0

Concentration Units (ug/L or mg/kg or ug) ug/L

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					

Volatile Organics Analysis Data Sheets
Tentatively Identified Compounds

Client ID: CLEANAIR

SAMPLE ID:: Run 3 Condensate

PASI ID: 024725 00

Number of TICs found: 0

Concentration Units (ug/L or mg/kg or ug) ug/L

	CAS #	Compound Name	RT	Est. Conc.	Match %
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					

JUN 14 2000 11:32 FR PHILIP ANALYTICAL 905 332 9169 TO 18479913385 P.02/06

32 075

MB.

CHAIN OF CUSTODY FORM

CLIENT: I T Corporation
PLANT: WPRAP @ Fernald, Ohio
PROJECT MANAGER: Mark Roach
JOB LEADER: Georg Pavlovics

PROJECT NO. 8705
DEPT. 66
RECOVERY PERSON: Bill Graham

PAGE 1 OF 3
REVISION NO. ____

CAE LAB NO.	RUN NO.	TEST LOCATION	DATE	SAMPLE MATRIX	NO. OF CONTAINERS	ORIGINAL VOLUME	ANALYSIS REQUESTED: GAS CHROMATOGRAPH BY METHOD 18			Archive	ADDITIONAL INFORMATION
Air #1	1A	T.O. Stack	5/17	Tenax tube# 15A	1		X				24697
" "	1A			Tenax/Charcoal tube# 15B.	1		X				24698.
Air #2	1B			Tenax tube# 13A	1		X				24699
" "	1B			Tenax/Charcoal tube# 13B	1		X				24700.
Air #3	1C			Tenax tube# 12A	1		X				24701
" "	1C			Tenax/Charcoal # 12B	1		X				24702
Air #4	1D			Tenax tube# 20A	1		X			X	Do not analyze unless 24703
" "	1D			Tenax/Charcoal tube # 20B	1		X			X	instructed after initial 24704.
	1										analysis.
Total	1A-1D			Condensate Catch (HPLC, H_2O)	1	40ml	X				24723
Air #1	Field Blank	FB		Tenax Tube # 18A	1		X				24696.
Air #2	Field Blank	FB		Tenax/Charcoal tube # 18B	1		X				

Relinquished by:(Signature)	Date/Time	Received by:(Signature)	Date/Time	Relinquished by:(Signature)	Date/Time
[signature]	5-18-00				
Courier:	Date/Time	Relinquished by:(Signature)	Date/Time	Rec'd for Analysis by: [signature] - PASC	Date/Time 000519 11:00

Special Handling Instructions: 000195

Forwarding Lab:

This form was completed by: 28 Tenax
Eric Rodriguez (HPLC)

Signature: [signature] Date: 5/18

Clean Air Engineering
500 West Wood Street
Palatine, IL 60067
(847) 991-3300 phone
(847) 991-3385 fax

DS COC Palatine
EXCL.R0-6/7/96

3050

5074

CHAIN OF CUSTODY FORM

CLIENT IT Corporation
PLANT WPRAP @ Fernald, Ohio
PROJECT MANAGER Mark Roach
JOB LEADER Georg Pavlovics

PROJECT NO. 8705
DEPT. 66
RECOVERY PERSON: Bill Graham

MB-24721

PAGE 2 OF 3
REVISION NO. ____

CAE LAB NO.	RUN NO.	TEST LOCATION	DATE	SAMPLE MATRIX	NO. OF CONTAINERS	ORIGINAL VOLUME	GAS CHROMATOGRAPH BY METHOD 18			ARCHIVE	ADDITIONAL INFORMATION
Pair #1	2A	T.O. Stack	5/17	Tenax tube # 19A	1		X				24705
Pair #1	2A	↓	↓	Tenax/Charcoal tube # 19B	1		X				24706.
Pair #2	2B	" "	" "	Tenax tube # 17A	1		X				24707.
Pair #2	2B	↓	↓	Tenax/Charcoal tube # 17B	1		X				24708.
Pair #3	2C	" "	" "	Tenax tube # 6A	1		X				24709.
Pair #3	2C	↓	↓	Tenax/Charcoal tube # 6B	1		X				24710.
Pair #4	2D	" "	" "	Tenax tube # 5A	1					X	Do not analyze unless 24711
Pair #4	2D	↓	↓	Tenax/Charcoal tube # 5B	1					X	instructed after initial 2471.
											analysis.
Total	2A-2D	" "	" "	Condensate Catch (HPLC)	1	40ml	X				24724
—	Blank	↓	5/18	Condensate Blank (HPLC)	1	40ml	X			X	24722

Relinquished by:(Signature)	Date/Time	Received by:(Signature)	Date/Time	Relinquished by:(Signature)	Date/Time
W.F. Graham	5-18-00				
Courier:	Date/Time	Relinquished by:(Signature)	Date/Time	Rec'd for Analysis by: [signature]	Date/Time 0:05:19 11:00

Special Handling Instructions

000196

Forwarding Lab:

This form was completed by: Eric Rodriguez

Signature [signature] Date 5/1

Clean Air Engineering
500 West Wood Street
Palatine, IL 60067
(847) 991-3300 phone
(847) 991-3385 fax
DS COC Palatine

CHAIN OF CUSTODY FORM

LIENT IT Corporation
LANT WPRAP @ Fernald, Ohio
ROJECT MANAGER Mark Roach
OB LEADER Georg Pavlovics
MB-24694.

PROJECT NO. 8705
DEPT. 66
RECOVERY PERSON: Bill Graham

PAGE 3 OF 3
REVISION NO. ____

CAE AB NO.	RUN NO.	TEST LOCATION	DATE	SAMPLE MATRIX	NO. OF CONTAINERS	ORIGINAL VOLUME	GAS CHROMATOGRAPH BY METHOD 18			Archive	ADDITIONAL INFORMATION
..r #1	3A	T.O. Stack	5/17	Tenax tube # 4A	1		x				24713.
"	3A			Tenax/charcoal tube # 4B	1		x				24714.
..r #2	3B			Tenax tube # 3A	1		x				24715.
"	3B			Tenax/Charcoal tube # 3B	1		x				24716
..r #3	3C			Tenax tube # 2A	1		x				24717.
"	3C			Tenax/charcoal tube # 2B	1		x				24718
..r #4	3D			Tenax tube # 1A	1					x	Do not analyze unless 2479.
"	3D			Tenax/charcoal tube # 1B	1					x	instructed after initial 24721
											analysis.
otal	3A-3D			Condensate Catch (HPLC H_2O)	1	40ml	x				24725
..r #1	Trip Blank	Trip Blank Stack		Tenax Tube # 4A	1		X				24695
..r #2	Trip Blank	Stack		Tenax/Charcoal # 4B	1		X				

Relinquished by:(Signature)	Date/Time	Received by:(Signature)	Date/Time	Relinquished by:(Signature)	Date/Time
[signature]	5-18-00				
Courier:	Date/Time	Relinquished by:(Signature)	Date/Time	Rec'd for Analysis by: [signature]	Date/Time 000519 11:00

000197

Special Handling Instructions

Forwarding Lab:

PO Number:

This form was completed by:

ERIC RODRIGUEZ

Signature [signature] Date 5/17/00

Clean Air Engineering
500 West Wood Street
Palatine, IL 60067
(847) 991-3300 phone
(847) 991-3385 fax

DS COC Palatine
EXCL.R0-6/7/98

3050

JUN 14 2000 11:32 FR PHILIP ANALYTICAL 905 332 9169 TO 18479913385 P.04/06

Page ___ of ___

US SAMPLE LOG IN SHEET

CLEAN AIR

Lab Name: Philip Analytical Services Corporation, Burlington Laboratory

Received By (Print Name): K. Carcuro

Received By (Signature):

Client Project ID:

REMARKS:		Condition of Samples/Sample Shipm
Custody Seal(s)	Present ___ Absent ✓	rec'd intact
[illegible]	Present ✓ Absent ___	
Airbill	Present ✓ Absent ___	
Airbill No.	3136069296	
Does Information on Custody Records and Samples Agree?	Yes ✓ No ___	
Date Received at Lab	5-19-00	
Time Received	11:00a	

Cooler ID:	Temperature	
1 cooler	19°C	thawed ice packs.

Relinquished By: R. Jones

Date: 5-19-00

Logbook No: ___

Logbook Page No. ___

3050

PSC
PHILIP SERVICES

FEDERAL EXPRESS

RECIPIENT'S COPY

QUESTIONS? CALL 800-238-5355 TOLL FREE

3136069296

AIRBILL PACKAGE TRACKING NUMBER 3136069296

3 1 3 6 0 6 9 2 9 6

1 [redacted] Date

From (Your Name) Please Print | Your Phone Number (Very Important) ( )

Company | Department/Floor No.

Street Address

City | State | ZIP Required

2 To (Recipient's Name) Please Print | Recipient's Phone Number (Very ( )

Company | Department/F

Exact Street Address (We Cannot Deliver to P.O. Boxes or P.O. Zip Codes.)

City | State | ZIP Required

YOUR INTERNAL BILLING REFERENCE INFORMATION (optional) (First 24 characters will appear on invoice.)

H IF HOLD AT FEDEX LOCATION, Print FEDEX Address Here
Street Address

City | State | ZIP Required

3 PAYMENT 1 ☐ Bill Sender 2 ☐ Bill Recipient's FedEx Acct. No. 3 ☐ Bill 3rd Party FedEx Acct. No. 4 ☐ Bill Credit Card
5 ☐ Cash/Check [redacted]

4 SERVICES (Check only one box)

Priority Overnight (Delivery by next business morning)
11 ☐ OTHER PACKAGING
16 ☐ FEDEX LETTER
12 ☐ FEDEX PAK*
13 ☐ FEDEX BOX
14 ☐ FEDEX TUBE

Standard Overnight (Delivery by next business afternoon. No Saturday delivery)
51 ☐ OTHER PACKAGING
56 ☐ FEDEX LETTER*
52 ☐ FEDEX PAK*
53 ☐ FEDEX BOX
54 ☐ FEDEX TUBE

Economy Two-Day (Delivery by second business day)
30 ☐ ECONOMY*
*Economy Letter Rate not available. Minimum charge: One pound Economy rate.

Government Overnight (Restricted for authorized users only)
46 ☐ GOVT LETTER
41 ☐ GOVT PACKAGE

Freight Service (for packages over 150 lbs.)
70 ☐ OVERNIGHT FREIGHT** (Confirmed reservation required)
80 ☐ TWO-DAY FREIGHT**
*Declared Value Limit $500. **Call for delivery schedule.

5 DELIVERY AND SPECIAL HANDLING (Check services required)

Weekday Service*
1 ☐ HOLD AT FEDEX LOCATION WEEKDAY (Fill in Section H)
2 ☐ DELIVER WEEKDAY

Saturday Service
31 ☐ HOLD AT FEDEX LOCATION SATURDAY (Fill in Section H)
3 ☐ DELIVER SATURDAY (Extra charge) (Not available to all locations)
9 ☐ SATURDAY PICK-UP (Extra charge)

Special Handling
4 ☐ DANGEROUS GOODS (Extra charge)
6 ☐ DRY ICE Dangerous Goods Shipper's Declaration not required
Dry Ice 9 UN 1845 ____ X ____ kg. 904 ☐
☐ DESCRIPTION
12 ☐ HOLIDAY DELIVERY (If offered) (Extra charge)

6

PACKAGES	WEIGHT in Pounds Only	YOUR DECLARED VALUE (See right)
Total	Total	Total

DIM SHIPMENT (Chargeable Weight)
☐ ____ lbs.
L x W x H

Received At
1 ☐ Regular Stop 3 ☐ Drop Box
4 ☐ B.S.C.
2 ☐ On-Call Stop 5 ☐ Station

Emp. No. | Date
☐ Cash Received
☐ Return Shipment
☐ Third Party ☐ Chg. To Del. ☐ Chg. To Hold
Street Address
City | State | Zip
Received By:
X
Date/Time Received | FedEx Employee Number

7 Release Signature:

Federal Expre
Base Charges
Declared Value
Other 1
Other 2
Total Charges

REVISION DATE 4/
PART #145412 W
FORMAT #160
160
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000199

IT CORPORATION
FERNALD, OH

Client Reference No: 773481-1958
CAE Project No: 8705

PERFORMANCE CRITERIA TEST PLAN

G

Waste Pits Remedial Action Project (WPRAP)

Performance Test Criteria

***

PREPARED
for
Fluor Daniel Fernald, Inc.
Fernald, Ohio

FDF Subcontract No. 98SC000001

***

PREPARED
by
IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923

IT Project No. 773481

***

Revision 0
Issue Date: 7/23/99

Record of Issue/Revisions

Date	Rev. No.	Description of Issue/Revision
6-25-98	A	Original Issue of Draft
8-20-98	B	Draft Issue for FDF Review
9-25-98	C	Draft Issue for EPA Review
3-10-99	D	Draft Final Issue for EPA Review
7-23-99	0	Final

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3 EPA Method 10 Sampling Train for CO
4 EPA Method 25A Sampling Train for Total Hydrocarbons
5 Process Flow Diagram

List of Acronyms/Abbreviations

ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
BSL	Bureau of Labor Statistics
CEM	continuous emissions monitoring
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
EC	electrical conductivity
EPA	U.S. Environmental Protection Agency
FDF	Fluor Daniel Fernald
FID	flame ionization detector
g	grams
GC	gas chromatography
GET	General Employee Training
GPM	gallons per minute
HEPA	high-efficiency particulate air
Hg	mercury
ID	induced draft
L/min	liters per minute
lb/hr	pounds per hour
MS	mass spectrometry
NDIR	nondispersive infrared
O_2	oxygen
OU	operable unit
THC	total hydrocarbons
VOA	volatile organic analyte
VOC	volatile organic compound
VOST	volatile organic sampling train
WESP	wet electrostatic precipitator
WPRAP	Waste Pits Remedial Action Project
WTS	Wastewater Treatment System

1.0 INTRODUCTION

This Performance Test Criteria is for the Dryer off gas vent stack at the Fernald OU1 Remedial Action Project. This document is intended to provide the supplemental information required by the State of Ohio in the Intent to Test Notification procedures.

The "Intent to Test Notification" form is attached. The general layout of this document follows the outline provided by the Ohio EPA intent to test notification additional information document.

2.0 TECHNICAL APPROACH

2.1 Performance Test Overview

To collect the required information, one sampling run will be performed. All testing will be performed using EPA Reference Methods or Methods contained in SW-846.

The Performance Test will involve conducting emissions testing during normal full load operations of both dryers. The material processed by the dryers will consist of actual waste pit materials. Before the Performance Test, WPRAP will check the stockpiled wastepit material to verify that the waste is representative of the wastes that are generated during routine operations.

2.2 Description of Test Methods

The following sections provide summary descriptions of the test methodologies to be used to quantify emissions of the targeted parameters.

2.2.1 Location of Traverse Points

To insure representative sampling of particulate and the other non-gaseous target constituents, the cross section of the stack will be divided into discreet sampling points according to the procedures described in 40 CFR 60; Appendix A, Method 1. The stack gas characteristics (i.e., flow, temp.) will be measured at each of the traverse locations during the test run.

2.2.2 Velocity and Volumetric Flow Measurements

Velocity measurements will be performed prior to sampling so as to characterize the gas stream flow characteristics, and during each sampling run. Velocity measurements on each source will be performed using the procedures outlined in 40 CFR, Part 60, Appendix A, Method 2, Determination of Stack Gas Velocity and Volumetric Flow Rate. The velocity pressures will be measured using a "S"-type pitot tube and standard oil filled manometers.

Cyclonic flow patterns with angles greater than 10° off vertical are not expected at the sampling location. However, cyclonic flow checks will be performed using a S-type pitot tube as described in Method 1, Section 2.4. If the average yaw angle exceeds 20° an alternative particulate sampling location will be considered or alternate methods to measure velocity and particulate emission rates will be proposed.

2.2.3 Temperature Measurements

The temperature of the stack gas will be measured prior to sampling and during each test run using K-type thermocouples and dedicated digital temperature readouts. Each isokinetic sampling train will be equipped with a thermocouple. The temperature will be recorded on the sampling data sheet at each traverse point location. The stack temperatures will be arithmetically averaged and used to calculate the volumetric flow rates at standard and dry standard conditions.

2.2.4 Moisture Determinations

The moisture content of the stack gas will be determined using procedures outlined in 40 CFR 60; Appendix A, Reference Method 4. The Method 4 sampling will be incorporated with the isokinetic sampling train, and as a separate sample train for moisture determinations prior to any isokinetic sampling. The moisture will be determined for the sampling train by gravimetrically measuring the weight gain of the chilled impingers over the length of the sampling run.

2.2.5 Carbon Dioxide and Oxygen

The CO_2 and O_2 stack gas concentrations will be determined according to procedures specified in CFR 40, Part 60, Appendix A, Method 3, Gas Analysis for Carbon Dioxide, Oxygen, Excess Air, and Dry Molecular Weight. Stack gas samples for CO_2 and O_2 will be collected utilizing a stainless steel sampling probe attached to an isokinetic sample train. The sample will be collected in either a 10 liter aluminized polyethylene or Tedlar® bag using a multi-point grab sampling technique. A grab sampling train, as illustrated in CFR 40, Part 60, Appendix A, Method 3, will be used to draw equal volumes of stack gas at each traverse point. The composite sample collected during the test run will be analyzed using an Orsat analyzer. All samples will be analyzed within four hours of collection.

2.2.6 Particulate

The gas stream will be sampled for particulate using an EPA Method 5 sampling train. A schematic of the sampling train is shown in Figure 1. The sampling train will collect approximately 180 dry standard cubic feet of gas during the six hour sampling run. Particulate matter will be collected on a glass fiber filter in the M5 train according to EPA Method 5. The weight gain of this filter will be used determine the total particulate concentration in the gas stream, and the resulting particulate mass emission rate. The M5 procedure includes measurement of the stack gas flow rate and temperature according to EPA Methods 1 and 2. The train will also be used to determine the moisture of the gas stream according to EPA Method 4.

The samples will be recovered from the M5 train as follows:

- **Particulate Filter.** Will be removed from the filter holder, placed in a petri dish, and sealed.

- **Probe Rinse.** The nozzle, probe, and front half of the filter holder and any connecting glassware will be brushed and rinsed with acetone. The rinses will be placed in glass jars with Teflon-lined lids.

- **Impinger Solutions.** The contents of each impinger will be volumetrically measured and placed in a glass sample bottle with a Teflon-lined lid. The impingers and connecting glassware will be rinsed with measured amounts of the appropriate impinger solutions and the rinses added to the appropriate sample bottle.

- **Silica Gel.** The silica gel impinger will be weighed to the nearest 0.5 g to determine the amount of moisture collected.

Quality control samples for the M5 train will consist of blanks for the filter, acetone, and impinger solutions.

2.2.7 Volatile Organic Compounds

Volatile Organic Sampling Train Method 0030, *Test Methods for Evaluating Solid Wastes, SW-846*, 3rd Edition, September, 1986 will be used to measure the emission rates of specific volatile compounds from the process stack. Sampling will take place during the sampling run with replacement of sorbent tube pairs after each 40 minutes of sampling. Each pair of tubes will be used to sample approximately 20 liters of stack gas. The VOST condensate is to be collected one time at the end of each sampling run in 40 ml VOA vials eliminating head space. All VOA samples will be stored on ice from the time of collection. Four pairs of sorbentcartridges will be collected during the run, three of the pairs will be targeted for analysis and one pair will serve as a back-up pair in the event of breakage or sample loss.

2.2.7.1 Sorbent Tube Preparation and Handling

The laboratory will prepare the sorbent tubes and deliver them to the field sampling crew for sampling. The field sampling crew will recover the samples for subsequent analysis at the laboratory. The procedures for preparing, handling, storing, and analyzing the tubes will be those described in the EPA SW-846 Method 0030 referenced below. As described in the protocol, sorbent material (Tenax™ resin and charcoal) will be Soxhlet extracted, vacuum dried, thermally conditioned with organic-free nitrogen, and loaded into tubes which are then tested individually

for background contamination using gas chromatography. A batch of resin tubes will be prepared specifically for the performance tests. Two pairs of these VOST tubes will be spiked with surrogate compounds and analyzed by the analytical laboratory as spiked resin blanks. Each sorbent tube will be labeled and tracked through its individual project identification number.

The sorbent tubes will be protected from contamination by placing them in glass culture tubes during shipping and storage. These tubes will contain clean charcoal as a fugitive contaminant scavenger. For shipment to the site, the tubes will be packed separately and kept at $\leq 4°C$ on ice, blue ice or ice in insulated storage containers.

At the test site VOST handling area, the tubes will be stored on ice until needed. Before each replicate sampling run, the sample coordinator will supply numbered resin tubes, including a numbered field blank pair, to the stack sampling specialist conducting the VOST sampling.

At the end of each run, the process sample coordinator will recover the tubes along with a VOST sample collection sheet. VOST samples will then be re-packed on ice and shipped, along with the sample documentation, via overnight delivery to the analytical laboratory.

2.2.7.2 VOST Operation

A schematic of the VOST is shown in Figure 2. The sample collection procedures will be as described in the standard EPA protocol. As described in the protocol, the dry gas meter will be calibrated before arriving at the test site, and the sample train will be cleaned and assembled before installing the resin tubes. The end caps of the tubes will be stored in each tube's corresponding clean glass culture tube while the Tenax™ tubes are in the train. The train will be leak tested at a minimum of 10 in. Hg in such a manner as to prevent exposure of the train components to the ambient air. Leak tests will be conducted before and after the sampling interval for each sorbent cartridge pair.

Before sampling is commenced, ice water will be circulated through the condensers, and the probe will be inserted into the sampling port and purged with stack gas. The condenser trap will also be cooled with an ice bath for the duration of the run. The probe will be heated above 130°C. The train will be operated under "slow VOST" conditions, i.e., at the reduced sample flow rate discussed in the protocol. The stack will be sampled at a rate of 0.5 L/min for 40 min to collect a nominal sample volume of 20 L for each pair of sorbent tubes.

Four pairs of tubes will be collected during each test run. After collecting the samples, the tube pair will be removed from the VOST, their end caps replaced, returned to their culture tubes, and stored in coolers on dry ice. At the conclusion of the sampling run, the volume condensate water will be measured and collected in a VOA vial with no headspace. A measured volume of organic free deionized water will be added, if needed, to fill the VOA vial. All VOA samples will be stored on ice from the time of collection.

During the sampling run, the end caps will be removed from the field blank tube pair to simulate the handling of the test sample tubes. The tubes will remain open for approximately 10 minutes. This approximates the amount of time the sample tubes are exposed to the ambient air during a tube changeout.

For each sample shipment to the laboratory, a VOST tube pair will be removed from storage, assigned a sample number, and logged in as the VOST trip blank pair. This pair will remain sealed during the test.

Samples will be placed on ice in clean coolers, which will be stored in an area away from other samples and potential contamination sources. The VOST condensate sample will be shipped in a separate cooler and preserved by chilling to $\leq 4°C$ with ice. VOST samples will be shipped daily by overnight service to the laboratory.

The expected detection limit ≤ 5 μg/resin tube for each of the targeted compounds listed in Table 1. The analysis will be performed in a fixed base laboratory using GC/Mass Spectroscopy. The VOST tube samples will be spiked with the appropriate surrogate compounds before analysis. The sample tubes will then be thermally desorbed using a Nutech desorption apparatus.

The Tenax™ and Tenax™/charcoal sample tubes will be analyzed separately for the target compounds following Method 8240/5040 for volatile organics. Field blank and travel blank tubes may be analyzed as a sample pair. VOST condensate samples will be analyzed by Method 5040, Protocol for Analysis of Sorbent Cartridges from Volatile Organic Sampling Train, SW-846 and Method 8240, Purge and Trap, Gas Chromatograph/Mass Spectroscopy (GC/MS) Method for Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, 3rd Edition, September, 1986 and updates.

TABLE 1

SUMMARY OF COMPOUNDS FOR ANALYSIS FROM THE VOST

1,1,1-Trichloroethane	Chloroform
1,1-Dichloroethane	Ethyl benzene
1,1-Dichloroethene	Isobutyl alcohol
1,2-Dichloroethane	Methylene Chloride
1,2-Dichloroethylene	Styrene
1,4-Dioxane	Tetrachloroethene
2-Butanone	Toluene
Acetone	Total Xylene
Benzene	Trichloroethene
Carbon Tetrachloride	Trichlorofluoromethane
Chlorobenzene	

2.8 Carbon Monoxide

The stack gases will be sampled for carbon monoxide (CO) concentration using a dedicated nondispersive infrared (NDIR) gas analyzer. The key components of this analyzer include an infrared light source, a rotating gas filter wheel, a bandpass filter, a sample measurement chamber and a solid state detector. CO sampling will conform to procedures presented in EPA Method 10. A schematic of the sampling train is shown in Figure 3. Access to the stack will be through a dedicated CEM sample port and sample line. A stainless steel probe will be used to extract the gas sample from the stack. A heated, 1/4 inch Teflon® line will transport the sample from the point of extraction to the gas conditioning system. The sample will pass through a refrigerated chiller which will be thermostatically controlled to remove moisture from the gas stream with minimal contact with the sample gas stream. The analyzer will be located in a temperature controlled area to minimize thermal affects on the calibration of the instrument.

Quality control procedures implemented during the testing would include three-point calibrations, calibration drift tests, bias tests, and response time tests for the CO monitor. The CO monitor will be calibrated daily before and after each test run. These calibrations will consist of introducing prepurified nitrogen as a zero gas and three known concentrations of CO. EPA Protocol 1 calibration gases will be used to perform these calibrations.

Bias checks will be also performed in conjunction with the monitor calibrations. These checks will be performed by introducing calibration gas at the point of sample extraction on the stack. This will allow calibration gases to travel through the complete CO monitoring system.

Response time tests will be performed in conjunction with the bias checks. Alternating the introduction of span and zero calibration gas during the bias checks three times and recording the time required for the monitor to reach 95 percent of the final stable value will enable the determination of mean upscale and downscale response times.

The computer controlled data acquisition system will sample the analyzer once per second. The DAS will then average 60 individual data points and store the one minute averages electronically. The mean of the one minute averages will be calculated over the length of each sampling run. Stack concentrations will then be corrected for drift and bias as required by the Method. The mass emission rate of CO will be reported in pounds per hour (lb/hr) and parts per million by volume. The emission rate will be calculated using the hourly average concentration in ppmv, the dry standard volumetric flow rate determined using EPA Methods 1 and 2.

2.9 Total Hydrocarbons

Emissions of total hydrocarbons will be determined using EPA Method 25A. A schematic of the sampling system is shown in Figure 4. A gas slipstream is extracted from the stack through a heated sample line and heated glass fiber filter and introduced to a flame ionization detector, (FID). The concentration of hydrocarbons measured by the analyzer is proportional to the number of carbon-hydrogen bonds present in the sample stream. The analyzer is calibrated using EPA protocol 1 propane. Access to the stack will be through a dedicated sample port and sample line. A borosilicate glass probe will be used to extract the gas sample from the stack. A heated, 1/4 inch Teflon® line will transport the sample from the point of extraction to the analyzer. The analyzer will be located in a temperature controlled area to minimize thermal affects on the calibration of the instrument.

Quality control procedures implemented during the testing will include three-point calibrations, calibration drift tests, bias tests, and response time tests for the THC monitor. The THC monitor will be calibrated daily before and after each test run. These calibrations will consist of introducing prepurified nitrogen as a zero gas and three known concentrations of propane.

Bias checks will be also performed in conjunction with the monitor calibrations. These checks will be performed by introducing calibration gas at the point of sample extraction on the stack. This will allow calibration gases to travel through the complete THC monitoring system.

Response time tests will be performed in conjunction with the bias checks. Alternating the introduction of span and zero calibration gas during the bias checks three times and recording the time required for the monitor to reach 95 percent of the final stable value will enable the determination of mean upscale and downscale response times.

The mass emission rate of total hydrocarbons will be reported in pounds per hour (lb/hr) and parts per million by volume. The emission rate will be calculated using the hourly average concentration in ppm, the dry standard volumetric flow rate generated using EPA Methods 1 and 2.

3.0 DESCRIPTION OF OPERATIONS AND PROCESS

A simplified process flow diagram is shown as Figure 5. The process is initiated by excavating waste from pits and transferring it to a feed preparation and storage building. A front-end loader will be used to transfer solid waste materials from the staging bins to the feed hoppers of the mass flow screw feeders. Material is transferred from the mass flow screw feeders to the belt feed conveyors which include belt scales. The speed of each mass flow feeder is automatically controlled to adjust the mass rate of waste material being fed as measured and indicated by the belt scale. The feed material discharges from the belt feed conveyors into the dryer feed screws that extend into the rotary dryers. The screw feeders provide a positive feed mechanism to assure uniform transfer of the material into the rotary dryers, and it also provides a positive seal that limits the amount of infiltration air into the rotary dryers.

Two indirectly heated rotary dryers (F-2001 A/B) receive and process wet waste material of various moisture contents, depending on the type of waste. The design basis moisture content is 40 percent (wet basis). The rotary dryers reduce the moisture content of the waste materials to 10 - 15 percent (wet weight basis). Waste materials are fed to each rotary dryer primarily as solids through the feed screws. The feed screws extend inside the rotary dryers to deposit wet waste within the heated zone.

Each rotary dryer system consists of a cylindrical shell rotated with a variable speed drive. The rotating cylinder is heated externally by a furnace with adequate length and diameter to satisfy heat transfer requirements. Using natural gas as fuel for combustion, heat energy for the indirect drying is produced in multiple furnace zones by a set of burners located in each zone. Burners are operated with adjustable primary air/fuel ratio and secondary air addition to control the flame temperature so the rotating cylinder does not exceed its design temperature. Air to the burners is supplied by combustion air fans.

Burner exhaust gases from each furnace zone are vented directly to the atmosphere through multiple vent stacks. Heat energy from each furnace zone is indirectly transferred to the material advancing inside the rotating shell.

Each rotary dryer has multiple furnace zones and is provided with individual temperature control of each zone. This ability to control the temperature throughout the rotary dryer provides flexibility and simplicity in drying wastes with varying levels of incoming moisture content to achieve

the desired moisture content in the dried product. It is anticipated that the rotary dryer shell temperature may vary from 1200°F to 1600°F.

The slope and speed of the cylinder's rotation determine the retention time in the rotary dryer. The slope is fixed, but the rotation speed is variable and is used to adjust the retention time as necessary, providing additional control of the drying process.

The product from each rotary dryer is discharged to the product conveyors. An enclosed drag flight conveyor will be used for this application. Atomized water sprays will be utilized at the outlet of the conveyors to control dust as required. A set of airlock valves will be located at the discharge of each dryer product conveyor to minimize air infiltration. The dryer product mixers will be used as required to intermix rotary dryer product to a uniform consistency.

Infiltration air enters the rotary dryers operating under a vacuum at a predetermined rate to aid in carrying the water vapor produced during the drying process through the gas cleaning system. Inert gas is introduced as necessary to control the ultimate oxygen concentration in the system. After exiting the rotary dryers, the process off-gas stream is routed to the gas cleaning.

The off-gas from each rotary dryer initially passes through the high efficiency cyclone separators to remove large, entrained particulate. The solids removed from the off-gas are transferred from the cyclones via the cyclone solids transfer screws to the rotary dryer product system and combined in a mixing operation to assure the proper product consistency and moisture content. This design mitigates dust generation and minimizes worker exposure as defined in the ALARA concept.

The off-gas from the cyclones is conditioned in the scrubber to cool the rotary dryer off-gas, remove a portion of the entrained particulate, and partially condense water vapor generated by the drying process. The scrubber spray water is recirculated at a nominal rate of 150 GPM. The water and condensate pass from the scrubber into the scrubber sump tank. The scrubber pumps recycle water from the scrubber sump tank back to the scrubber. A continuous blowdown circulates to the process blowdown pre-treatment system to control suspended solids concentration in the scrubber water. The majority of the blowdown stream is then returned as makeup to the scrubber. Sodium hydroxide (caustic) from the caustic tank and/or acid from the acid tank is added to the Scrubber recycle stream to neutralize the process as needed.

The off-gas from the scrubber flows to the subcool quench. Cooling water is recirculated through the subcool quench at a nominal rate of 1600 GPM by the subcool quench recirculation pumps. This recycle water is cooled in the quench heat exchangers prior to introduction into the off-gas stream in the subcool quench. This further reduces the temperature of the off-gas to a nominal 100° F. Subcooling the off-gas generates a nominal 30 GPM of condensate which flows to the Process Blowdown Pre-treatment System and ultimately to the Wastewater Treatment System.

A cooling tower and recirculating cooling water loop is used as the cooling medium for the subcool quench heat exchangers. Cooling water is recycled by the cooling tower recirculation pumps from the cooling tower through the heat exchangers back to the tower. A small purge stream is discharged from the cooling tower to the Clearwell. This water does not contact contaminated materials and is not expected to be contaminated.

Off-gas from the Subcool Quench flows into a wet electrostatic precipitator (WESP) for the removal of submicron particulate and water droplets. Water and particulate collected in the WESP are pumped to the Process Blowdown Pretreatment System.

The off-gas from the WESP is slightly reheated in the electrically heated off-gas reheater to prevent any condensation in the HEPA filters. The HEPA filters are mounted in parallel with only one set being used at a time, with the other on standby or being replaced as necessary. The HEPA filters remove particulate greater than 0.3 microns that may have passed through the WESP. Two induced-draft fans are used to pull the off-gases through the system from the rotary dryer through the HEPA filters, keeping the entire system under negative pressure so that any leakage is into the system. The two ID Fans are arranged as an inline spare configuration with one fan normally operating and the other on standby.

The filtered off-gas from the HEPAs is directed into the Thermal Oxidizer which provides an effective means for the treatment of remaining volatile organic compounds (VOCs) and carbon monoxide (CO) in the off-gas stream. The system off-gasses are finally released to the atmosphere through the vent stack.

The condensed and purged liquids from the GCS are directed to the Process Blowdown Pretreatment System. All liquid blowdown streams flow to the primary clarifier and then to the secondary clarifier for solids settlement using polymer and pH controlled clarification. The outflow from the secondary clarifier is accumulated in the clarifier surge tank and pumped via the

clarifier discharge pump through dual sand filters, dual bag filters, and recycled to the drying process as scrubber makeup. Sludge from the clarifier bottoms is directed to the sludge mix tank. Raked or skimmed organic materials are collected in the organic condensate surge container and subsequently pumped to the sludge mix tank. The sludge mix tank also receives site sump flows and the Wastewater Treatment System (WTS) solids blowdown. Solid materials are separated from the sludge in the filter press with the liquid collected in the filtrate storage tank. Oily liquids are pumped to the organic condensate storage tank. The water fraction will be routed to the WTS influent tank for pretreatment prior to discharge to the BSL. The oil fraction will be turned over to FDF for subsequent handling and disposal.

4.0 STACK DESCRIPTION

The process stack will be directly attached to the exhaust of the Thermal Oxidizer Unit and will have an exit plane 60 feet above grade. The inside stack diameter will be 2'4". The stack will be insulated from top to bottom with two inches of high temperature ceramic fiber insulation.

5.0 HEALTH AND SAFETY REQUIREMENTS

The following paragraphs describe the general site requirements. A detailed discussion is contained in the Health & Safety Plan for Remedial Action Operations.

5.1 Medical Monitoring and Training

Medical clearance for work at hazardous waste sites shall be submitted to Flour Daniel Fernald four days prior to work at the site. Drug screening may be required for individuals who will be working in areas were safety is a concern. Individuals with documented proof of previous training (e.g. Hazwoper Training) which is equivalent to Flour Daniel Fernald, Inc. Site Worker Training may receive exemption from Site Worker Training. However, General Employee Training (GET) will be required.

5.2 Natural Occurrence (Weather)

Weather affected work will be stopped if lighting , heavy persistent rain, wind, or other adverse conditions are in the area. This includes any weather conditions whose impact is judged to be detrimental to safety by Flour Daniel Fernald, Inc. Any operations utilizing cranes, drill rigs or personnel working on elevated steel will be suspended if any wind velocity reaches 25 mph.

5.3 Eye Protection

All eye protection shall comply with ANSI Z87.1 rigid side shields are required with safety glasses. Safety glasses are a minimum requirement into any area associated with this project.

5.4 Hard Hats

All hard hats shall be Z89.1 listed. Hard hats are to be worn at all times within defined areas and during the excavation phase.

5.5 Safety Shoes

All personnel shall wear ANSI Z41 listed boots when working in all areas associated with this project.

5.6 Work Uniform

All personnel shall wear as a minimum, long pants and shirt with four (4) inch long sleeves in all work areas associated with this project. Additional PPE may be required in certain areas as deemed necessary by Flour Daniel Fernald, Inc.

5.7 Buddy System

As required in 29 CFR 1910.120 the buddy system shall be required for all work on this project.

5.8 Hearing Protection

Hearing PPE will be required in areas where the noise exposure or noise dose of personnel is equal or greater than 85 dBA for any duration of time.

5.9 Fall Protection

Fall protection will be required for heights above 6 feet. Apparatus used (depending on situation) will be outlined in the IT WPRAP Fall Protection Program.

6.0 TEST REPORT

Following completion of test activites a final test report will be prepared and submitted to OEPA by the project in compliance with OEPA requirements. The report will contain, at a minimum, the following information:

- All raw data sheets, including strip charts for CO,
- Process data relevant to the source's emission rates,
- Results of audit samples, if any,
- Certificates of analysis, Chains of Custody, analytical backup,
- Instrument calibration data,
- Example calculations
- Descriptions of relevant process and sampling disruptions or upset conditions.

FIGURES

INTENT TO TEST NOTIFICATION
(One Emission Unit Per Sheet)

AGENCY USE ONLY
Date Received _____
No. Assigned _____

Proposed Test Date _____
Pre-Test Meeting Desired? Yes ☐ No ☐
Facility Premise No. _____
SCC Code _____

A. Facility Information
Name _____ Address _____
Contact Person _____ Phone Number _____

B. Testing Firm Information
Name _____ Address _____
Contact Person _____ Phone Number _____

C. Test Plan and Emissions Unit Information Table: List the applicable information under each respective column heading.

Emissions Unit #	Control Equipment	Monitoring Equipment	Pollutant(s) to be Tested	EPA Test Method(s)	Filter Box Temperature	Number of Sampling Points	Total Time for Test Run	Number of Sampling Runs

Source is testing to comply with (check all that apply): ☐ State PTI ☐ State PTO ☐ Title V ☐ NSPS ☐ MACT ☐ BIF ☐ Title IV ☐ Other ____

D. What is the maximum rated capacity? _____
Will Emissions Unit be operated at the maximum capacity given in its permit-to-operate? Yes ☐ No ☐ If no, attach explanation.
Specify how operation rate will be demonstrated during testing (*See notes 1,2, and 3 on page 2.): _____
Are any modifications to USEPA Reference Method(s) proposed? Yes ☐ No ☐ If "no" is checked, then no modification, however minor, wil be accepted. If yes, explain proposed modification(s): _____

Sampling Location(s): Inlet ☐ Outlet ☐ Simultaneous ☐ Will Cyclonic flow check(s) be conducted? Yes ☐ No ☐
Fuel Sampling: Coal-Proximate ☐ Ultimate ☐ Other ☐ If other, specify _____
Emission rate to be calculated using: F-Factor ☐ Ultimate Coal analysis ☐ Other ☐ If other, specify _____
Are concurrent Method 9 readings to be performed? Yes ☐ No ☐ Does the test method require audit samples? Yes ☐ No ☐

E. Sample Train Calibration: All affected measuring and monitoring equipment should be calibrated within 60 days of the scheduled testing.

000225

3050

STARTING DATE: 6/3/98	DATE LAST REV.:	DRAFT. CHCK. BY: R. MOORE	INIATOR: R. MOORE	DWG. NO.:
DRAWN BY: K. KINDER	DRAWN BY:	ENG. CHCK. BY: R. MOORE	PROJ. MGR.:	PROJ. NO.: 773481

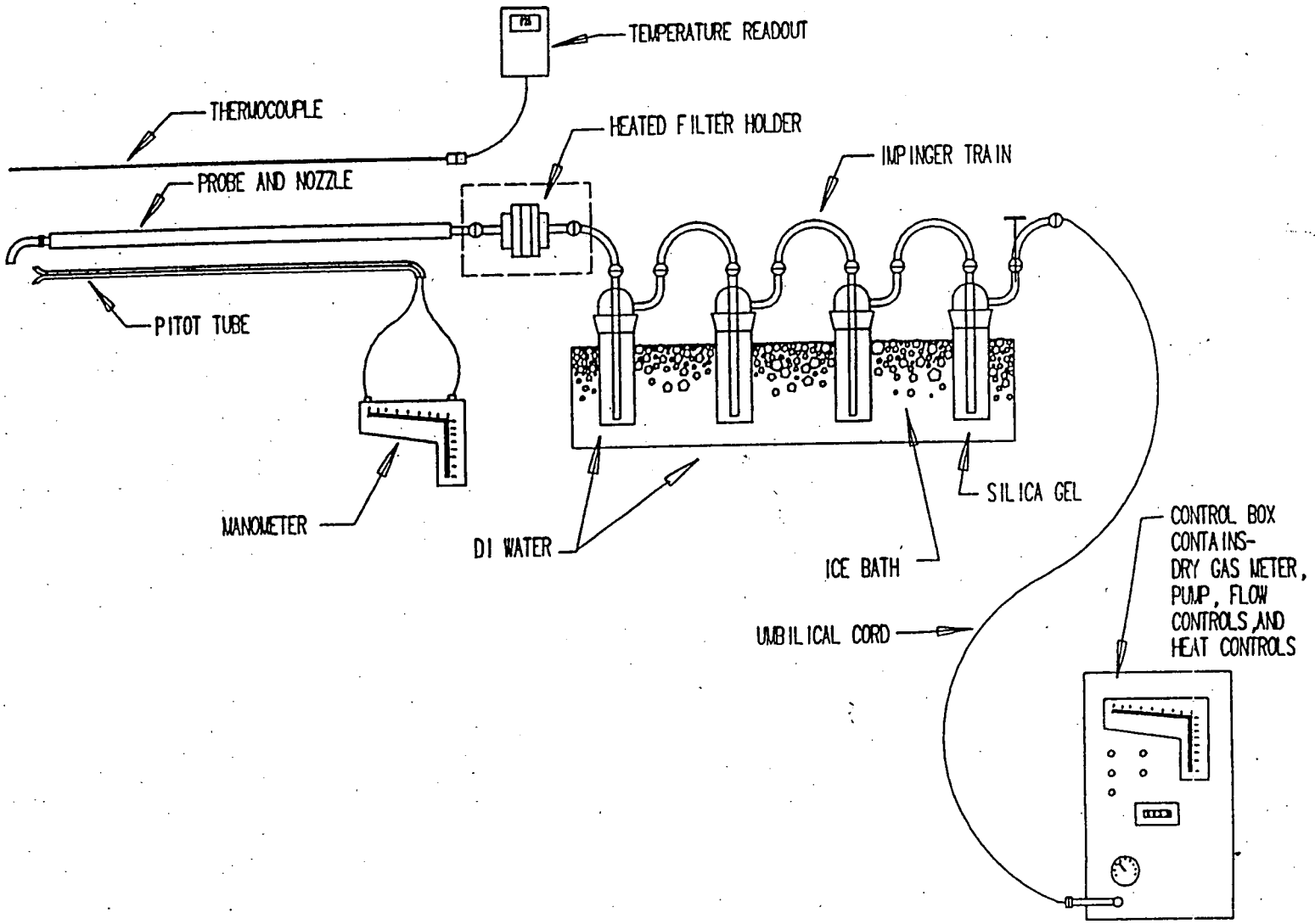

FIGURE 1
METHOD 5 PARTICULATE SAMPLING TRAIN

INTERNATIONAL TECHNOLOGY CORPORATION

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STARTING DATE: 6/3/98	DATE LAST REV.:	Drwf. CHCK. BY: R. MOORE	INIATOR: R. MOORE	DWG. NO.:
DRAWN BY: K. KINDER	DRAWN BY:	ENG. CHCK. BY: R. MOORE	PROJ. MGR.:	PROJ. NO.: 773481

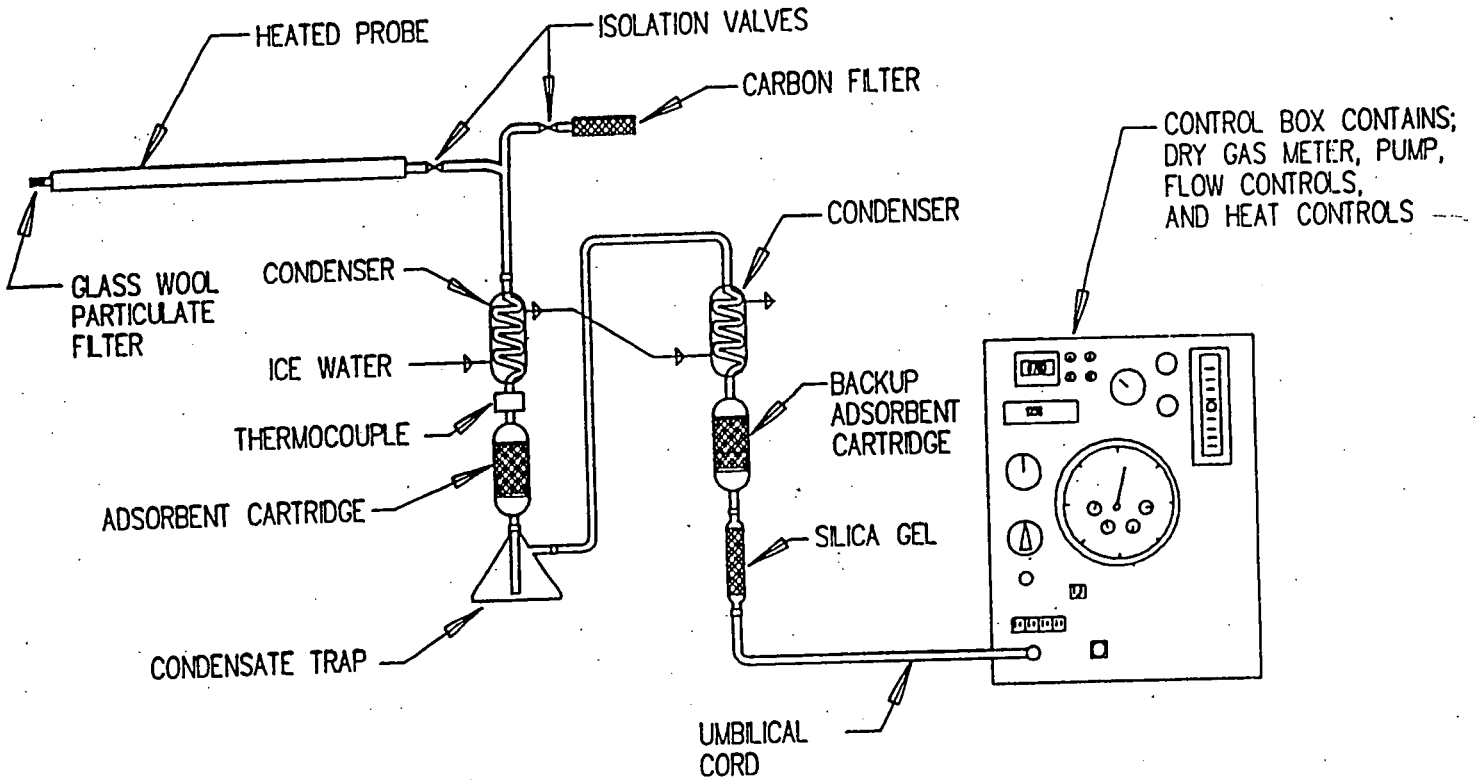

FIGURE 2
VOLATILE ORGANIC SAMPLING TRAIN

INTERNATIONAL TECHNOLOGY CORPORATION

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STARTING DATE: 6/4/98	DATE LAST REV.:	DRAFT. CHCK. BY:R. MOORE	INIATOR: R. MOORE	DWG. NO.:
DRAWN BY: K. KINDER	DRAWN BY:	ENG. CHCK. BY:R. MOORE	PROJ. MGR.:	PROJ. NO.: 773481

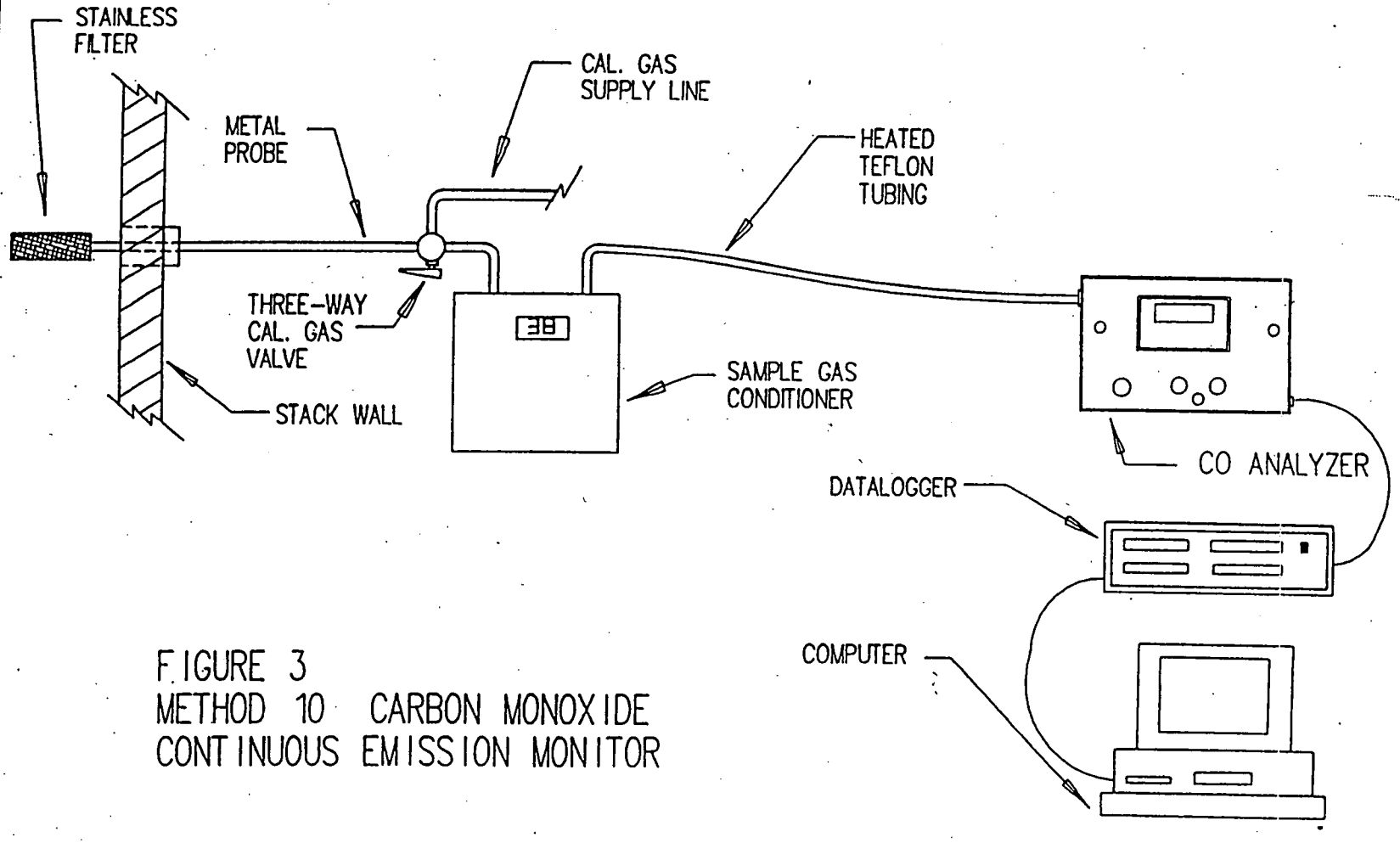

FIGURE 3
METHOD 10 CARBON MONOXIDE
CONTINUOUS EMISSION MONITOR

INTERNATIONAL TECHNOLOGY CORPORATION

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STARTING DATE: 6/4/98	DATE LAST REV.:	DRAFT. CHCK. BY: R. MOORE	INIATOR: R. MOORE	DWG. NO.:
DRAWN BY: K. KINDER	DRAWN BY:	ENG. CHCK. BY: R. MOORE	PROJ. MGR.:	PROJ. NO.: 773481

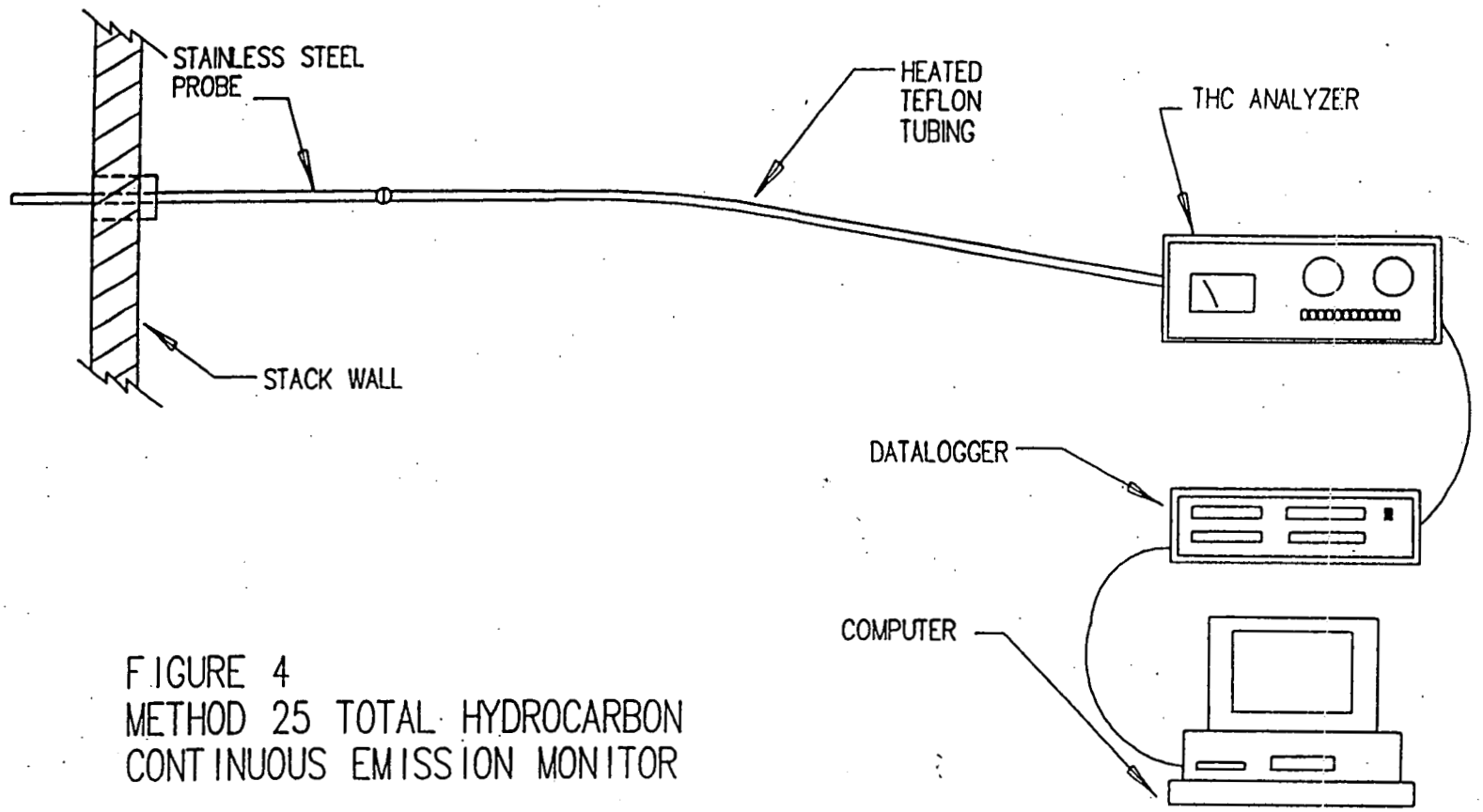

FIGURE 4
METHOD 25 TOTAL HYDROCARBON
CONTINUOUS EMISSION MONITOR

INTERNATIONAL TECHNOLOGY CORPORATION

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STARTING DATE: 6/3/98	DATE LAST REV.:	DRAFT. CHCK. BY: R. MOORE	INIATOR: R. MOORE	DWG. NO.:
DRAWN BY: K. KINDER	DRAWN BY:	ENG. CHCK. BY: R. MOORE	PROJ. MGR.:	PROJ. NO.: 773481

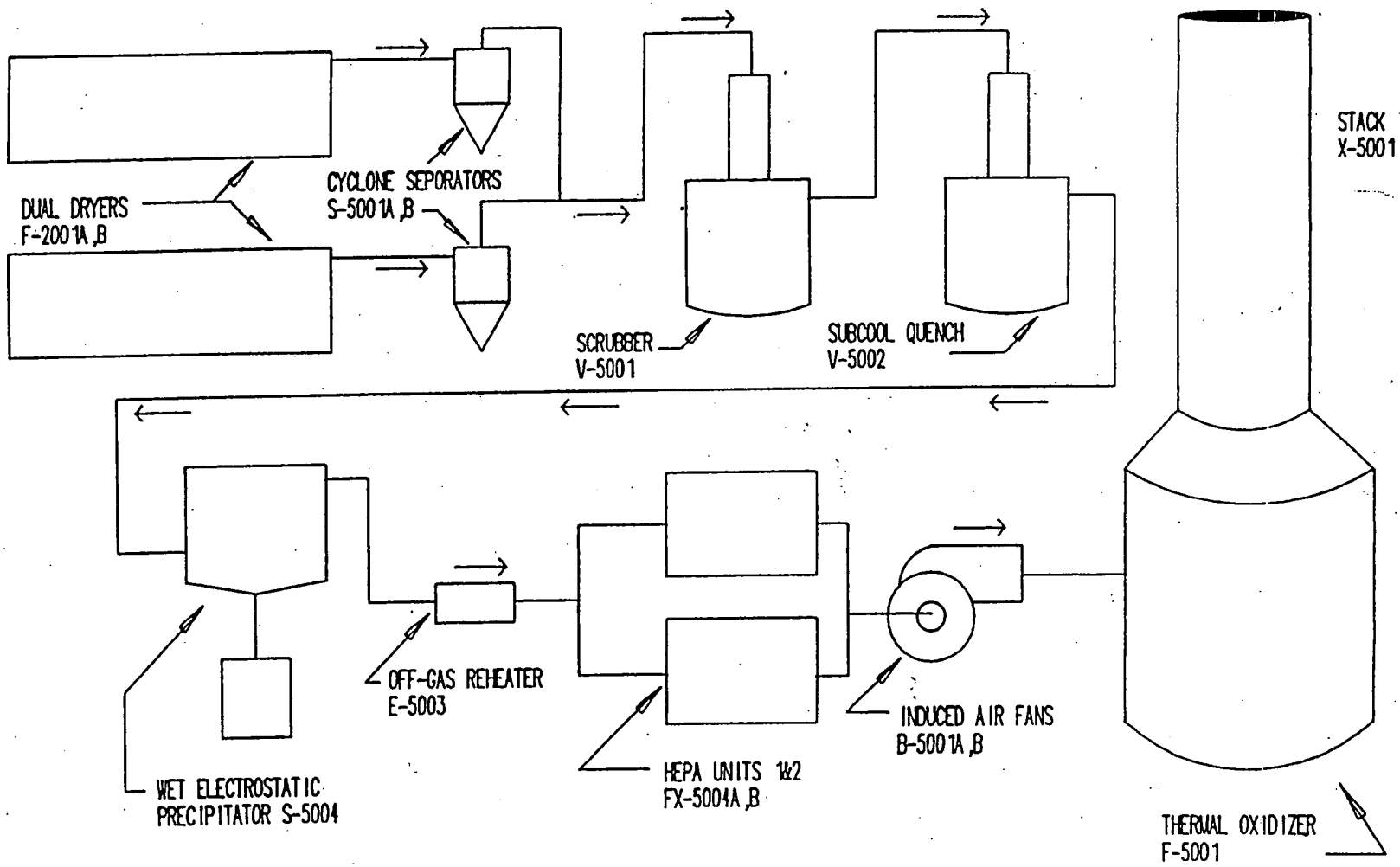

FIGURE 5
DRYER OFF-GAS PROCESS FLOW DIAGRAM

INTERNATIONAL TECHNOLOGY CORPORATION

000230

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IT CORPORATION
FERNALD, OH

Client Reference No: 773481-1958
CAE Project No: 8705

SYSTEM OPERATING PARAMETERS AND CHRONOLOGY

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Performance Criteria Test Chronology

May 17, 2000, Test Day 1:

1020 hrs Method 5 started
1036 hrs VOST started
1115 hrs Started 1st CEM run
1504 hrs Completed 3rd CEM run
1530 hrs Stopped sampling due to Thunderstorm
1632 hrs Restarted VOST run
Method 5 train did not pass leak check prior to restart due to a broken Impinger
1736 hrs Started method 4 for stack moisture
1836 hrs Completed Method 4
1839 hrs Completed Run 2 VOST

Peter Sturdevant Hamilton County Department of Environmental Services performed a method 9 during the day.

The system operation was smooth with several short duration outages of feed due to system oxygen level and draft. The high oxygen level and draft problems were related to a loose seal on Dryer B which was adjusted during the test. (Since the unit is operated under a draft (negative pressure compared to atmospheric) air enters the system if a gap develops at the seal)

May 18, 2000 Test Day 2:

0738 hrs Started Method 5
0743 hrs Started VOST run 3
1046 hrs completed VOST run 3
1234 hrs Stopped sampling due to loss of feed
1246 hrs Restarted sampling
1357 hrs Completed Method 5 run

The loss of feed was due to an instrument technician trouble shooting a duct velocity instrument. The technician induced a high duct velocity which shut down feed to both units.

Otherwise, the system operation was smooth with several short duration outages of feed due to system oxygen level and draft. The high oxygen level and draft problems were related to a leaking seal on Dryer A, which was adjust during the test.

Performance Test Operating Parameters

Operating Parameters: Normal full capacity operation was conducted during the performance testing. The operating parameters contained in the remedial design package were utilized during both tests. The following operating parameter table contains the average process parameters during the test. Two operating parameters were adjusted to worst case levels during the test as follows:

- Thermal Oxidizer temperature was reduced to 1350 F from 1600 F
- Wet Electrostatic Precipitator (WESP) was turned OFF

Performance Criteria Test
Operating Parameters Summary
WPRAP Drying System

Parameter	Units	Tag	Test Day 1	Test Day 2
Date			May 17, 2000	May 18, 2000
Sample Time Interval			10:36 - 15:28 16:32 - 18:39	07:38 – 12:34 12:46 – 13:57
Dryer A feed	tph	WI 150A	10.36	10.68
Dryer B feed	tph	WI 150B	10.52	10.57
Dryer A feed Per Totalizer	tph	WQI 150A	10.26	10.62
Dryer B feed Per Totalizer	tph	WQI 150B	10.27	10.48
Oxygen monitor A	percent	AI 558A	4.25	3.22
Oxygen monitor B	percent	AI 558B	4.09	3.12
Dryer A Zone 1	F	TY 212A	1287	1284
Dryer A Zone 2	F	TY 222A	1415	1450
Dryer A Zone 3	F	TY 232A	1376	1373
Dryer A Zone 4	F	TY 242A	1304	1296
Dryer A Exhaust	F	TI 293A	432	410
Dryer B Zone 1	F	TY 212B	1320	1327
Dryer B Zone 2	F	TY 222B	1406	1448
Dryer B Zone 3	F	TY 232B	1397	1402
Dryer B Zone 4	F	TY 242B	1325	1312
Dryer B Exhaust	F	TI 293B	403	399
Scrubber Exhaust	F	TI 523	203	203
Subcool Exhaust	F	TI 533	87	87
WESP Power	KW	JI-560	0.0	0.0
TO inlet flowrate	ACFM	FI 592	687	547*
TO inlet temp	F	TI 573	136	131
TO outlet temp	F	TI 585	1350	1348

The process parameters are the average values during the stated sample time intervals.
* Instrument maintenance was required during test