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Final

Prove-Out Event Report

Ash Landfill Immediate Response Measure
Seneca Army Depot Activity
Romulus, New York

Contract No. DACW45-94-D-0054
Delivery Order No. 01

Prepared for:
U.S. Army Corps of Engineers
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1.0 Introduction

This Report outlines the activities performed during the Prove-Out Event for the Ash Landfill remediation project, which occurred from October 31 through November 8, 1994. The Prove-Out Event was performed by IT Corporation (IT) in support of the Work Plan and Scope of Services for the Rapid Response immediate response measure (IRM) at the Seneca Army Depot in Romulus, New York. This Report has been prepared to provide a summary of the tasks completed by IT for the U.S. Army Corps of Engineers (USACE), Omaha District, so that it meets the requirements detailed in Delivery Order No. 01, under Rapid Response contract number DACW45-94-D-0054. Preliminary results from the Prove-Out Event have been previously introduced in project memoranda in early December 1994.

1.1 Site Location and History

The Seneca Army Depot facility is located in Romulus, New York near the eastern shore of Seneca Lake, where it was constructed in 1941. Prior to ownership by the Department of the Army, the site was used for farming. The Ash Landfill site encompasses approximately 130 acres of the 10,587 acre Seneca Army Depot Activity (SEDA) facility, situated near the southwestern corner of the facility. The site consists of the abandoned landfill area, including the Ash Landfill and the Non-Combustible Landfill, a burned out incinerator building and stack, and a nearby cooling pond. Residences and farmland border the area on the western side and beyond that lies Seneca Lake. The SEDA railroad runs to the east of the site and SEDA has undeveloped land to the south. Cemetery Road bounds the area to the north.

The subject of this Rapid Response action is the "Bend-in-the-Road" Landfill located near the western boundary of the Seneca Army Depot. The Ash Landfill was established to dispose of ash generated from burning of the facility's trash from 1941 to the early 1960's. In 1974, an incinerator was built to treat the refuse from facility operations and the ash from the incinerator was buried in the "Bend-in-the-Road" landfill area. A fire in 1979 destroyed the incinerator and the landfill was closed. Since that time, the landfill area has been capped with various layers of soils, but has never been closed with an engineered cover or cap.

In addition to the burning pit and incinerator ash disposed of in the Ash Landfill, it is suspected that other types of facility refuse and domestic wastes have also been buried in the landfill. The

amount and type of debris may include household trash and construction-type debris.

1.2 Task Description

The Prove-Out Event is the first activity of Phase 2 of the Ash Landfill IRM project. The Prove-Out Event (referred to as the Start-Up/Prove-Out activity in the USACE Scope of Services document) was conducted to determine the operating capabilities and conditions for the low temperature thermal desorption (LTTD) unit prior to full-scale treatment of contaminated soil material in the LTTD unit. Activities performed during the Prove-Out Event include material segregation and debris washing; start-up, testing, and operation of the LTTD system; air pollution control; and verification testing by pre- and post-treatment soil sampling and emission source testing.

Section 2.0 of this Report introduces the details of the implementation of the Prove-Out Event including LTTD plant operations, soil sampling, and emission source testing activities. Plant operations and the results of the verification soil sampling and emission source testing are presented in Section 3.0. Section 4.0 describes the quality assurance/ quality control (QA/QC) performed for the task. In Section 5.0, conclusions from the Prove-Out Event are discussed.

2.0 Prove-Out Event

The basic elements and requirements for the Prove-Out Event are presented in the project's Start-Up/Prove-Out Plan (SPP) and the Air Monitoring Plan (AMP), submitted as part of the Ash Landfill project Work Plan, written by IT and approved by the USACE in September, 1994. The Prove-Out Event consists of plant operations during LTTD start-up activities, verification soil sampling, and emission source testing in order to evaluate the LTTD system capabilities. The Prove-Out Event was performed and completed from October 31 through November 8, 1994. In the sections below, the set-up and implementation of the Prove-Out Event is presented.

2.1 Objectives

The Prove-Out Event was developed to determine if the LTTD system will be able to treat contaminated soils at the Ash Landfill project site to acceptable clean-up levels. The Event includes the start-up of the LTTD system, test feed runs with soil material, and verification of proper LTTD operation by testing of untreated and processed soils and air emissions. The objectives of the Prove-Out Event are as follows:

- document the ability of the LTTD system to treat contaminated soils to the accepted treatment levels for each of the different media;
- measure and document the optimal operating conditions and parameters of the LTTD system while in operation; and,
- measure and evaluate the effectiveness of air pollution control equipment associated with the LTTD system.

Results of the Prove-Out Event, including operational data, soil sample results, and air emissions data, will provide the evidence and information needed to ensure that the LTTD system at the Ash Landfill site will be able to appropriately treat contaminated soils and not generate adverse environmental impacts in the form of unclean soils or air emissions.

2.2 Prove-Out Event Scope

The Prove-Out Event, as discussed above, intends to demonstrate that the LTTD system is capable of operating at an appropriate level to meet the requirements of the project Work Plan. In order to accurately determine this, a "test" of the system must be completed. The Prove-Out

Event is a designed test to demonstrate acceptable performance by the LTTD system. The Event requires that the LTTD system successfully treat 1500 tons of soil material, including 500 tons of material without interruption, to acceptable clean-up levels. Acceptable performance is defined as meeting treatment criteria outlined in the Work Plan with a production rate sufficient to ensure completion of all soil treatment activities at the Ash Landfill site by the scheduled project completion date.

In addition to the above, the LTTD treatment unit must also show that it is fully operational and that it can successfully reduce air emissions with air pollution control equipment.

2.3 Prove-Out LTTD Operations

The LTTD system constructed for this project consists of a feeder/separator, a large, rotating dryer heated by propane gas, a conveyor belt system, and an off-gas emissions train that includes a baghouse and a thermal oxidizer as air pollution control equipment. A schematic of the LTTD system is presented in Figure 2-1. The LTTD system is fed by a front-end loader at the feeder/separator unit, which handles the soil material and crushes it to the correct size for entry into the dryer. The material that enters is heated and then treated in the rotating dryer unit. The material passes out of the dryer on the conveyor system and is deposited in a pile outside in the clean soils area. Heated off-gas emissions from the soil treatment are captured and carried to the baghouse, which removes the particulate matter present in the air stream. After removal of the particulates, the air stream enters the thermal oxidizer unit and is heated to temperatures near 1400 °F to remove the volatile organic compounds.

The soil material excavated from the excavation areas is first processed through a debris screening unit to remove large-scale material. The screened material is added to the LTTD system and heated to approximately 800-900 °F while being fed through the rotary dryer. Soil material exiting the LTTD system is stored in 150 cubic yard piles prior to confirmation sampling and backfilling. The optimum processing rate is approximately 20 tons per hour.

In addition to the soil treatment operation, the LTTD system also captures the exhaust air stream from the rotating dryer. Particulate matter from the dryer exhaust is filtered through a baghouse filter collector with primary and secondary filter fabrics. Collected particulate fines are recycled back to the rotary dryer for retreatment. The particulate free off-gas is fed into the thermal

Figure 2-1

oxidizer, where the volatilized contaminants are destroyed by applying heat necessary for oxidation. The air stream is then exhausted out of a 42-inch diameter, 56 foot tall stack.

2.4 Prove-Out Soil Sampling

The soil sampling activities performed during the Prove-Out Event included verification testing of soil material. Pre- and post-treatment sampling of soil material from the LTTD system was conducted, with soil samples collected for every 150 tons of material put through the treatment system, until the 1500 tons of treated material was processed. The Prove-Out Event soil sampling activities occurred from October 31 through November 8, 1994. Below, a brief overview of the soil sampling protocol is presented.

2.4.1 Pre-Treatment Soils

Pre-treatment soil material entering the LTTD system was collected from the conveyor belt before entering the dryer. Samples were collected for each 150 tons of pre-processed soil for a total of four "grab/discrete" samples. One "grab" sample was collected approximately every two hours over an eight hour period for a total of 4 "grab" samples. Each soil sample included a volatile compound sample and a semi-volatile sample. The first 150 tons of pre-treatment soil material included a sample for total lead. The procedure was repeated for every 150 tons of soil fed into the LTTD unit until all 1500 tons of excavated soil were processed.

2.4.2 Post-Treatment Soils

Post-treatment soil material discharged from the LTTD system was collected from each of the collection soil piles. Samples were collected for each 150 tons of post-processed soil with one composite sample collected, consisting of 4 "grab/discrete" samples, from each soil pile for volatile and semi-volatile analysis. One composite sample was collected, consisting of 4 "grab/discrete" samples, from each 150 ton soil pile for TCLP metals analysis for each 750 tons of treated soil. The "grab" samples were collected from four different locations around the perimeter of the soil pile, at a minimum of two feet below the soil pile surface using a long handled stainless steel trowel. The procedure was repeated for every 150 tons of treated, stockpiled soil until all 1500 tons of treated soil were sampled.

2.5 Prove-Out Emission Source Testing

The scope of the Prove-Out Event includes a determination of the operating efficiency of the LTTD system air pollution control equipment. The emission source testing protocol outlined in

the AMP describes the methods required to accurately test the off-gas emission from the LTTD and demonstrate equipment efficiency. For the Prove-Out Event, emission source testing was performed over three days, from November 2 through November 4, 1994. Below, a brief overview of the emission source testing protocol is presented.

The emission source testing protocol performed for the Prove-Out Event included testing for stack velocity, temperature, volumetric flow rate, and molecular weight (oxygen and carbon dioxide content, and moisture content) using U.S. EPA Methods 1 through 4 (40 CFR 60, Appendix A). Samples were collected for volatile and semi-volatile organic compounds, hydrogen chloride, and particulate matter. Sampling methods utilized were as follows:

- **Method TO-14**- collection of volatile organics by SUMMA®-passivated canister; analysis via gas chromatography (from *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air*, EPA 600/4-84-041, May 1988);

- **Method SW-846 8270/Modified Method 5**- collection of semi-volatile samples by XAD-2 resin trap and impingers; analyzed with GC/MS (from *Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods*, U.S. EPA SW-846, November 1986); and,

- **BIF Method 0050**- collection of hydrogen chloride and particulate samples via impinger with analysis by ion chromatography (from *Methods Manual for Compliance with the BIF Regulations*, EPA/530-SW-91-010, December 1990).

A total of three one-hour runs were conducted for each type of sampling method. Method-specific quality assurance and quality control was conducted for the source testing. The testing protocol also included sample train leak testing and the formation of method, reagent, and field blanks. Additional details on the sampling program and methodology are presented in the source test report, included as part of Appendix B of this document.

3.0 Prove-Out Event Results

A summary of the Prove-Out Event results is presented below. LTTD system operating conditions were measured by recording processing and operating scenarios of the LTTD. The attainment of acceptable treatment criteria for the soil material by the LTTD system was also examined, utilizing soil sampling and analysis protocols. Air pollution control equipment operation was evaluated by emission source testing.

3.1 LTTD Operations Summary

The LTTD system was first fired on October 31, 1994 at approximately 1700 hours. Operating conditions and processing information have been collected from this time. Table 3-1 provides a summary of the operating information for the LTTD system as measured during the Prove-Out Event.

Table 3-1
U.S. Army Corps of Engineers Omaha District
Seneca Army Depot Activity Ash Landfill IRM
Prove-Out Event
LTTD System Processing Data

Date	Hour	Temperature	Cumulative Tons
10/31/94	0700	864	146.9
11/1/94	1700	840	240.2
11/2/94	0700	885	396.4
11/3/94	0700	880	603.2
11/4/94	0700	870	846.1
11/5/94	0700	890	893.0
11/6/94	0700	826	1036.8
11/7/94	0700	858	1217.3
11/8/94	1700	848	1363.6
		TOTAL	**1454.6**

At the initiation of the Prove-Out Event, severe weather conditions in the form of heavy rainfall continued from October 31st through to the afternoon of November 2, 1994, initially hampering efforts to de-bug and troubleshoot the system during the start-up action. Treatment of the first 150 tons of soil material was completed between 0700 and 0800 hours the morning of November 1st. The LTTD unit averaged 13.3 tons per hour processing rate for the first 150 tons of material. Operating temperatures during the time period to process this material ranged from 811-930 °F, with an average of 861 °F.

LTTD process operational parameters for the remainder of the Prove-Out Event (up to 1500 tons treated soils) were also measured. From 0700 hours on November 1st through the end of the 3rd, the LTTD unit treated a total of 570.1 tons of material and averaged 14.7 tons per hour processing rate; from 0000 hours on November 4th to the end of the 7th, the LTTD unit treated a total of 543.5 tons of soil and averaged 14.8 tons per hour processing rate (with a significant rise in production rate, i.e., averaging 18 tons/hr., on November 7th); and at 1700 hours on November 8th when the 1500 ton goal was reached, the LTTD system processed 191 tons and averaged 18.3 tons per hour processing rate. Operating temperatures for the first 1500 tons of soil material treated ranged from 800-1050 °F, with an average of 875 °F.

As expected, the LTTD system experienced equipment problems, operational difficulties, and process downtime during start-up activities and the Prove-Out Event. The reasons for these problems were varied, including:

- system equipment failures requiring maintenance and repair time;
- feed loading unable to keep up with system processing rate because of inability to maintain adequate supply in inclement weather;
- obstruction of feed hopper, crusher, and conveyor mechanisms because of high moisture content of soil material; and,
- labor restrictions caused by working in Level C conditions- adequate relief staff not available.

Five hundred tons of continuous soil treatment by the LTTD system was achieved from 0600 hours on November 4th through to 1700 hours on November 8, 1994, where a running total of 535.5 tons of material was successfully treated. Three separate non-working or off shifts were

included in this time frame. Over the entire course of the Prove-Out Event (October 31-November 8), the LTTD system was operational for 89 hours out of a possible 199 hours available in this time frame. Process downtime, as summarized above, included approximately 38 hours down for repair and maintenance activities; a total of 42 hours for non-working, off shift time; and 23 hours down due to severe inclement weather at the beginning of the Event.

Soil material processed and treated during the Prove-Out Event totalled 1454.6 tons, as recorded from 1800 hours on October 31, 1994 to 1700 hours on November 8, 1994.

3.2 Soil Sampling Data Summary

The results from the laboratory analyses of pretreated and treated soil samples are presented below. The laboratory analytical results were evaluated versus the site-specific cleanup levels. All ten pretreated soil samples were determined to contain volatile and/or semi-volatile constituents at concentrations which exceed cleanup levels. Only one treated soil sample was determined to contain semi-volatiles at concentrations exceeding cleanup levels.

Concentrations of only one volatile constituent (1,2-dichloroethene) were detected at greater than cleanup levels in four samples taken prior to treatment (PT-B1-4, PT-B1-7, PT-B1-8, and PT-B1-9). The concentrations ranged from 520 ppm to 650 ppm. After treatment of the soil all volatile constituents in the pretreated samples, above or below cleanup levels, were not detected in the treated soil samples in concentrations greater than their respective practical quantitation limits (PQLs).

Semi-volatiles were detected at varying concentrations in all pretreated samples and treated samples. Out of the ten target semi-volatile compounds, four semi-volatile constituents were detected at concentrations greater than site-specific cleanup levels. The four semi-volatile constituents (benzo(a)anthracene, benzo(a)pyrene, chrysene, and dibenzo(a,h)anthracene) ranged in concentrations from 17 ppm to 580 ppm and were detected in all pretreated samples (PT-B1-1 through PT-B1-10) and one treated sample (T-B1-8).

One pretreated soil sample (T-B1-M1) was collected form the first 150 tons of excavated soil and analyzed for the eight toxicity characteristic metals. The results revealed four of the metals detected (arsenic, barium, cadmium, and lead) with none of the concentrations exceeding toxicity

characteristic levels. Summary of the laboratory analytical results for proveout soil samples are presented in Tables 3-1 and 3-2.

3.3 Emission Source Data Summary

Emission source testing of the LTTD system was performed over a three day period (November 2nd-4th). Emission exhaust samples were collected by the field team from the 42 inch-diameter LTTD exhaust stack downstream of the air pollution control equipment outlet. Sampling ports were located 9.1 duct diameters downstream of the thermal oxidizer unit outlet and 2.3 duct diameters upstream of the stack exit. A total of twelve (12) traverse points were established for sampling in accordance with EPA Method 1.

A summary of the exhaust gas conditions for each test period is presented in Table 3-4. Volumetric gas flow rates are displayed in actual cubic feet per minute (ACFM) and dry standard cubic feet per minute (dscfm). Standard conditions are zero percent moisture at 68 °F and 29.92 in.Hg. Stack temperature, water vapor concentration, and oxygen and carbon dioxide content were also recorded. The averages from the test runs equalled 54,300 ACFM and 10,900 dscfm. Exhaust stack temperatures ranged from 1376 to 1434 °F, with an average of 1399 °F. Moisture concentrations averaged 31 percent by volume and oxygen content average 12.2 percent on a dry weight basis.

As can be seen in the data, one testing run, S-HCL-2, was considered not valid (very low volumetric flow rates) for the purposes of this project because condensed water built up in the measuring instrument, a pitot tube, and associated sampling lines. Volumetric flow rates and emission results from this sample are void. Measures to prevent re-occurrence of the water build up were taken in the field for all remaining samples. In addition, it appears the flow measurements for sample S-HCL-1 are biased somewhat low. With the exclusion of samples S-HCL-1 and S-HCL-2, only valid volumetric flow rates were used in calculating emission rates for the compounds to be tested.

The sampling results of the emission source testing are presented below. Appendix B contains the emissions test report as submitted by the field team for this activity. Additional information on sampling results, quality assurance (QA)/quality control (QC) procedures implemented for the emission testing, and sampling methodology and calculations can be found in Appendix B.

3.3.1 Particulate and Hydrochloric Gas Emissions

Particulate matter and hydrochloric gas emissions were collected via BIF Method 0050 and these data results are summarized in Table 3-5. Particulate emissions averaged 0.0617 grains per dry standard cubic foot (gr./dscf) or 5.56 pounds per hour (lbs./hr.) emission rate for the two valid one-hour tests. Hydrochloric gas emissions had an average concentration of 12.5 parts per million (ppm), corresponding to an average emission rate of 0.76 lbs./hr.

3.3.2 Volatile Organic Compound Emissions

EPA Method TO-14 sampling for volatile compounds was performed for three sampling runs and the data results are presented in Table 3-6. Compounds which were found at or above their respective method detection limit are reported. The method detection limits differ from run to run based on analytical sample dilutions and sample volumes. Emission rates were calculated from the concentration and corresponding volumetric gas flow rate. Volatile compounds detected during the Prove-Out emission testing include:

- Benzene
- Bromomethane
- Chloromethane
- Toluene
- m/p-Xylene

Concentrations and emission rates for these compounds were very low. The volatile chloromethane was found in all three sample runs with an average concentration of 3.6 ppb (7.4 ug/m^3), corresponding to an emission rate of 0.00029 lbs./hr.

3.3.3 Semi-Volatile Compound Emissions

Semi-volatile compounds were collected by Method SW-846/Modified Method 5 and the analytical results are presented in Table 3-7. Compounds which were found at or above their respective method detection limit are reported. The method detection limits differ from run to run based on analytical sample dilutions and sample volumes. Emission rates were calculated from the concentration and corresponding volumetric gas flow rate. As shown in Table 3-7, three phthalates: bis(2-ethylhexyl)phthalate, diethylphthalate, and di-n-butylphthalate were found in all three sampling runs. Of the three, only bis(2-ethylhexyl)phthalate was found at levels significantly above those of the field blank. Other semi-volatile compounds which were also detected or had estimated concentrations include:

- Anthracene
- Napthalene
- 2-Nitrophenol
- Phenanthrene
- Phenol
- Pyrene
- 1,2,4-Trichlorobenzene

3.4 Emissions Impact Analysis

Emission compounds listed on the LTTD system NYSDEC emission permit authorization and compounds reported as detected from the Prove-Out emission source testing activity were evaluated against their respective ambient guideline concentrations in order to determine if the LTTD system was in compliance with its' permit authorization. This emission impact analysis was performed according to NYSDEC Air Guide-1 (1991) protocols and new Air Guide-1 Appendix B (1994) procedures for determining emission impacts. The results of this analysis are presented in Table 3-8.

The NYSDEC, in granting approval of the LTTD emission authorization, requested that the LTTD system be able to demonstrate compliance with the protocols defined in NYSDEC Air Guide-29, which outlines procedures to calculates emission impacts for soil vapor extraction systems, water treatment units, and concrete furnaces. This protocol compares emission rates with one-half of the Annual Guideline Concentration (AGC). The emission impact analysis performed on the data provide by the emission source testing followed this procedure.

As seen in Table 3-8, the emission compounds from LTTD operation are below compliance impact concentrations for all AGCs, the one-half AGC values, and the Short-Term Guideline Concentrations (SGCs) for each compound. Emissions from the LTTD unit appear to be in compliance with NYSDEC Air Guide-1 requirements.

4.0 Quality Assurance/Quality Control (QA/QC)

The Prove-Out Event, as part of the implementation of the Work Plan for the Seneca Army Depot Ash Landfill IRM, is subject to the quality assurance and quality control guidelines presented in the SPP, CSAP, and AMP. Specific requirements are also listed in the particular sampling and analytical reference methods utilized for this portion of the project. The QA/QC program implemented for this task includes:

- Detailed sample collection and handling protocols
- Calibration of instrumentation and apparatus
- Sample analysis in association with specific QC activities, such as blank and duplicate analyses
- Data reduction, validation, and reporting
- Documentation of the sampling and analytical program, and
- Internal quality control.

Specific steps for this task were undertaken at the analytical laboratory, as method and instrument blanks, calibration checks, and duplicate sample analyses were completed for the sample sets. Raw data and the associated QA/QC results for the soil sampling and emission source testing can be found in Appendices A and B, respectively.

5.0 Conclusions

Conclusions gathered from the execution of the Prove-Out Event include:

- The LTTD system demonstrated that it is able to meet the necessary processing performance requirements for the project;
- Performance of the LTTD unit revealed successful reduction/elimination of all volatile constituents detected in the soil samples to at or below constituent PQLs. The LTTD unit will be able to achieve project clean-up criteria stipulated in the Work Plan;
- Performance of the LTTD unit indicated reduction in concentrations of semi-volatile constituents detected in pretreatment soil samples. Most of the semi-volatile constituents detected above cleanup levels in the pretreatment soil samples are successfully reduced to concentrations below cleanup levels;
- Air pollution control equipment associated with the LTTD system demonstrated appropriate operation by eliminating or reducing volatile compounds, semi-volatile compounds, and particulate matter from exhaust emissions of the LTTD; and,
- The LTTD system is operating in compliance with its' NYSDEC emission source permit authorization.

Tables

Table 3-2
U.S. Army Corps of Engineers Omaha District
Seneca Army Depot Activity Ash Landfill IRM
Prove-Out Event
Soil Volatile and Semi-Volatile Data Summary

e Specific Compounds	Sample Identification and Constituent Concentration (ppb)								
	PT-B1-1	PT-B1-1 dilution	T-B1-1	PT-B1-2	PT-B1-2 dilution	T-B1-2	PT-B1-3	T-B1-3	
latiles									
Trichloroethene	380 E	180 D	<11	240 E	33 D	<12	20	<12	
1,2-Dichloroethene	640 E	300 D	<11	280 E	46 D	<12	29	<12	
Vinyl chloride	21	NA	<11	5 J	NA	<12	8 J	<12	
Toluene	2 J	NA	<11	2 J	NA	<12	<12	1 J	
Xylene	3 J	NA	<11	<12	NA	<12	<12	<12	
mi-volatiles									
Napthalene	<660	NA	<660	63 J	NA	<660	<660	<660	
Phenanthrene	<660	NA	<660	180 J	NA	<660	67 J	<660	
Fluoranthene	<660	NA	<660	290 J	NA	<660	110 J	<660	
Pyrene	<660	NA	<660	270 J	NA	<660	110 J	<660	
Bis(2-ethylhexyl)phthalate	<660	NA	<660	190 J	NA	<660	50 J	<660	
Indeno(1,2,3-CD)pyrene	<660	NA	<660	377 J	NA	<660	<660	<660	
Benzo(a)anthracene	**320***	NA	56 J	**290 J***	NA	5.0	100	25	
Chrysene	350 J	NA	46 J	270	NA	<3.3	95	17	
Benzo(a)pyrene	**400***	NA	30 J	**230***	NA	<3.3	**87***	17	
Dibenzo(a,h)anthracene**	**70 J***	NA	<18	<18	NA	<18	**17***	<18	

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SEDA-PhaseSoil1.prj

Table 3-2 (cont)
U.S. Army Corps of Engineers Omaha District
Seneca Army Depot Activity Ash Landfill IRM
Prove-Out Event
Soil Volatile and Sem-Volatile Data Summary

e Specific Compounds	Sample Identification and Constituent Concentration (ppb)							
	PT-B1-4 dilution	T-B1-4	PT-B1-5	T-B1-5	PT-B1-6	PT-B1-6 dilution	T-B1-6	PT-B1-7
latiles								
Trichloroethene	220 D	<11	52	<11	260 E	150 D	<10	260 B
1,2-Dichloroethene	**520 D***	<11	78	1 J	500 E	210 D	<10	**650***
Vinyl chloride	NA	<11	4 J	<11	65	NA	<10	28 J
Toluene	NA	<11	<11	2 J	1 J	NA	2 J	1 J
Xylene	NA	<11	<11	<11	4 J	NA	<10	<55
mivolatiles								
Napthalene	NA	<660	42 J	<660	180 J	NA	<660	92 J
Phenanthrene	NA	<660	180 J	<660	290 J	NA	<660	280 J
Fluoranthene	NA	<660	290 J	<660	360 J	NA	<42	430 J
Pyrene	NA	<660	280 J	<660	320 J	NA	<660	330 J
Bis(2-ethylhexyl)phthalate	NA	520 J	70 J	<660	88 J	NA	<660	110 J
Indeno(1,2,3-CD)pyrene	NA	<660	73 J	<660	93 J	NA	<660	110 J
Benzo(a)anthracene	NA	14 J	**260***	32 J	**260***	NA	33 J	**490***
Chrysene	NA	<3.3	120 J	65 J	240 J	NA	<3.3	**480***
Benzo(a)pyrene	NA	16 J	**120 J***	36 J	**230***	NA	37 J	**220***
Dibenzo(a,h)anthracene**	NA	<18	<18	<18	<18	NA	<18	**100***

otes at end of table.

Table 3-2 (cont)
U.S. Army Corps of Engineers Omaha District
Seneca Army Depot Activity Ash Landfill IRM
Prove-Out Event
Soil Volatile and Semi-Volatile Data Summary

	Sample Identification and Constituent Concentration (ppb)								
te Specific Compounds	PT-B1-8	T-B1-8	T-B1-8 duplicate	Equipment Blank	Field Blank	PT-B1-9	T-B1-9	PT-B1-10	T-I
latiles									
Trichloroethene	150	<12	<11	<10	<10	160	<12	82 B	
,2-Dichloroethene	**610***	<12	<11	<10	<10	**610***	<12	200	
Vinyl chloride	32 J	<12	<11	<10	<10	25 J	<12	3 J	
Toluene	1 J	1 J	1 J	<10	<10	<53	1 J	0.6	
Xylene	<49	<12	<11	<10	<10	<53	<12	<11	
nivolatiles									
Napthalene	100 J	<660	<660	<660	NA	140 J	<660	250 J	
Phenanthrene	240 J	53 J	47 J	<660	NA	560 J	120 J	470 J	
Fluoranthene	340 J	61 J	70 J	<660	NA	900	190 J	700	
Pyrene	280 J	62 J	53 J	<660	NA	680	120 J	520 J	
Bis(2-ethylhexyl)phthalate	130 J	<660	<660	<660	NA	200 J	30 J	190 J	
ndeno(1.2.3-CD)pyrene	90 J	49 J	40 J	<660	NA	270 J	99 J	190 J	
Benzo(a)anthracene	**580***	38 J	81 J	<0.05	NA	98	18	207	
Chrysene	**430***	40 J	<61	<0.05	NA	108	16	220	
Benzo(a)pyrene	**570***	40 J	61 J	<0.05	NA	**102***	22	**203***	
Dibenzo(a.h)anthracene**	**93***	**22***	**27***	<0.10	NA	**21***	<18	**26***	

:

Dilution concentration
Estimated value. Concentration exceeded calibration range. See dilution.
Indicates an estimated value. Concentration above the instrument detection limit (IDL) but below the practical quantitation limit (PQL).
Not applicable

I.D) - Indicates constituent concentration detected above site specific cleanup levels.
Dibenzo(a.h)anthracene has a PQL of 18 ppb and a method detection limit of 4.5 ppb. Any sample resulting in Dibenzo(a.h)anthracene not detected at the PQL is not considered detected above the site specific cleanup level (14 ppb)at a 95 % confidence level and therefore has not been idicated as such.

Table 3-3
U.S. Army Corps of Engineers Omaha District
Seneca Army Depot Activity Ash Landfill IRM
Prove-Out Event
Soil Toxicity Characteristic Metals Analysis Data Summary

Sample ID	TCLP Metals	Constituent Conct. (ppm)	Toxicity Characteristic Levels (ppm)	Above Toxicity Characteristic Levels?
PT-B1-1	Total Lead	47	5.0	no*
T-B1-M1	Arsenic	0.010	5.0	no
	Barium	1.0	100	no
	Cadmium	0.0055	1.0	no
	Chromium	<0.005	5.0	no
	Lead	0.43	5.0	no
	Mercury	< 0.0002	0.2	no
	Selenium	<0.0015	1.0	no
	Silver	<0.005	5.0	no

Notes:
* - Toxicity Characteristic values are measured in milligrams per liter. Total lead is measured in milligrams per kilogram. Therefore, a 20X dilution factor needs to be considered when comparing analytical results of total and leachable lead.
TCLP - Toxicity Characteristic Leaching Procedure
ppm - Parts per million

Table 3-4
Seneca Army Depot Activity Ash Landfill IRM
Prove-Out Event
LTTD Exhaust Gas Conditions

	Volumetric Gas Flow			Composition (%)		
Run No.	ACFM	dscfm	Temperature (°F)	H_2O	CO_2	O_2
S-HCL-1	*37,300*	*6,600*	1434	34	5.5	12.0
S-HCL-2	*16,100*	*2,940*	1414	34	4.5	12.5
S-HCL-3	52,500	10,100	1387	32	5.0	12.0
S-MM5-1	53,100	10,700	1381	29	---	---
S-MM5-2	55,300	11,600	1402	25	---	---
S-MM5-3	56,500	11,300	1376	30	---	---
Average	54,300[a]	10,900[a]	1399	31	5.0[b]	12.2[b]

Notes:
[a]- The average of all MM5 runs and S-HCL-3.
[b]- The average CO_2 and O_2 values from the HCl runs were use in the calculations for the MM5 runs.

Table 3-5
Seneca Army Depot Activity Ash Landfill IRM
Prove-Out Event
Hydrogen Chloride and Particulate Emissions- BIF Method 0050 Results

	Filterable Particulate		HCl Emissions	
Run No.	gr/dscf	lb/hr	ppm	lb/hr
S-HCL-1	0.0626	5.87	13	0.82[a]
S-HCL-3	0.0607	5.26	12	0.69
Average	0.0617	5.56	12.5	0.76

Notes:
[a]- Calculated using the average volumetric flow rate.

Table 3-6
U.S. Army Corps of Engineers Omaha District
Seneca Army Depot Acitvity Ash Landfill IRM
TO14 Volatile Data Summary
Prove-Out Event

Type	Date Collected	Sample ID #	Compound(s) Detected	VOC Results in ppb (v/v)	Emission Rate (lb/hr)
VOC	11/2/94	AC8544			
			Toluene	2.1	0.000329
			Benzene	8.7	0.00116
			Chloromethane	3.8	0.000327
VOC	11/3/94	AC8546			
			Chloromethane	1.7	0.000146
VOC	11/3/94	AC8547			
			m/p-Xylene	1.5	0.000251
			Toluene	2.6	0.000377
			Bromomethane	1.5	0.000224
			Chloromethane	5	0.000397
VOC	11/3/94	AC8547DP			
			m/p-Xylene	1.5	0.000251
			Toluene	2.6	0.000377
			Bromomethane	1.5	0.000224
			Chloromethane	5	0.000397
VOC	11/1/94	AC8548			
			Toluene	0.54	
			Methylene Chloride	3	

Table 3-7
U.S. Army Corps of Engineers Omaha District
Seneca Army Depot Acitvity Ash Landfill IRM
Semi-Volatile Data Summary
Prove-Out Event

Type	Date Collected	Sample ID #	Compound(s) Detected	Results (ug)	Qualifier	Emission Rate (lb/hr)
Semivol		AC9533- Meth.				
			bis (2-Ethylhexyl) Phthalate	7	J	-
Semivol	11/4/94	SMM51				
			2-Nitrophenol	14	J	0.000498
			Naphthalene	7	J	0.000249
			Diethylphthalate	61	+	0.00217
			Phenanthrene	5	J	0.000178
			Di-n-Butylphthalate	970	D50+	0.0345
			bis (2-Ethylhexyl) Phthalate	570	BD50+	0.0203
			Phenol	60	J	0.00213
Semivol	11/4/94	SMM52				
			bis (2-Ethylhexyl) Phthalate	230	B+	0.0091
			Phenol	150	+	0.00693
			Diethylphthalate	89	+	0.00352
			Pyrene	8	J	0.000316
			Di-n-Butylphthalate	340	+	0.0135
Semivol	11/4/94	SMM53				
			2-Nitrophenol	11	J	0.000368
			1.2.4-Trichlorobenzene	23	J	0.000769
			Diethylphthalate	57	+	0.00191
			Anthracene	5	J	0.000167
			Di-n-Butylphthalate	470	D50J	0.0157
			Pyrene	6	J	0.000201
			bis (2-Ethylhexyl) Phthalate	900	BD50+	0.0301

ounds analyzed for but not detected are not included above
0) - Compound analyzed at secondary dilution
sitive result.
mpound detected but below quantification limit: value is estimated.
ompound found in method blank.

Table 3-7
U.S. Army Corps of Engineers Omaha District
Seneca Army Depot Acitvity Ash Landfill IRM
Semi-Volatile Data Summary
Prove-Out Event

Type	Date Collected	Sample ID #	Compound(s) Detected	Results (ug)	Qualifier	Emission Rate (lb/hr)
Semivol	11/1/94	SMM5BLANK				
			Diethylphthalate	28	+	-
			Di-n-Butylphthalate	340	D5+	-
			bis (2-Ethylhexyl) Phthalate	13	B+	-

ounds analyzed for but not detected are not included above.
D) - Compound analyzed at secondary dilution.
sitive result.
mpound detected but below quantification limit; value is estimated.
ompound found in method blank.

Engineers Omaha District
POT ASH LANDFILL IRM
T
T ANALYSIS

	CAS No.	AGC (ug/m3)	SGC (ug/m3)	1/2 AGC	% Control	Emission Rates[2] (lbs./hr.)	(lbs./yr.)	Hs	TEMP (°R)	Radius (ft.)	Velocity (ft./s)	FLUX (m^4/s^3)	He (flux)	He (2.25) FLUX	Ca FLUX (0.4)	Cp FLUX (0.4)	Cst FLUX (0.4)	PASS AGC
E)	79-01-6	0 45	33000	0.23	0 99	1 61E-04	1 41E+00	56	1872	1.667	90	50 22	188 06	130967	0 00003	0 00003	0 00168	Y
OCE)	156-59-2	1900	190000	950	0 99	1 19E-04	1 04E+00	56	1872	1 667	90	50 22	188 06	130967	0 00002	0 00002	0 00124	Y
	75-01-4	0 02	1300	0 01	0 99	7 67E-05	6 72E-01	56	1872	1 667	90	50 22	188 06	130967	0 00001	0 00001	0 00080	Y
	71-43-2	0 12	30	0 06	0 99	1 16E-03	1 02E+01	56	1872	1 667	90	50 22	188 06	130967	0 00019	0 00019	0 01209	Y
	108-88-3	2000	89000	1000	0 99	3 77E-04	3 30E+00	56	1872	1 667	90	50 22	188 06	130967	0 00006	0 00006	0 00393	Y
	1330-20-7	300	100000	150	0 99	2 51E-04	2 20E+00	56	1872	1 667	90	50 22	188 06	130967	0 00004	0 00004	0 00262	Y
	95-47-6	700	100000	350	0 99	1 30E-04	1 14E+00	56	1872	1 667	90	50 22	188 06	130967	0 00002	0 00002	0 00135	Y
	7641-01-0	167	1667	83 5	0 99	7 60E-01	6 66E+03	56	1872	1 667	90	50 22	188 06	130967	0 12200	0 12186	7 92106	Y
	74-83-9	452	4524	226	0 99	2 24E-04	1 96E+00	56	1872	1 667	90	50 22	188 06	130967	0 00004	0 00004	0 00233	Y
	74-87-3	770	22000	385	0 99	3 97E-04	3 48E+00	56	1872	1 667	90	50 22	188 06	130967	0 00006	0 00006	0 00414	Y
	75-09-2	27	41000	13 5	0 99	1 60E-04	1 40E+00	56	1872	1 667	90	50 22	188 06	130967	0 00003	0 00003	0 00167	Y
THALATE	117-81-7	11 90	1190	5 95	0 00	3 10E-02	2 72E+02	56	1872	1 667	90	50 22	188 06	130967	0 00498	0 00497	0 32310	Y
	100-02-7	0 10	---	0 05	0 00	1 98E-03	1 73E+01	56	1872	1 667	90	50 22	188 06	130967	0 00032	0 00032	0 02064	Y
	91-20-3	120	12000	60	0 00	1 98E-03	1 73E+01	56	1872	1 667	90	50 22	188 06	130967	0 00032	0 00032	0 02064	Y
	84-66-2	12	1200	6 00	0 00	3 52E-03	3 08E+01	56	1872	1 667	90	50 22	188 06	130967	0 00057	0 00056	0 03669	Y
	85-01-8	4 76	476	2 38	0 00	1 98E-03	1 73E+01	56	1872	1 667	90	50 22	188 06	130967	0 00032	0 00032	0 02064	Y
	87-74-2	120	1190	60	0 00	3 45E-02	3 02E+02	56	1872	1 667	90	50 22	188 06	130967	0 00554	0 00553	0 35957	Y
	108-95-2	9 60	4500	4 80	0 00	5 93E-03	5 19E+01	56	1872	1 667	90	50 22	188 06	130967	0 00095	0 00095	0 06181	Y
	129-00-0	4 76	476	2 38	0 00	1 78E-03	1 56E+01	56	1872	1 667	90	50 22	188 06	130967	0 00029	0 00029	0 01855	Y
NE	120-82-1	9 00	3700	4 50	0 00	1 98E-03	1 73E+01	56	1872	1 667	90	50 22	188 06	130967	0 00032	0 00032	0 02064	Y
	120-12-7	4 76	476	2 38	0 00	1 98E-03	1 73E+01	56	1872	1 667	90	50 22	188 06	130967	0 00032	0 00032	0 02064	Y
	NY75-00-0	80	320	40	0 90	5 56E+00	4 87E+04	56	1872	1 667	90	50 22	188 06	130967	0 89254	0 89152	57 94884	Y

DS ORGINALLY LISTED ON PERMIT APPLICATION AND COMPOUNDS DETECTED DURING PROVE-OUT EVENT
RATE MEASURED or MAXIMUM CONCENTRATION BASED ON HIGHEST DETECTION LIMIT

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Figures

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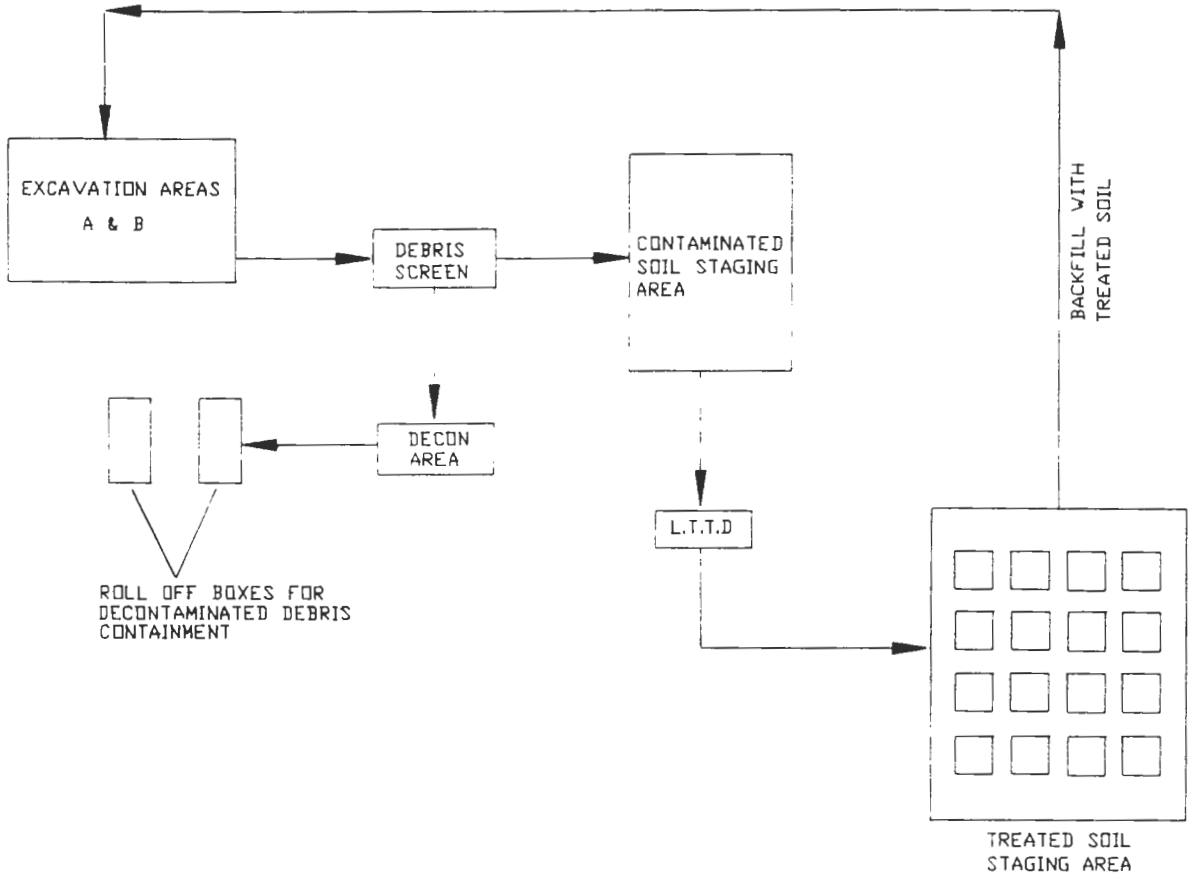

FIGURE
PROCESS SCHEMATIC - SOIL

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INTERNATIONAL TECHNOLOGY CORPORATION

132298

Appendix A

Soil Analytical Data/Certificates of Analysis

AGP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

PT-B1-1 (PRETREAT)

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4611502

Sample wt/vol: 5.10 (g/mL) G Lab File ID: H6062.MSC

Level: (low/med) LOW Date Samp/Recv: 11/01/94 11/01/94

% Moisture: not dec. 16.6 Heated Purge: Y Date Analyzed: 11/02/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	380	E
540-59-0	1,2-Dichloroethene (Total)	640	E
75-01-4	Vinyl chloride	21	
108-88-3	Toluene	2	U
1330-20-7	Total Xylenes	3	U

PRELIMINARY

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.
PT-BL-1(PRETREAT) DL

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 8192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A46115C2DL

Sample wt/vol: 1.10 (g/mL) G Lab File ID: H6065.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/01/94 11/01/94

% Moisture: not dec. 16.6 Heated Purge: Y Date Analyzed: 11/02/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	130	D
540-59-0	1,2-Dichloroethene (Total)	300	D
75-01-4	Vinyl chloride	17	DJ
108-88-3	Toluene	54	U
1330-20-7	Total Xylenes	54	U

PRELIMINARY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
0191940

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-001

Matrix:(soil/water) Soil Lab Sample ID: 0191940

Sample wt/vol: 35.8 g Lab File ID: >1B045

Level: (low/med)LOW Date Received: 11/01/94

% Moisture: 16.2 Decanted:(Y/N)N Date Extracted: 11/02/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/03/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	660	U
85-01-8	Phenanthrene	660	U
206-44-0	Fluoranthene	660	U
129-00-0	Pyrene	660	U
56-55-3	Benzo(a)anthracene	660	U
218-01-9	Chrysene	660	U
117-81-7	bis(2-Ethylhexyl)phthalate	660	U
50-32-8	Benzo(a)pyrene	660	U
193-39-5	Indeno(1,2,3-cd)pyrene	660	U
53-70-3	Dibenz(a,h)anthracene	660	U
	METHOD 8310		
56-55-3	Benzo(a)anthracene	250	
218-01-9	Chrysene	33	U
50-32-8	Benzo(a)pyrene	33	U
53-70-3	Dibenz(a,h)anthracene	50	J
	METHOD 8310 REANALYSIS on 11/9		
56-55-3	Benzo(a)anthracene	320	
218-01-9	Chrysene	350	J
50-32-8	Benzo(a)pyrene	400	
53-70-3	Dibenz(a,h)anthracene	70	J

ASP91[illegible] - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.: T-31-1 (TREAT)

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: [illegible]

Matrix: (soil/water) SOIL Lab Sample ID: A4611[illegible]

Sample wt/vol: 5.11 g/mL) G Lab File ID: V6064.MSD

Level: (low/med) LOW Date Samp/Recv: 11/01/94 11/[illegible]/94

% Moisture: not dec. 10.3 Heated Purge: Y Date Analyzed: 11/02/94

GC Column: DB-624 ID: 0.53 mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: ug/L or ug/Kg	UG/KG	Q
79-01-6	Trichloroethene		[illegible]	[illegible]
540-59-0	1,2-Dichloroethene (Total)		[illegible]	[illegible]
75-01-4	Vinyl chloride		[illegible]	[illegible]
108-88-3	Toluene		[illegible]	[illegible]
1330-20-7	Total Xylenes		[illegible]	[illegible]

PRELIMINARY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
0191941

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-001

Matrix:(soil/water) Soil Lab Sample ID: 0191941

Sample wt/vol: 34.2 g Lab File ID: >1B046

Level: (low/med)Low Date Received: 11/01/94

% Moisture: 11.3 Decanted:(Y/N)N Date Extracted: 11/02/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/03/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	660	U
85-01-8	Phenanthrene	660	U
206-44-0	Fluoranthene	660	U
129-00-0	Pyrene	660	U
56-55-3	Benzo(a)anthracene	660	U
218-01-9	Chrysene	660	U
117-81-7	bis(2-Ethylhexyl)phthalate	660	U
50-32-8	Benzo(a)pyrene	660	U
193-39-5	Indeno(1,2,3-cd)pyrene	660	U
53-70-3	Dibenz(a,h)anthracene	660	U
	METHOD 8310		
56-55-3	Benzo(a)anthracene	33	U
218-01-9	Chrysene	33	U
50-32-8	Benzo(a)pyrene	33	U
53-70-3	Dibenz(a,h)anthracene	67	U
	METHOD 8310 REANALYSIS 9/9		
56-55-3	Benzo(a)anthracene	56	J
218-01-9	Chrysene	46	J
50-32-8	Benzo(a)pyrene	30	J
53-70-3	Dibenz(a,h)anthracene	6.7	U

ASP91 1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

TRIP BLANK

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: 2TB11

Matrix: (soil/water) WATER Lab Sample ID: A4611501

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: H6060.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/01/94 11/01/94

% Moisture: not dec. _____ Heated Purge: N Date Analyzed: 11/02/94

GC Column: DB-624 ID: 1.51 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ uL

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
540-59-0	1,2-Dichloroethene (Total)	10	U
75-01-4	Vinyl chloride	10	U
108-88-3	Toluene	10	U
1330-20-7	Total Xylenes	10	U

PRELIMINARY

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

VBLK98

Lab Name: Recra Environmenta Contract: _____

Lab Code: RECNY Case No.: 5190 SAS No.: _____ SDG No.: RTB11

Matrix: (soil/water) WATER Lab Sample ID: A4611506

Sample wt/vol: 5.00 g/mL. ML Lab File ID: H6049.MSQ

Level: (low/med) LOW Date Samp/Recv: _____ _____

% Moisture: not dec. _____ Heated Purge: N Date Analyzed: 11/02/94

GC Column: DB-624 ID: 1.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
540-59-0	1,2-Dichloroethene (Total)	10	U
75-01-4	Vinyl chloride	10	U
108-88-3	Toluene	10	U
1330-20-7	Total Xylenes	10	U

PRELIMINARY

ASP91-1 - SELECT VOLATILES ANALYSIS DATA SHEET

Client No.: PT-B1-2(PRE-TREAT)

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4623702

Sample wt/vol: 5.00 (g/mL) G Lab File ID: G1380.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/02/94 11/03/94

% Moisture: not dec. 14.0 Heated Purge: Y Date Analyzed: 11/07/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	240	E
540-59-0	1,2-Dichloroethene (Total)	280	E
75-01-4	Vinyl chloride	5	J
108-88-3	Toluene	2	J
1330-20-7	Total Xylenes	12	U

PRELIMINARY

AS?91-1 - SELECT VOLATILES ANALYSIS DATA SHEET

Client No.

PT-B1-2(PRE-TREAT)DL

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4623702DL

Sample wt/vol: 5.00 (g/mL) G Lab File ID: G1388.MSO

Level: (low/med) LOW Date Samp/Recv: 11/02/94 11/03/94

% Moisture: not dec. 14.1 Heated Purge: Y Date Analyzed: 11/07/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	33	D
540-59-0	1,2-Dichloroethene (Total)	46	D
75-01-4	Vinyl chloride	12	U
108-88-3	Toluene	0.2	DJ
1330-20-7	Total Xylenes	12	U

PRELIMINARY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
0192055

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-002

Matrix:(soil/water) Soil Lab Sample ID: 0192055

Sample wt/vol: 35.1 g Lab File ID: >1B078

Level: (low/med)Low Date Received: 11/03/94

% Moisture: 14.5 Decanted:(Y/N)N Date Extracted: 11/04/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/07/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	63	J
85-01-8	Phenanthrene	180	J
206-44-0	Fluoranthene	290	J
129-00-0	Pyrene	270	J
56-55-3	Benzo(a)anthracene	160	J
218-01-9	Chrysene	160	J
117-81-7	bis(2-Ethylhexyl)phthalate	190	J
50-32-8	Benzo(a)pyrene	130	J
193-39-5	Indeno(1,2,3-cd)pyrene	377	J
53-70-3	Dibenz(a,h)anthracene	660	U
	METHOD 8310		
56-55-3	Benzo(a)anthracene	290	
218-01-9	Chrysene	270	
50-32-8	Benzo(a)pyrene	230	
53-70-3	Dibenz(a,h)anthracene	6.7	U

ASP91-1 - SELECT VOLATILES ANALYSIS DATA SHEET

Client No.: T-B1-2(TREAT)

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: FTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4623703

Sample wt/vol: 5.00 (g/mL) G Lab File ID: G1381.MSO

Level: (low/med) LOW Date Samp/Recv: 11/02/94 11/03/94

% Moisture: not dec. 17.1 Heated Purge: Y Date Analyzed: 11/07/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	12	U
540-59-0	1,2-Dichloroethene (Total)	12	U
75-01-4	Vinyl chloride	12	U
108-88-3	Toluene	12	U
1330-20-7	Total Xylenes	12	U

PRELIMINARY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
0192056

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-002

Matrix:(soil/water) Soil Lab Sample ID: 0192056

Sample wt/vol: 33.3 g Lab File ID: >1B075

Level: (low/med)Low Date Received: 11/03/94

% Moisture: 10.0 Decanted:(Y/N)N Date Extracted: 11/04/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/07/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	660	U
85-01-8	Phenanthrene	660	U
206-44-0	Fluoranthene	660	U
129-00-0	Pyrene	660	U
56-55-3	Benzo(a)anthracene	660	U
218-01-9	Chrysene	660	U
117-81-7	bis(2-Ethylhexyl)phthalate	660	U
50-32-8	Benzo(a)pyrene	660	U
193-39-5	Indeno(1,2,3-cd)pyrene	660	U
53-70-3	Dibenz(a,h)anthracene	660	U
	METHOD 8310		
56-55-3	Benzo(a)anthracene	5.0	
218-01-9	Chrysene	3.3	U
50-32-8	Benzo(a)pyrene	3.3	U
53-70-3	Dibenz(a,h)anthracene	6.7	U

ASP91-1 - SELECT VOLATILES ANALYSIS DATA SHEET

Client No.

PT-B1-3(PRE-TREAT)

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4623704

Sample wt/vol: 5.00 (g/mL) G Lab File ID: G1382.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/03/94 11/03/94

% Moisture: not dec. 17.3 Heated Purge: Y Date Analyzed: 11/07/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	20	
540-59-0	1,2-Dichloroethene (Total)	29	
75-01-4	Vinyl chloride	8	J
108-88-3	Toluene	12	U
1330-20-7	Total Xylenes	12	U

PRELIMINARY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
0192057

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-002

Matrix:(soil/water) Soil Lab Sample ID: 0192057

Sample wt/vol: 34.4 g Lab File ID: >1B076

Level: (low/med)Low Date Received: 11/03/94

% Moisture: 12.9 Decanted:(Y/N)N Date Extracted: 11/04/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/07/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	660	U
85-01-8	Phenanthrene	67	J
206-44-0	Fluoranthene	110	J
129-00-0	Pyrene	110	J
56-55-3	Benzo(a)anthracene	73	J
218-01-9	Chrysene	77	J
117-81-7	bis(2-Ethylhexyl)phthalate	50	J
50-32-8	Benzo(a)pyrene	67	J
193-39-5	Indeno(1,2,3-cd)pyrene	660	U
53-70-3	Dibenz(a,h)anthracene	660	U
	METHOD 8310		
56-55-3	Benzo(a)anthracene	100	
218-01-9	Chrysene	95	
50-32-8	Benzo(a)pyrene	87	
53-70-3	Dibenz(a,h)anthracene	17	

ASP91-1 - SELECT VOLATILES ANALYSIS DATA SHEET

Client No.

T-B1-3(TREAT)

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4623705

Sample wt/vol: 5.00 (g/mL) G Lab File ID: G1383.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/03/94 11/03/94

% Moisture: not dec. 15.9 Heated Purge: Y Date Analyzed: 11/07/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	12	U
540-59-0	1,2-Dichloroethene (Total)	12	U
75-01-4	Vinyl chloride	12	U
108-88-3	Toluene	1	J
1330-20-7	Total Xylenes	12	U

PRELIMINARY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
0192058

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-002

Matrix:(soil/water) Soil Lab Sample ID: 0192058

Sample wt/vol: 34.2 g Lab File ID: >1B077

Level: (low/med)Low Date Received: 11/03/94

% Moisture: 12.3 Decanted:(Y/N)N Date Extracted: 11/04/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/07/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	660	U
85-01-8	Phenanthrene	660	U
206-44-0	Fluoranthene	660	U
129-00-0	Pyrene	660	U
56-55-3	Benzo(a)anthracene	660	U
218-01-9	Chrysene	660	U
117-81-7	bis(2-Ethylhexyl)phthalate	660	U
50-32-8	Benzo(a)pyrene	660	U
193-39-5	Indeno(1,2,3-cd)pyrene	660	U
53-70-3	Dibenz(a,h)anthracene	660	U
	METHOD 8310		
56-55-3	Benzo(a)anthracene	25	
218-01-9	Chrysene	17	
50-32-8	Benzo(a)pyrene	17	
53-70-3	Dibenz(a,h)anthracene	6.7	U

ASP91-1 - SELECT VOLATILES ANALYSIS DATA SHEET

Client No.

TRIP BLANK

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) WATER Lab Sample ID: A4626601

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: G1397.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/04/94 11/05/94

% Moisture: not dec. _____ Heated Purge: N Date Analyzed: 11/08/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
540-59-0	1,2-Dichloroethene (Total)	10	U
75-01-4	Vinyl chloride	10	U
108-88-3	Toluene	10	U
1330-20-7	Total Xylenes	10	U

PRELIMINARY

ASP91-1 - SELECT VOLATILES ANALYSIS DATA SHEET

Client No.

VBLK23

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4623709

Sample wt/vol: 5.00 (g/mL) G Lab File ID: G1396.MSQ

Level: (low/med) LOW Date Samp/Recv: _____ _____

% Moisture: not dec. _____ Heated Purge: Y Date Analyzed: 11/08/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	10	U
540-59-0	1,2-Dichloroethene (Total)	10	U
75-01-4	Vinyl chloride	10	U
108-88-3	Toluene	10	U
1330-20-7	Total Xylenes	10	U

PRELIMINARY

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

PT-B1-4(PRE-TREAT)

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4624002

Sample wt/vol: 5.09 (g/mL) G Lab File ID: G1385.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/03/94 11/04/94

% Moisture: not dec. 15.0 Heated Purge: Y Date Analyzed: 11/07/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	360	E
540-59-0	1,2-Dichloroethene (Total)	880	E
75-01-4	Vinyl chloride	36	
108-88-3	Toluene	2	J
1330-20-7	Total Xylenes	2	J

PRELIMINARY

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

PT-B1-4(PRE-TREAT)DL

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4624002DL

Sample wt/vol: 1.17 (g/mL) G Lab File ID: G1391.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/03/94 11/04/94

% Moisture: not dec. 15.0 Heated Purge: Y Date Analyzed: 11/08/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.0C

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	220	D
540-59-0	1,2-Dichloroethene (Total)	520	D
75-01-4	Vinyl chloride	14	DJ
108-88-3	Toluene	50	U
1330-20-7	Total Xylenes	50	U

PRELIMINARY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
PT-B1-4

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-003

Matrix:(soil/water) Soil Lab Sample ID: 0192153

Sample wt/vol: 35.5 g Lab File ID: >1B085

Level: (low/med)Low Date Received: 11/04/94

% Moisture: 15.4 Decanted:(Y/N)N Date Extracted: 11/07/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/08/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	660	U
85-01-8	Phenanthrene	170	J
206-44-0	Fluoranthene	230	J
129-00-0	Pyrene	200	J
117-81-7	bis(2-Ethylhexyl)phthalate	85	J
193-39-5	Indeno(1,2,3-cd)pyrene	56	J
	METHOD 8310		
56-55-3	Benzo(a)anthracene	150	J
218-01-9	Chrysene	22	J
50-32-8	Benzo(a)pyrene	170	
53-70-3	Dibenzo(a,h)anthracene	6.7	U

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

T-B1-4(TREAT)

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4624003

Sample wt/vol: 5.18 (g/mL) G Lab File ID: G14C0.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/03/94 11/04/94

% Moisture: not dec. 10.9 Heated Purge: Y Date Analyzed: 11/08/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	11	U
540-59-0	1,2-Dichloroethene (Total)	11	U
75-01-4	Vinyl chloride	11	U
108-88-3	Toluene	11	U
1330-20-7	Total Xylenes	11	U

PRELIMINARY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
T-B1-4

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-003

Matrix:(soil/water) Soil Lab Sample ID: 0192154

Sample wt/vol: 33.0 g Lab File ID: >1B086

Level: (low/med)Low Date Received: 11/04/94

% Moisture: 9.0 Decanted:(Y/N)N Date Extracted: 11/07/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/09/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	660	U
85-01-8	Phenanthrene	660	U
206-44-0	Fluoranthene	660	U
129-00-0	Pyrene	660	U
117-81-7	bis(2-Ethylhexyl)phthalate	520	J
193-39-5	Indeno(1,2,3-cd)pyrene	660	U
	METHOD 8310		
56-55-3	Benzo(a)anthracene	14	J
218-01-9	Chrysene	3.3	U
50-32-8	Benzo(a)pyrene	16	J
53-70-3	Dibenzo(a,h)anthracene	6.7	U

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

TRIP BLANK

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB1[illegible]

Matrix: (soil/water) WATER Lab Sample ID: A4624001

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: G1378.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/03/94 11/04/94

% Moisture: not dec. _____ Heated Purge: N Date Analyzed: 11/07/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
540-59-0	1,2-Dichloroethene (Total)	10	U
75-01-4	Vinyl chloride	10	U
108-88-3	Toluene	10	U
1330-20-7	Total Xylenes	10	U

PRELIMINARY

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

PT-B1-5(PRE-TREAT)

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4624004

Sample wt/vol: 5.29 (g/mL) G Lab File ID: G1387.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/04/94 11/04/94

% Moisture: not dec. 12.2 Heated Purge: Y Date Analyzed: 11/07/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	52	
540-59-0	1,2-Dichloroethene (Total)	78	
75-01-4	Vinyl chloride	4	J
108-88-3	Toluene	11	U
1330-20-7	Total Xylenes	11	U

PRELIMINARY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
PT-B1-5

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-003

Matrix:(soil/water) Soil Lab Sample ID: 0192155

Sample wt/vol: 35.2 g Lab File ID: >1B087

Level: (low/med)Low Date Received: 11/04/94

% Moisture: 14.7 Decanted:(Y/N)N Date Extracted: 11/07/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/09/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	42	J
85-01-8	Phenanthrene	180	J
206-44-0	Fluoranthene	290	J
129-00-0	Pyrene	280	J
117-81-7	bis(2-Ethylhexyl)phtnalate	70	J
193-39-5	Indeno(1,2,3-cd)pyrene	73	J
	METHOD 8310		
56-55-3	Benzo(a)anthracene	260	
218-01-9	Chrysene	120	J
50-32-8	Benzo(a)pyrene	120	J
53-70-3	Dibenzo(a,h)anthracene	6.7	U

ASP91-1 - SELECT VOLATILES ANALYSIS DATA SHEET

Client No.: T-B1-5(Treat)

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4626603

Sample wt/vol: 5.01 (g/mL) G Lab File ID: G1402.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/05/94 11/05/94

% Moisture: not dec. 11.3 Heated Purge: Y Date Analyzed: 11/08/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	C
79-01-6	Trichloroethene	11	U
540-59-0	1,2-Dichloroethene (Total)	1	J
75-01-4	Vinyl chloride	11	U
108-88-3	Toluene	2	J
1330-20-7	Total Xylenes	11	U

PRELIMINARY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
T-B1-5

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-004

Matrix:(soil/water) Soil Lab Sample ID: 0192157

Sample wt/vol: 34.1 g Lab File ID: >1B089

Level: (low/med)Low Date Received: 11/05/94

% Moisture: 12.1 Decanted:(Y/N)N Date Extracted: 11/07/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/09/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	660	U
85-01-8	Phenanthrene	660	U
206-44-0	Fluoranthene	660	U
129-00-0	Pyrene	660	U
117-81-7	bis(2-Ethylhexyl)phthalate	660	U
193-39-5	Indeno(1,2,3-cd)pyrene	660	U
	METHOD 8310		
56-55-3	Benzo(a)anthracene	32	J
218-01-9	Chrysene	65	J
50-32-8	Benzo(a)pyrene	36	J
53-70-3	Dibenzo(a,h)anthracene	6.7	U

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

METHOD BLANK(VBLK22)

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4624006

Sample wt/vol: 5.00 (g/mL) G Lab File ID: G1375.MSQ

Level: (low/med) LOW Date Samp/Recv: _____ _____

% Moisture: not dec. _____ Heated Purge: Y Date Analyzed: 11/07/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	10	U
540-59-0	1,2-Dichloroethene (Total)	10	U
75-01-4	Vinyl chloride	10	U
108-88-3	Toluene	10	U
1330-20-7	Total Xylenes	10	U

PRELIMINARY

ASP91-1 - SELECT VOLATILES ANALYSIS DATA SHEET

Client No.: PT-B1-6(Pretreat)

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4626602

Sample wt/vol: 5.13 (g/mL) G Lab File ID: G1401.MSO

Level: (low/med) LOW Date Samp/Recv: 11/05/94 11/05/94

% Moisture: not dec. 15.4 Heated Purge: Y Date Analyzed: 11/08/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	260	E
540-59-0	1,2-Dichloroethene (Total)	500	E
75-01-4	Vinyl chloride	65	
108-88-3	Toluene	1	J
1330-20-7	Total Xylenes	4	J

PRELIMINARY

ASP91-1 - SELECT VOLATILES ANALYSIS DATA SHEET

Client No.: PT-B1-6(Pretreat) DL

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4626602DL

Sample wt/vol: 1.17 (g/mL) G Lab File ID: G1405.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/05/94 11/05/94

% Moisture: not dec. 15.4 Heated Purge: Y Date Analyzed: 11/08/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	150	D
540-59-0	1,2-Dichloroethene (Total)	210	D
75-01-4	Vinyl chloride	7	DJ
108-88-3	Toluene	50	U
1330-20-7	Total Xylenes	50	U

PRELIMINARY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
PT-B1-6

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-004

Matrix:(soil/water) Soil Lab Sample ID: 0192156

Sample wt/vol: 31.7 g Lab File ID: >1B088

Level: (low/med)Low Date Received: 11/05/94

% Moisture: 15.3 Decanted:(Y/N)N Date Extracted: 11/07/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/09/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	180	J
85-01-8	Phenanthrene	290	J
206-44-0	Fluoranthene	360	J
129-00-0	Pyrene	320	J
117-81-7	bis(2-Ethylhexyl)phthalate	88	J
193-39-5	Indeno(1,2,3-cd)pyrene	93	J
	METHOD 8310		
56-55-3	Benzo(a)anthracene	260	
218-01-9	Chrysene	240	J
50-32-8	Benzo(a)pyrene	230	
53-70-3	Dibenzo(a,h)anthracene	6.7	U

ASP91-1 - SELECT VOLATILES ANALYSIS DATA SHEET

Client No.: T-B1-6(Treat)

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4626604

Sample wt/vol: 5.17 (g/mL) G Lab File ID: G1404.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/05/94 11/05/94

% Moisture: not dec. 6.9 Heated Purge: Y Date Analyzed: 11/08/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	10	U
540-59-0	1,2-Dichloroethene (Total)	10	U
75-01-4	Vinyl chloride	10	U
108-88-3	Toluene	2	U
1330-20-7	Total Xylenes	10	U

PRELIMINARY

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
T-B1-6

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-004

Matrix:(soil/water) Soil Lab Sample ID: 0192158

Sample wt/vol: 32.5 g Lab File ID: >1B090

Level: (low/med)Low Date Received: 11/05/94

% Moisture: 7.6 Decanted:(Y/N)N Date Extracted: 11/07/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/09/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	660	U
85-01-8	Phenanthrene	660	U
206-44-0	Fluoranthene	42	U
129-00-0	Pyrene	660	U
117-81-7	bis(2-Ethylhexyl)phthalate	660	U
193-39-5	Indeno(1,2,3-cd)pyrene	660	U
	METHOD 8310		
56-55-3	Benzo(a)anthracene	33	J
218-01-9	Chrysene	3.3	U
50-32-8	Benzo(a)pyrene	37	J
53-70-3	Dibenzo(a,h)anthracene	6.7	U

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

VBLK23

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4626607

Sample wt/vol: 5.00 (g/mL) G Lab File ID: G1396.MSQ

Level: (low/med) LOW Date Samp/Recv: _____ _____

% Moisture: not dec. _____ Heated Purge: Y Date Analyzed: 11/08/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	10	U
540-59-0	1,2-Dichloroethene (Total)	10	U
75-01-4	Vinyl chloride	10	U
108-88-3	Toluene	10	U
1330-20-7	Total Xylenes	10	U

PRELIMINARY

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

PT-B1-7(PRETREAT)

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4628302

Sample wt/vol: 1.03 (g/mL) G Lab File ID: G1433.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/06/94 11/07/94

% Moisture: not dec. 11.3 Heated Purge: Y Date Analyzed: 11/10/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	260	B
540-59-0	1,2-Dichloroethene (Total)	650	
75-01-4	Vinyl chloride	28	J
108-88-3	Toluene	1	J
1330-20-7	Total Xylenes	55	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
PT-B1-7

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-005

Matrix:(soil/water) Soil Lab Sample ID: 0192177

Sample wt/vol: 35.0 g Lab File ID: >1B097

Level: (low/med)Low Date Received: 11/08/94

% Moisture: 14.4 Decanted:(Y/N)N Date Extracted: 11/08/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/09/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	92	J
85-01-8	Phenanthrene	280	J
206-44-0	Fluoranthene	430	J
129-00-0	Pyrene	330	J
117-81-7	bis(2-Ethylhexyl)phthalate	110	J
193-39-5	Indeno(1,2,3-cd)pyrene	110	J
	METHOD 8310		
56-55-3	Benzo(a)anthracene	490	
218-01-9	Chrysene	480	
50-32-8	Benzo(a)pyrene	220	
53-70-3	Dibenzo(a,h)anthracene	100	

ASP91-L - SELECT VOLATILES ANALYSIS DATA SHEET

Client No.

T-B1-7(TREAT)

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4628303

Sample wt/vol: 5.23 (g/mL) G Lab File ID: G1417.MSO

Level: (low/med) LOW Date Samp/Recv: 11/07/94 11/07/94

% Moisture: not dec. 10.8 Heated Purge: Y Date Analyzed: 11/09/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	11	U
540-59-0	1,2-Dichloroethene (Total)	11	U
75-01-4	Vinyl chloride	11	U
108-88-3	Toluene	11	U
1330-20-7	Total Xylenes	11	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
T-B1-7

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-005

Matrix:(soil/water) Soil Lab Sample ID: 0192178

Sample wt/vol: 33.4 g Lab File ID: >1B098

Level: (low/med)Low Date Received: 11/08/94

% Moisture: 10.1 Decanted:(Y/N)N Date Extracted: 11/08/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/09/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	660	U
85-01-8	Phenanthrene	660	U
206-44-0	Fluoranthene	660	U
129-00-0	Pyrene	660	U
117-81-7	bis(2-Ethylhexyl)phthalate	400	J
193-39-5	Indeno(1,2,3-cd)pyrene	660	U
	METHOD 8310		
56-55-3	Benzo(a)anthracene	32	J
218-01-9	Chrysene	61	J
50-32-8	Benzo(a)pyrene	21	J
53-70-3	Dibenzo(a,h)anthracene	11	J

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

PT-B1-8(PRETREAT)

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4628304

Sample wt/vol: 1.17 (g/mL) G Lab File ID: G1424.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/07/94 11/07/94

% Moisture: not dec. 13.2 Heated Purge: Y Date Analyzed: 11/10/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	2
79-01-6	Trichloroethene	150	
540-59-0	1,2-Dichloroethene (Total)	610	
75-01-4	Vinyl chloride	32	J
108-88-3	Toluene	1	J
1330-20-7	Total Xylenes	49	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
PT-B1-8

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-005

Matrix:(soil/water) Soil Lab Sample ID: 0192179

Sample wt/vol: 35.3 g Lab File ID: >1B099

Level: (low/med)Low Date Received: 11/08/94

% Moisture: 15.1 Decanted:(Y/N)N Date Extracted: 11/08/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/09/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	100	J
85-01-8	Phenanthrene	240	J
206-44-0	Fluoranthene	340	J
129-00-0	Pyrene	280	J
117-81-7	bis(2-Ethylhexyl)phthalate	130	J
193-39-5	Indeno(1,2,3-cd)pyrene	90	J
	METHOD 8310		
56-55-3	Benzo(a)anthracene	580	
218-01-9	Chrysene	430	
50-32-8	Benzo(a)pyrene	570	
53-70-3	Dibenzo(a,h)anthracene	93	

ASP91-1 - SELECT VOLATILES ANALYSIS DATA SHEET

Client No.: T-B1-8(TREAT)

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A46283C5

Sample wt/vol: 5.13 (g/mL) G Lab File ID: G1418.MSO

Level: (low/med) LOW Date Samp/Recv: 11/07/94 11/07/94

% Moisture: not dec. 17.5 Heated Purge: Y Date Analyzed: 11/09/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	12	U
540-59-0	1,2-Dichloroethene (Total)	12	U
75-01-4	Vinyl chloride	12	U
108-88-3	Toluene	1	J
1330-20-7	Total Xylenes	12	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
T-B1-8

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-005

Matrix:(soil/water) Soil Lab Sample ID: 0192180

Sample wt/vol: 35.9 g Lab File ID: >1B100

Level: (low/med)Low Date Received: 11/08/94

% Moisture: 16.5 Decanted:(Y/N)N Date Extracted: 11/08/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/09/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	660	U
85-01-8	Phenanthrene	53	J
206-44-0	Fluoranthene	61	J
129-00-0	Pyrene	62	J
117-81-7	bis(2-Ethylhexyl)phthalate	660	U
193-39-5	Indeno(1,2,3-cd)pyrene	49	J
	METHOD 8310		
56-55-3	Benzo(a)anthracene	38	J
218-01-9	Chrysene	40	J
50-32-8	Benzo(a)pyrene	40	J
53-70-3	Dibenzo(a,h)anthracene	22	

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

T-B1-8 DUPLICATE

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4628306

Sample wt/vol: 5.17 (g/mL) G Lab File ID: G1419.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/07/94 11/07/94

% Moisture: not dec. 9.2 Heated Purge: Y Date Analyzed: 11/10/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	11	U
540-59-0	1,2-Dichloroethene (Total)	11	U
75-01-4	Vinyl chloride	11	U
108-88-3	Toluene	1	J
1330-20-7	Total Xylenes	11	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
T-B1-8 DUP

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-005

Matrix:(soil/water) Soil Lab Sample ID: 0192181

Sample wt/vol: 33.7 g Lab File ID: >1B101

Level: (low/med)Low Date Received: 11/08/94

% Moisture: 10.9 Decanted:(Y/N)N Date Extracted: 11/08/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/09/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	660	U
85-01-8	Phenanthrene	47	J
206-44-0	Fluoranthene	70	J
129-00-0	Pyrene	53	J
117-81-7	bis(2-Ethylhexyl)phthalate	660	U
193-39-5	Indeno(1,2,3-cd)pyrene	40	J
	METHOD 8310		
56-55-3	Benzo(a)anthracene	81	J
218-01-9	Chrysene	61	U
50-32-8	Benzo(a)pyrene	61	J
53-70-3	Dibenzo(a,h)anthracene	27	

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

EQUIP BLANK

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) WATER Lab Sample ID: A4628307

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: G1411.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/07/94 11/07/94

% Moisture: not dec. _____ Heated Purge: Y Date Analyzed: 11/09/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
540-59-0	1,2-Dichloroethene (Total)	10	U
75-01-4	Vinyl chloride	10	U
108-88-3	Toluene	10	U
1330-20-7	Total Xylenes	10	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
E B

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-005

Matrix:(soil/water) Water Lab Sample ID: 0192182

Sample wt/vol: Lab File ID: >1B105

Level: (low/med)Low Date Received: 11/08/94

% Moisture: 10.9 Decanted:(Y/N)N Date Extracted: 11/08/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/09/94

Injection Volume: 1 (uL) Dilution Factor: 1

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	660	U
85-01-8	Phenanthrene	660	U
206-44-0	Fluoranthene	660	U
129-00-0	Pyrene	660	U
117-81-7	bis(2-Ethylhexyl)phthalate	660	U
193-39-5	Indeno(1,2,3-cd)pyrene	660	U
	METHOD 8310		
56-55-3	Benzo(a)anthracene	0.05	U
218-01-9	Chrysene	0.05	U
50-32-8	Benzo(a)pyrene	0.05	U
53-70-3	Dibenzo(a,h)anthracene	0.10	U

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

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Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) WATER Lab Sample ID: A4628306

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: G1412.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/07/94 11/07/94

% Moisture: not dec. _____ Heated Purge: Y Date Analyzed: 11/09/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
540-59-0	1,2-Dichloroethene (Total)	10	U
75-01-4	Vinyl chloride	10	U
108-88-3	Toluene	10	U
1330-20-7	Total Xylenes	10	U

ASP91-1 - SELECT VOLATILES ANALYSIS DATA SHEET

Client No.

TRIP BLANK

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) WATER Lab Sample ID: A4628301

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: G1410.MSQ

Level: (low/med) LCW Date Samp/Recv: 11/07/94 11/07/94

% Moisture: not dec. _____ Heated Purge: Y Date Analyzed: 11/09/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
540-59-0	1,2-Dichloroethene (Total)	10	U
75-01-4	Vinyl chloride	10	U
108-88-3	Toluene	10	U
1330-20-7	Total Xylenes	10	U

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

PT-B1-9

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4631601

Sample wt/vol: 1.10 (g/mL) G Lab File ID: G1421.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/08/94 11/08/94

% Moisture: not dec. 14.3 Heated Purge: Y Date Analyzed: 11/10/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	160	
540-59-0	1,2-Dichloroethene (Total)	610	
75-01-4	Vinyl chloride	25	U
108-88-3	Toluene	33	U
1330-20-7	Total Xylenes	33	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
PT-B1-9

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-006

Matrix:(soil/water) Soil Lab Sample ID: 0192220

Sample wt/vol: 35.7 g Lab File ID: >3B057

Level: (low/med)Low Date Received: 11/08/94

% Moisture: 15.9 Decanted:(Y/N)N Date Extracted: 11/09/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/10/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	140	J
85-01-8	Phenanthrene	560	J
206-44-0	Fluoranthene	900	
129-00-0	Pyrene	680	
117-81-7	bis(2-Ethylhexyl)phthalate	200	J
193-39-5	Indeno(1,2,3-cd)pyrene	270	J
	METHOD 8310		
56-55-3	Benzo(a)anthracene	98	
218-01-9	Chrysene	108	
50-32-8	Benzo(a)pyrene	102	
53-70-3	Dibenzo(a,h)anthracene	21	

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

T-B1-9

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) SOIL Lab Sample ID: A4631602

Sample wt/vol: 5.10 (g/mL) G Lab File ID: G1420.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/08/94 11/08/94

% Moisture: not dec. 17.5 Heated Purge: Y Date Analyzed: 11/10/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	12	U
540-59-0	1,2-Dichloroethene (Total)	12	U
75-01-4	Vinyl chloride	12	U
108-88-3	Toluene	1	J
1330-20-7	Total Xylenes	12	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
T-B1-9

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-006

Matrix:(soil/water) Soil Lab Sample ID: 0192222

Sample wt/vol: 35.6 g Lab File ID: >3B055

Level: (low/med)Low Date Received: 11/08/94

% Moisture: 15.7 Decanted:(Y/N)N Date Extracted: 11/09/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/10/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	660	U
85-01-8	Phenanthrene	120	J
206-44-0	Fluoranthene	190	J
129-00-0	Pyrene	120	J
117-81-7	bis(2-Ethylhexyl)phthalate	30	J
193-39-5	Indeno(1,2,3-cd)pyrene	99	J
	METHOD 8310		
56-55-3	Benzo(a)anthracene	18	
218-01-9	Chrysene	16	
50-32-8	Benzo(a)pyrene	22	
53-70-3	Dibenzo(a,h)anthracene	6.7	U

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

TRIP BLANK

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB11

Matrix: (soil/water) WATER Lab Sample ID: A4631603

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: G1414.MSO

Level: (low/med) LOW Date Samp/Recv: 11/07/94 11/08/94

% Moisture: not dec. _____ Heated Purge: Y Date Analyzed: 11/09/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
540-59-0	1,2-Dichloroethene (Total)	10	U
75-01-4	Vinyl chloride	10	U
108-88-3	Toluene	10	U
1330-20-7	Total Xylenes	10	U

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

PT-B1-10

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB110

Matrix: (soil/water) SOIL Lab Sample ID: A4631701

Sample wt/vol: 5.23 (g/mL) G Lab File ID: G1432.MSQ

Level: (low/med) LOW Date Samp/Recv: 11/08/94 11/08/94

% Moisture: not dec. 14.4 Heated Purge: Y Date Analyzed: 11/10/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichlorcethene	82	B
540-59-0	1,2-Dichloroethene (Total)	200	
75-01-4	Vinyl chloride	3	J
108-88-3	Toluene	0.6	J
1330-20-7	Total Xylenes	11	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
PT-B1-10

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-006

Matrix:(soil/water) Soil Lab Sample ID: 0192221

Sample wt/vol: 34.6 g Lab File ID: >3B055

Level: (low/med)Low Date Received: 11/08/94

% Moisture: 13.3 Decanted:(Y/N)N Date Extracted: 11/09/94

Concentrated Extract Volume:1000(uL) Date Analyzed: 11/10/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)Y pH: NA

CAS NO	COMPOUND	CONCENTRATION (ug/L or ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	250	J
85-01-8	Phenanthrene	470	J
206-44-0	Fluoranthene	700	
129-00-0	Pyrene	520	J
117-81-7	bis(2-Ethylhexyl)phthalate	190	J
193-39-5	Indeno(1,2,3-cd)pyrene	190	J
	METHOD 8310		
56-55-3	Benzo(a)anthracene	207	
218-01-9	Chrysene	220	
50-32-8	Benzo(a)pyrene	203	
53-70-3	Dibenzo(a,h)anthracene	26	

ASP91-1 - SELECT VOLATILES
ANALYSIS DATA SHEET

Client No.

T-B1-10

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB110

Matrix: (soil/water) SOIL Lab Sample ID: 94636202

Sample wt/vol: 5.16 (g/mL) G Lab File ID: G1451.MSO

Level: (low/med) LOW Date Samp/Recv: 11/09/94 11/09/94

% Moisture: not dec. 8.8 Heated Purge: Y Date Analyzed: 11/11/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
79-01-6	Trichloroethene	11	U
540-59-0	1,2-Dichloroethene (Total)	11	U
75-01-4	Vinyl chloride	11	U
108-88-3	Toluene	11	U
1330-20-7	Total Xylenes	11	U

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE NO.
T-B1-10

Lab Name: EAS (Kodak) Contract: Seneca Army Depot (IT)

Lab Code:10146 Case No: _____ SAS No: _____ SDG No:S94-007

Matrix:(soil/water) Soil Lab Sample ID: 0192311

Sample wt/vol: 32.5 g Lab File ID: >1B131

Level: (low/med)Low Date Received: 11/09/94

% Moisture: 7.7 Decanted:(Y/N)N Date Extracted: 11/10/94

Concentrated Extract Volume:2000(uL) Date Analyzed: 11/11/94

Injection Volume: 1 (uL) Dilution Factor: 2

GPC Cleanup:(Y/N)N pH: NA

CAS NO	COMPOUND	CONCENTRATION ug/Kg	Q
	METHOD 8270		
91-20-3	Naphthalene	37	J
85-01-8	Phenanthrene	47	J
206-44-0	Fluoranthene	54	J
129-00-0	Pyrene	47	J
117-81-7	bis(2-Ethylhexyl)phthalate	660	U
193-39-5	Indeno(1,2,3-cd)pyrene	660	U
	METHOD 8310		
56-55-3	Benzo(a)anthracene	5.9	J
218-01-9	Chrysene	12	U
50-32-8	Benzo(a)pyrene	21	U
53-70-3	Dibenzo(a,h)anthracene	18	U

ASP91-1 - SELECT VOLATILES ANALYSIS DATA SHEET

Client No.

TRIP BLANK

Lab Name: Recra Environmental Contract: _____

Lab Code: RECNY Case No.: 5192 SAS No.: _____ SDG No.: PTB110

Matrix: (soil/water) WATER Lab Sample ID: A4636201

Sample wt/vol: 5.00 (g/mL) ML Lab File ID: G1450.MSO

Level: (low/med) LOW Date Samp/Recv: 11/08/94 11/09/94

% Moisture: not dec. _____ Heated Purge: N Date Analyzed: 11/11/94

GC Column: DB-624 ID: 0.53 (mm) Dilution Factor: 1.00

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
79-01-6	Trichloroethene	10	U
540-59-0	1,2-Dichloroethene (Total)	10	U
75-01-4	Vinyl chloride	10	U
108-88-3	Toluene	10	U
1330-20-7	Total Xylenes	10	U

Appendix B

Prove-Out Emission Source Testing Report

EMISSION TEST REPORT

LOW-TEMPERATURE THERMAL DESORBER PROVEOUT TESTS

SENECA ARMY DEPOT
ROMULUS, NEW YORK

December 1994

by

IT Corporation
11499 Chester Road
Cincinnati, Ohio 45246

JTN 519200-005

Table of Contents

1.0 Introduction

From November 2 through 4, 1994, IT Corporation conducted stack emission sampling on the low-temperature thermal desorber (LTTD) in support of soil remediation activities at the Seneca Army Depot near Romulus, New York. U.S. Environmental Protection Agency (EPA) Methods 1 through 4* were used to measure volumetric stack gas flow rates. Samples were collected and analyzed for volatile and semivolatile organic compounds [EPA Method TO14** (canisters) and SW 846 Method 0010***/8270 [modified Method 5 (MM5)], respectively] and for hydrogen chloride (HCl) and filterable particulate (BIF Method 0050).**** A total of three 1-hour runs were conducted of each type. A field blank was also collected for each organic sample type. Sampling was conducted through a charcoal filter to obtain a canister field blank. A semivolatile field blank consisted of setting up a sampling train, checking it for leaks, and recovering it as a sample. Reagent blanks were taken for the particulate/HCl tests.

Table 1-1 is a log of the stack sampling activities conducted during this project. The stack sampling team (Mr. Brian Garls, Team Leader, and Mr. Darren DeFabo) was directed on site by Mr. Robert Rushing, the IT Site Manager. Samples were shipped to Quanterra Environmental Services in Knoxville, Tennessee, for analysis. This report was prepared by Mr. John Prohaska of the Cincinnati IT office. Mr. Jeff Korb (IT-Rochester) coordinated the proveout test work.

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* 40 CFR 60, Appendix A, July 1993.

** Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, EPA 600/4-84-041, May 1988.

*** Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, U.S. EPA SW 846, November 1986.

**** Methods Manual for Compliance with the BIF Regulations, EPA/530-SW-91-010, December 1990.

Table 1-1
Stack Sampling Log for LTTD at Seneca Army Depot
(IT JN 519200-005)

Date (1994)	Time (24-h)	Activity or Run No.
11/1	-	Organic sample field blanks (S-TO14-blank and S-MM5-blank)
11/2	2018-2136	Particulate/HCl Run 1 (S-HCl-1)
	2033-2138	Volatile organic Run 1 (S-TO14-1)
11/3	1151-1347	S-HCl-2
	1154-1314	S-TO14-2
	1640-1752	S-HCl-3
	1641-1743	S-TO14-3
11/4	1203-1315	Semivolatile organic Run 1 (S-MM5-1)
	1401-1509	S-MM5-2
	1553-1659	S-MM5-3

2.0 Summary of Results

Table 2-1 summarizes the stack gas conditions for each test period. Volumetric gas flow rates are shown in actual cubic feet per minute (acfm) and dry standard cubic feet per minute (dscfm). Standard conditions are zero percent moisture at 68°F and 29.92 in.Hg. Volumetric flow rates and emission results for Run S-HCl-2 are void because condensed water built up in the pitot lines used to measure stack gas velocity pressures (as evidenced by the very low volumetric flow rates). After this run, additional measures were taken to avoid this condition (i.e., the pitot lines were blown out frequently). This run was known to be invalid in the field. Following a review of all test results, however, it appears likely that the flow rates for S-HCl-1 are also biased low, but to a lesser degree. Emission rates were therefore calculated by using only valid volumetric flow rates (if there was no valid flow rate corresponding to the same sampling period, the overall average flow rate was used).

Table 2-2 presents emission results for filterable particulate matter and HCl. Filterable particulate represents material collected in the probe and on the filter, which was heated to a nominal value of 250°F. HCl represents gaseous chlorides that passed through the filter and were collected in a dilute solution of sulfuric acid.

Tables 2-3 and 2-4 present the levels of semivolatile and volatile organic compounds in the samples, including values detected below the method reporting limits. Results reported as not detected are shown as "less than" values based on the numerical reporting limits. The reporting limits differed from run to run based on the sample dilutions and sample volumes. The tables include the concentration results for each sample as well as the average concentration in micrograms per standard cubic meter ($\mu g/m^3$). The emission rates in each table were calculated from the concentration and the corresponding volumetric gas flow rate. An emission rate value shown as 1.81E-3 is equivalent to 1.81×10^{-3}.

As shown in Table 2-3, three phthalates were found in all three runs, but only bis(2-ethylhexyl)phthalate was found at levels significantly above those of the field blank. No other semivolatile organic compounds were found consistently at levels significantly above the field blanks. Phenol was detected, however, in samples for Runs 1 and 2.

As shown in Table 2-4, only chloromethane was found in all three samples. The average chloromethane concentration was 7.4 $\mu g/m^3$, corresponding to an emission rate of 2.9×10^{-4} lb/h.

Table 2-1
Summary of Gas Conditions
Seneca Army Depot (IT JN 519200-005)

	Volumetric Gas Flow			Composition (%)[a]		
Run No.	acfm[b]	dscfm[c]	Temperature (°F)	H_2O	CO_2	O_2
S-HCl-1	37,300	6,600	1434	34	5.5	12.0
S-HCl-2	16,100	2,940	1414	34	4.5	12.5
S-HCl-3	52,500	10,100	1387	32	5.0	12.0
S-MM5-1	53,100	10,700	1381	29	-	-
S-MM5-2	55,300	11,600	1402	25	-	-
S-MM5-3	56,500	11,300	1376	30	-	-
Average	54,300[d]	10,900[d]	1399	31	5.0[e]	12.2[e]

[a] By volume, CO_2 and O_2 are on a dry basis.

[b] acfm = Actual cubic feet per minute.

[c] dscfm = Dry standard cubic feet per minute; standard conditions are 68°F and 29.92 in.Hg.

[d] The average of all MM5 runs and S-HCl-3.

[e] The average CO_2 and O_2 values from the HCl runs were used in the calculations for the MM5 runs.

Table 2-2
Particulate and HCl Emissions[a]
Seneca Army Depot (IT JN 519200-005)

	Filterable Particulate		HCl	
Run No.	gr/dscf	lb/h	ppm	lb/h
S-HCl-1	0.0626	5.87[b]	13	0.82[b]
S-HCl-3	0.0607	5.26	12	0.69
Average	0.0617	5.56	13	0.76

[a] Concentrations are in grains per dry standard cubic foot (gr/dscf, at zero percent moisture, 68°F, and 29.92 in.Hg) and parts per million by volume at zero moisture (ppm); emission rates are in pounds per hour (lb/h).

[b] Calculated using the average volumetric flow rate.

Table 2-3. Semivolatile Emissions

(Seneca Army Depot, Proveout Tests November 4, 1994, JTN 519200-005)

	Concentration, µg/m3				Emission Rate, lb/h			
	Runs				Runs			
Compound	S-MM5-1	S-MM5-2	S-MM5-3	Average	S-MM5-1	S-MM5-2	S-MM5-3	Average
PHENOL	53	136	<40	≤76	2.13E-3	5.93E-3	<1.67E-3	≤3.25E-3
BIS(2-CHLOROETHYL)ETHER	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
-CHLOROPHENOL	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
,3-DICHLOROBENZENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
,4-DICHLOROBENZENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
,2-DICHLOROBENZENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
-METHYLPHENOL	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
,2'-OXYBIS(1-CHLOROPROPANE)	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
-METHYLPHENOL	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
N-NITROSO-DI-n-PROPYLAMINE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
HEXACHLOROETHANE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
NITROBENZENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
SOPHORONE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
-NITROPHENOL	12	<45	9	≤22	4.98E-4	<1.98E-3	3.68E-4	≤9.48E-4
,4-DIMETHYLPHENOL	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
BIS(2-CHLOROETHOXY)METHANE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
,4-DICHLOROPHENOL	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
,2,4-TRICHLOROBENZENE	<44	<45	18	≤36	<1.78E-3	<1.98E-3	7.69E-4	≤1.51E-3
NAPHTHALENE	6	<45	<40	≤30	2.49E-4	<1.98E-3	<1.67E-3	≤1.30E-3
-CHLOROANILINE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
HEXACHLOROBUTADIENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
-CHLORO-3-METHYLPHENOL	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
-METHYLNAPHTHALENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
HEXACHLOROCYCLOPENTADIENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
,4,6-TRICHLOROPHENOL	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
,4,5-TRICHLOROPHENOL	<107	<109	<95	<103	<4.27E-3	<4.75E-3	<4.01E-3	<4.34E-3
-CHLORONAPHTHALENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
-NITROANILINE	<107	<109	<95	<103	<4.27E-3	<4.75E-3	<4.01E-3	<4.34E-3
DIMETHYL PHTHALATE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
ACENAPHTHYLENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
,6-DINITROTOLUENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3
-NITROANILINE	<107	<109	<95	<103	<4.27E-3	<4.75E-3	<4.01E-3	<4.34E-3
ACENAPHTHENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E-3

Continued

Table 2-3. Semivolatile Emissions

(Seneca Army Depot, Proveout Tests November 4, 1994, JTN 519200-005)

Continued

Compound	Concentration, µg/m3				Emission Rate, lb/h			
	Runs				Runs			
	S-MM5-1	S-MM5-2	S-MM5-3	Average	S-MM5-1	S-MM5-2	S-MM5-3	Averag
2,4-DINITROPHENOL	<107	<109	<95	<103	<4.27E-3	<4.75E-3	<4.01E-3	<4.34E
4-NITROPHENOL	<107	<109	<95	<103	<4.27E-3	<4.75E-3	<4.01E-3	<4.34E
DIBENZOFURAN	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
2,4-DINITROTOLUENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
DIETHYLPHTHALATE	54	81	45	60	2.17E-3	3.52E-3	1.91E-3	2.53E
4-CHLOROPHENYL PHENYL ETHER	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
FLUORENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
4-NITROANILINE	<107	<109	<95	<103	<4.27E-3	<4.75E-3	<4.01E-3	<4.34E
4,6-DINITRO-2-METHYLPHENOL	<107	<109	<95	<103	<4.27E-3	<4.75E-3	<4.01E-3	<4.34E
N-NITROSODIPHENYLAMINE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
4-BROMOPHENYL PHENYL ETHER	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
HEXACHLOROBENZENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
PENTACHLOROPHENOL	<107	<109	<95	<103	<4.27E-3	<4.75E-3	<4.01E-3	<4.34E
PHENANTHRENE	4	<45	<40	≤30	1.78E-4	<1.98E-3	<1.67E-3	≤1.28E
ANTHRACENE	<44	<45	4	≤31	<1.78E-3	<1.98E-3	1.67E-4	≤1.31E
CARBAZOLE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
DI-N-BUTYLPHTHALATE	863	309	371	514	3.45E-2	1.35E-2	1.57E-2	2.12E
FLUORANTHENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
PYRENE	<44	7	5	≤19	<1.78E-3	3.16E-4	2.01E-4	≤7.65E
BUTYL BENZYL PHTHALATE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
3,3'-DICHLOROBENZIDINE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
BENZO(A)ANTHRACENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
CHRYSENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
BIS(2-ETHYLHEXYL)PHTHALATE	507	209	711	476	2.03E-2	9.10E-3	3.01E-2	1.98E
DI-N-OCTYL PHTHALATE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
BENZO(B)FLUORANTHENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
BENZO(K)FLUORANTHENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
BENZO(A)PYRENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
INDENO(1,2,3-CD)PYRENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
DIBENZO(A,H)ANTHRACENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E
BENZO(G,H,I)PERYLENE	<44	<45	<40	<43	<1.78E-3	<1.98E-3	<1.67E-3	<1.81E

Table 2-4. Volatile Emissions

(Seneca Army Depot, Proveout Tests November 2-3, 1994, JTN 519200-005)

	Concentration, µg/m3				Emission Rate, lb/h			
	Runs				Runs			
Compound	STO14-1	STO14-2	STO14-3	Average	STO14-1	STO14-2	STO14-3	Average
Dichlorodifluoromethane	<3.0	<3.3	<3.9	<3.4	<1.24E-4	<1.36E-4	<1.48E-4	<1.36E-4
1,2-Dichlorotetrafluoroethane	<4.3	<4.7	<5.5	<4.8	<1.75E-4	<1.92E-4	<2.10E-4	<1.92E-4
Chloromethane	8.0	3.6	10.5	7.4	3.27E-4	1.46E-4	3.97E-4	2.90E-4
Vinyl Chloride	<1.6	<1.7	<2.0	<1.8	<6.38E-5	<7.02E-5	<7.67E-5	<7.03E-5
Bromomethane	<2.4	<2.6	5.9	≤3.6	<9.70E-5	<1.07E-4	2.24E-4	≤1.43E-4
Chloroethane	<1.6	<1.8	<2.1	<1.8	<6.59E-5	<7.25E-5	<7.92E-5	<7.25E-5
Trichlorofluoromethane	<3.4	<3.8	<4.5	<3.9	<1.40E-4	<1.54E-4	<1.69E-4	<1.54E-4
1,1-Dichloroethene	<2.4	<2.7	<3.1	<2.7	<9.90E-5	<1.09E-4	<1.19E-4	<1.09E-4
1,1,2-Trichlorotrifluoroethane	<7.0	<7.7	<9.4	<8.0	<2.87E-4	<3.16E-4	<3.54E-4	<3.19E-4
Methylene Chloride	<3.2	<3.5	<4.2	<3.6	<1.30E-4	<1.43E-4	<1.60E-4	<1.45E-4
1,1-Dichloroethane	<2.5	<2.7	<3.2	<2.8	<1.01E-4	<1.11E-4	<1.21E-4	<1.11E-4
cis-1,2-Dichloroethene	<2.4	<2.7	<3.1	<2.7	<9.90E-5	<1.09E-4	<1.19E-4	<1.09E-4
Chloroform	<3.0	<3.3	<3.9	<3.4	<1.22E-4	<1.34E-4	<1.46E-4	<1.34E-4
1,1,1-Trichloroethane	<3.3	<3.7	<4.3	<3.8	<1.36E-4	<1.50E-4	<1.64E-4	<1.50E-4
Carbon Tetrachloride	<3.8	<4.2	<5.0	<4.4	<1.57E-4	<1.73E-4	<1.89E-4	<1.73E-4
Benzene	28.3	<2.1	<2.5	≤11.0	1.16E-3	<8.78E-5	<9.59E-5	≤4.47E-4
1,2-Dichloroethane	<2.5	<2.7	<3.2	<2.8	<1.01E-4	<1.11E-4	<1.21E-4	<1.11E-4
Trichloroethene	<3.3	<3.6	<4.3	<3.7	<1.34E-4	<1.48E-4	<1.61E-4	<1.48E-4
1,2-Dichloropropane	<2.8	<3.1	<3.7	<3.2	<1.15E-4	<1.27E-4	<1.39E-4	<1.27E-4
cis-1,3-Dichloropropene	<2.8	<3.0	<3.6	<3.1	<1.13E-4	<1.25E-4	<1.36E-4	<1.25E-4
Toluene	8.0	<2.5	10.0	≤6.8	3.29E-4	<1.04E-4	3.77E-4	≤2.70E-4
trans-1,3-Dichloropropene	<2.8	<3.0	<3.6	<3.1	<1.13E-4	<1.25E-4	<1.36E-4	<1.25E-4
1,1,2-Trichloroethane	<3.3	<3.7	<4.3	<3.8	<1.36E-4	<1.50E-4	<1.64E-4	<1.50E-4
Tetrachloroethene	<4.1	<4.6	<5.4	<4.7	<1.69E-4	<1.86E-4	<2.03E-4	<1.86E-4
1,2-Dibromoethane	<4.7	<5.2	<6.1	<5.3	<1.92E-4	<2.11E-4	<2.31E-4	<2.11E-4
Chlorobenzene	<2.8	<3.1	<3.7	<3.2	<1.15E-4	<1.26E-4	<1.38E-4	<1.27E-4
Ethylbenzene	<2.6	<2.9	<3.4	<3.0	<1.08E-4	<1.19E-4	<1.30E-4	<1.19E-4
m/p-Xylene	<2.6	<2.9	6.6	≤4.1	<1.08E-4	<1.19E-4	2.51E-4	≤1.59E-4
o-Xylene	<2.6	<2.9	<3.4	<3.0	<1.08E-4	<1.19E-4	<1.30E-4	<1.19E-4
Styrene	<2.6	<2.9	<3.4	<2.9	<1.06E-4	<1.17E-4	<1.28E-4	<1.17E-4
1,1,2,2-Tetrachloroethane	<4.2	<4.6	<5.4	<4.7	<1.71E-4	<1.89E-4	<2.06E-4	<1.89E-4
1,3,5-Trimethylbenzene	<3.0	<3.3	<3.9	<3.4	<1.23E-4	<1.35E-4	<1.47E-4	<1.35E-4
1,2,4-Trimethylbenzene	<3.0	<3.3	<3.9	<3.4	<1.23E-4	<1.35E-4	<1.47E-4	<1.35E-4
1,3-Dichlorobenzene	<3.7	<4.0	<4.8	<4.2	<1.50E-4	<1.65E-4	<1.80E-4	<1.65E-4
1,4-Dichlorobenzene	<3.7	<4.0	<4.8	<4.2	<1.50E-4	<1.65E-4	<1.80E-4	<1.65E-4
1,2-Dichlorobenzene	<3.7	<4.0	<4.8	<4.2	<1.50E-4	<1.65E-4	<1.80E-4	<1.65E-4
Benzyl Chloride	<3.2	<3.5	<4.1	<3.6	<1.29E-4	<1.42E-4	<1.55E-4	<1.42E-4
1,2,4-Trichlorobenzene	<4.5	<5.0	<5.9	<5.1	<1.85E-4	<2.04E-4	<2.23E-4	<2.04E-4
Hexachlorobutadiene	<6.5	<7.2	<8.5	<7.4	<2.66E-4	<2.93E-4	<3.20E-4	<2.93E-4

3.0 Quality Assurance

3.1 Field Sampling

All of the sampling equipment was calibrated in accordance with the procedures outlined in Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, EPA/4-77-027b. Detailed procedures and calibration records are contained in Appendix E. All equipment used in this test program met the specifications established by EPA for producing accurate test results.

Dry gas meters and digital temperature indicators were also audited on site to ensure that equipment had been transported safely. Meters were audited with a calibrated critical orifice. The acceptance limit for the audit was a Y factor within ±5 percent of the pretest Y. Digital temperature indicators were audited with a millivolt calibration device. The acceptance limit was based on an accuracy within 0.5 percent measured at four different temperatures. Audit data sheets are included in Appendix B.

Checks were made on each sampling train before and after each test to ensure the equipment was leak-free within method tolerances. Isokinetic sampling rates for the particulate trains were all calculated to be within the allowable range of 90 to 110 percent; however, the actual rate for Run S-HCl-1 is probably lower because the measured gas velocity is believed to be biased low. A low isokinetic rate would tend to bias the particulate results higher if the particles are relatively large. The isokinetic rates for the MM5 train were all low because of the high pressure drop across the XAD-2 resin trap. Since this would tend to bias results high, and most results were low or nondetected, results are considered valid.

3.2 Laboratory Analysis

Particulate analysis results of reagent blanks are shown in the following list:

Blank Type	Blank Value
Filter	0.8 mg
Acetone	0.0138 mg/g

Particulate amounts found in the acetone rinse fraction were corrected for the maximum allowable value of 0.01 mg/g.

Analyses of HCl included reagent blanks, laboratory control samples (LCS), and a matrix spike/matrix spike duplicate (MS/MSD). The reagent blanks showed nondetectable amounts, and the LCS recovery was 100 percent. The MS/MSD recoveries were 89/89 percent.

Each organic analysis type included method blanks, multiple-point calibration, and the use of surrogate compounds spiked into each sample. In addition, canister preparations included batch blank checks prior to use. One field blank was collected and analyzed for each sample type. Laboratory control spikes and duplicate injections were also performed.

The canister field blank contained 0.54 part per billion (ppb) toluene compared with sample values of 2.1, <0.66, and 2.6 ppb. It also contained 3.0 ppb methylene chloride, which was not detected in any of the samples. The MM5 field blank contained three phthalates, two of which showed similar levels to those in the samples. The following list shows the results in μg/sample:

Compound	S-MM5-1	S-MM5-2	S-MM5-3	Field Blank
Diethylphthalate	61	89	57	28
Di-n-butylphthalate	970	340	470	340
Bis(2-ethylhexyl)phthalate	570	230	900	13

The method blank contained 7 μg of bis(2-ethylhexyl)phthalate, which is similar to the 13 μg found in the field blank, but insignificant compared with the sample values. Otherwise, method blanks showed nondetectable amounts.

Surrogate recoveries for canisters were all within method limits. Surrogate recoveries for semivolatiles could not be determined when the samples were significantly diluted such that surrogates were either diluted out or were too low to measure accurately. An assessment of the validity of the data was difficult because the recoveries were outside acceptable limits in several cases. The insignificant sample results tend to mitigate the inconsistent recoveries (see Appendix C).

Recoveries for a semivolatile laboratory control sample were within method limits except for pyrene, which showed a slightly high value.

Results of duplicate analyses are shown in the following list for those compounds detected at or above the reporting limits:

Compound	Relative Percent Difference
Chloromethane	1
Bromomethane	3
Toluene	3
m/p-Xylene	2

4.0 Sampling Procedures

Samples were collected in the 42-in.-diameter exhaust stack downstream of the control unit outlet. Two sampling ports are located 9.1 duct diameters downstream from the control device exit and 2.3 duct diameters upstream of the stack exit. A total of 12 traverse points were established for sampling in accordance with EPA Method 1. A sketch of the sampling location is contained in Appendix B.

Procedures described in EPA Methods 1 through 4 were used to measure volumetric exhaust gas flow rate, temperature, and molecular weight (moisture, O_2, and CO_2 content). These data were monitored in conjunction with particulate/HCl and/or semivolatile organic tests. Velocity pressures were measured with an S-type pitot tube and a 0- to 10-in.-H_2O inclined manometer. Temperatures were measured with a Type-K thermocouple and digital indicator. An Orsat analyzer was used to analyze gas bag samples for O_2 and CO_2 content. Moisture content was determined by measuring the weight gain of condensate in the impinger section of the train.

EPA Method TO14 procedures were used to measure volatile organic compound concentrations. Integrated samples were collected in evacuated SUMMA™ canisters and analyzed by gas chromatography/mass spectroscopy (GC/MS). Because no polar compounds were on the target list, no condensate trap was used in front of the canister.

Semivolatile organic compound concentrations were measured by using EPA SW 846 Method 0010, which incorporates GC/MS analysis by Method 8270. Samples were collected isokinetically in a train consisting of a one-piece quartz probe and nozzle, a glass-fiber filter heated to 248° ±25°F, a glass-coil condenser, an XAD-2 resin trap cooled to 68°F or less, a condensate trap, a series of Greenburg-Smith impingers, and related metering equipment. The train components back to and including the condensate trap were rinsed with methanol and methylene chloride after the test. Liquid collected in the condensate trap was retained, but liquid in the impingers was discarded. The filter- and resin-fraction glass containers were wrapped with foil, the condensate and solvent rinses were stored in amber glass containers with Teflon-lined lids, and the samples were packed in blue ice or equivalent to maintain their temperature at 4°C during shipment to the laboratory. At the laboratory, the filter, resin, solvent rinses, and condensate were extracted and combined for one analysis per run.

Particulate and HCl concentrations were measured by use of BIF Method 0050, which incorporates particulate analysis by U.S. EPA Method 5 and HCl analysis by BIF Method 9057. Samples were collected isokinetically in a train consisting of a one-piece quartz probe and nozzle, a glass-fiber filter heated to 248° ±25°F, a series of impingers containing 200 mL of 0.1 N sulfuric acid solution, and related metering equipment. The probe, nozzle, and front half of the filter holder were rinsed with acetone. The filter and residue that remained after the acetone evaporated were each weighed to the nearest 0.5 mg to determine filterable particulate. The impinger solutions and a deionized water rinse of the connecting glassware were combined and analyzed for chloride ion content by ion chromatography.

APPENDIX A

CALCULATIONS

- Example Calculations and Nomenclature
- Particulate HCl
- Semivolatile Organics
- Volatile Organics

Example Calculations for Pollutant Emissions

1. Volume of dry gas samples corrected to standard conditions.
Note: V_m must be corrected for leakage if any leakage rates exceed L_a.

$$V_{m_{std}} = 17.647 \times V_m \times Y \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right]$$

2. Volume of water vapor at standard conditions, ft^3.

$$V_{w_{std}} = 0.04707 \times V_{lc}$$

3. Moisture content in stack gas, volume fraction.

$$B_{ws} = \frac{V_{w_{std}}}{(V_{w_{std}} + V_{m_{std}})}$$

4. Dry molecular weight of stack gas.

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

5. Molecular weight of stack gas.

$$M_s = M_d \times (1 - B_{ws}) + 18 \times B_{ws}$$

6. Stack velocity at stack conditions, ft/s.

$$V_s = 85.49 \times C_p \times (avg\ \sqrt{\Delta P}) \times \sqrt{\frac{T_s}{P_s \times M_s}}$$

7. Stack gas volumetric flow rate at stack conditions, acfm.
Note: A_s = square feet.

$$Q_s = 60 \times V_s \times A_s$$

8. Dry stack gas volumetric flow rate at standard conditions, dscfm.

$$Q_{s_{std}} = 17.647 \times Q_s \times \frac{P_s}{T_s} \times (1 - B_{ws})$$

Correction Factors

$$17.647 = \left(\frac{T_{std}}{P_{std}}\right)$$

$$0.04707 = \left(\frac{ft^3\ H_2O\ vapor}{mL\ liquid}\right)$$

0.44 = molecular weight of $CO_2/100$

0.32 = molecular weight of $O_2/100$

0.28 = molecular weight of $N_2/100$

18 = molecular weight of water (H_2O)

$$85.49 = \frac{ft}{second}\left[\frac{(lb/lb\ -\ mole)(in.Hg)}{(^\circ R)(in.H_2O)}\right]^{1/2}\ *$$

* 40 CFR 60, Appendix A, Method 2.

Example Calculations for Pollutant Emissions

1. Volume of dry gas samples corrected to standard conditions.
Note: V_m must be corrected for leakage if any leakage rates exceed L_a.

$$V_{m_{std}} = 17.647 \times V_m \times Y \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right]$$

2. Volume of water vapor at standard conditions, ft^3.

$$V_{w_{std}} = 0.04707 \times V_{lc}$$

3. Moisture content in stack gas, volume fraction.

$$B_{ws} = \frac{V_{w_{std}}}{(V_{w_{std}} + V_{m_{std}})}$$

4. Dry molecular weight of stack gas.

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

5. Molecular weight of stack gas.

$$M_s = M_d \times (1 - B_{ws}) + 18 \times B_{ws}$$

6. Stack velocity at stack conditions, ft/s.

$$V_s = 85.49 \times C_p \times (avg\ \sqrt{\Delta P}) \times \sqrt{\frac{T_s}{P_s \times M_s}}$$

7. Stack gas volumetric flow rate at stack conditions, acfm.
Note: A_s = square feet.

$$Q_s = 60 \times V_s \times A_s$$

8. Dry stack gas volumetric flow rate at standard conditions, dscfm.

$$Q_{s_{std}} = 17.647 \times Q_s \times \frac{P_s}{T_s} \times (1 - B_{ws})$$

Correction Factors

$$17.647 = \left(\frac{T_{std}}{P_{std}}\right)$$

$$0.04707 = \left(\frac{ft^3\ H_2O\ vapor}{mL\ liquid}\right)$$

0.44 = molecular weight of $CO_2/100$

0.32 = molecular weight of $O_2/100$

0.28 = molecular weight of $N_2/100$

18 = molecular weight of water (H_2O)

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

* 40 CFR 60, Appendix A, Method 2.

Pollutant Emission Rate, lb/h

1a. Concentration in gr/dscf. Note: M_n in milligrams.

$$C_s = 0.01543 \ x \ \frac{M_n}{V_{m\ std}}$$

1b. Concentration in microgram per cubic meter, $\mu g/m^3$. Note: M'_n in micrograms.

$$C_s' = 35.315 \ x \ \frac{M_n',\ \mu g}{V_{m\ std}}$$

2a. Pollutant mass emission rate, lb/h. Note: C_s in gr/dscf.

$$pmr = \frac{C_s}{7000} \ x \ Q_{s\ std} \ x \ 60$$

2b. Pollutant mass emission rate, lb/h. Note: C'_s in $\mu g/m^3$.

$$pmr = C_s' \ x \ (6.243 \ x \ 10^{-11}) \ x \ Q_{s\ std} \ x \ 60$$

3. Isokinetic sampling rate, %.

$$ISO = \frac{100 \ x \ T_s \ x \left[(0.002669 \ x \ V_{lc}) + \left(\frac{V_m}{T_m} \ x \ Y \ x \left(P_{bar} + \frac{\Delta H}{13.6} \right) \right) \right]}{60 \ x \ \theta \ x \ V_s \ x \ P_s \ x \ A_n}$$

Correction Factors

0.01543	= grains per milligram (gr/mg)
35.315	= cubic feet/cubic meter
7000	= grains per pound (gr/lb)
6.243×10^{-11}	$= \left(\frac{\text{lb}}{453.6 \times 10^6\ \mu g}\right) \times \left(\frac{m^3}{35.315\ ft^3}\right)$
0.002669*	$= \frac{(\text{in.Hg})\ (ft^3)}{(\text{mL})\ (^\circ R)}$

* 40 CFR .60, Appendix A, Method 5.

Concentration, ppm

1. Concentration in parts per million by volume (ppmv).

   Note: M_n in mg; $V_{m_{std}}$ in ft^3

$$ppm = \frac{M_n \times 24.04}{V_{m\,std} \times 0.028317 \times MW}$$

2. Emission rate, lb/h.

$$pmr = \frac{ppm \times MW \times Q_{s\,std} \times 60}{385.3 \times 10^6}$$

Correction Factors

0.028317	= cubic meters per cubic feet
24.04	= molar volume, milliliters per millimole
10^6	= microliters per liter
385.3	= molar volume, cubic feet per pound-mole

Nomenclature and Dimensions

A_n = Cross-sectional area of sampling nozzle, sq. ft.

A_s = Cross-sectional area of stack, sq. ft.

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

C = Effluent gas concentration as measured, dry basis, ppm/%

C_{gas} = Effluent gas concentration calibration corrected, dry basis, ppm/%

C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm/%

C_{ma} = Actual concentration of the upscale calibration gas, ppm/%

C_{NO_x} = NO_x concentration, ppm (manual method)

C'_{NO_x} = Nitrogen oxides concentration as NO_2, pounds per dry standard cubic foot (lb/dscf), manual method

C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm/%

C_{O_2} = Effluent gas concentration oxygen corrected, ppm volume dry

C_{obs} = Average THC concentration indicated by gas analyzer, wet basis, ppm

C_p = Pitot tube coefficient, dimensionless

C_s = Concentration of pollutant matter in stack gas - dry basis, grains per standard cubic foot (gr/dscf)

C'_s = Concentration of pollutant matter in stack gas - dry basis, micrograms per normal cubic meter ($\mu g/m^3$)

C_{SO_2} = Concentration of sulfur dioxide, ppm volume (manual method)

Cl_s = Amount of Cl^- in sample, milligrams per liter (mg/L)

%C = Percent weight of carbon in fuel, dry basis

%CO = Percent of carbon monoxide by volume, dry basis

$\%CO_2$ = Percent of carbon dioxide by volume, dry basis

D_n = Sampling nozzle diameter, in.

F = Factor representing a ratio of the volume of dry gases generated to the calorific value of the fuel combusted, dry standard cubic feet per million Btu of heat input (dscf/10^6 Btu)

GCV = Gross calorific value of the fuel on dry basis, Btu/lb

%H = Percent weight of hydrogen in fuel, dry basis

ΔH = Average pressure drop across the sampling meter flow orifice, inches of water (in. H_2O)

HHV = Higher heating value on an as-received basis, Btu/lb

ISO = Percent of Isokinetic sampling rate, percent

IFR = Incinerator feed rate, wet tons/h

L_a = Maximum acceptable leakage rate for either a pretest leak check or for a leak check following a component change; equal to 0.020 cubic foot per minute or 4% of the average sampling rate, whichever is less

M_d = Dry molecular weight, lb/lb-mole

M_f = Fuel firing rate (measured coal to boiler), lb of coal per hour

M_n = Total amount of pollutant matter collected, mg

M'_n = Total amount of pollutant matter collected, micrograms (μg)

M_s = Molecular weight of stack gas (wet basis), lb/lb-mole

MW = Molecular weight, lb/lb-mole

N = Normality of titrant, eq/liter

%N = Percent weight of nitrogen in fuel, dry basis

$\%N_2$ = Percent of nitrogen by volume, dry basis

$\%O_2$ = Percent of oxygen by volume, dry basis

ΔP = Velocity head of stack gas, in.H_2O

P_{bar} = Barometric pressure, inches of mercury (in.Hg)

P_i and P_f = Initial and final flask pressure, measured as vacuum, in.Hg

P_s = Absolute stack gas pressure, in.Hg

P_{stat} = Static pressure of stack gas, in.H_2O

P_{std} = Gas pressure at standard conditions, in.Hg (29.92 in.Hg)

ppm = Parts per million

pmr = Pollutant mass emission rate, pounds per hour (lb/h)

pmr´ = Pollutant mass emission rate, pounds per million Btu of heat input (10^6 Btu)

pmr_{100} = Pollutant mass emission rate, pounds per 100 pounds of feed (lb/100)

P_{NO_x} = Micrograms NO_x, μg (manual method)

Q_H = Total heat input, 10^6 Btu/h

Q_s = Volumetric flow rate - stack conditions, actual cubic feet per minute (acfm)

$Q_{s_{std}}$ = Volumetric flow rate - dry basis at standard conditions, dry standard cubic feet per minute (dscfm)

%S = Percent weight of sulfur in fuel, dry basis

T_i and T_f = Initial and final flask temperature, °F

T_m = Average temperature of dry gas meter, °R

T_s = Average temperature of stack gas, °R

T_{std} = Temperature at standard conditions, (528°R)

V_a = Volume of aliquot titrated, milliliters (mL)

V_f = Flask volume, mL

V_{lc} = Total volume of liquid collected in impingers and silica gel, mL

V_m = Volume of dry gas sampled at meter conditions, cu. ft.

$V_{m_{std}}$ = Volume of dry gas sampled at standard conditions, cu. ft.

V_{NO_x} = NO_x sample volume, mL (manual method)

V_s = Average stack gas velocity at stack conditions, feet per second (ft/s)

V_{sc} = Volume of sample collected, liters (L)

V_{soln} = Volume of sample solution, mL

V_t = Volume of titrant used, mL

V_{tb} = Volume of titrant used for blank, mL

$V_{w_{std}}$ = Volume of water vapor at standard conditions, scf

Y = Dry gas meter calibration factor, dimensionless

θ = Total sampling time, minutes

NOTE: Standard conditions = 68°F and 29.92 in.Hg

INTERNATIONAL TECHNOLOGY CORPORATION

IT AIR QUALITY SERVICES

validated 8/3/94

EMISSION TEST REPORT

FIELD DATA

Plant: **Seneca Army Depot**
Sampling location: **Kiln Stack**
Test time (start-stop): **2018-2136**

Date: **11/2/94**
Run number: **S-HCl-1**

Sample type: **HCl/Part.**
Bar. press. (in. Hg): **29.02**
Static press. (in. H2O): **-0.40**
Filter number(s): **9410092**
Stack dia. or width (in.): **42.00**
Pitot tube coeff.: **0.84**
Total H2O collected (ml): **431.5**
% O2 by volume (dry): **12.0**

Volume correction (cu. ft.): **0.000**
Meter calibration factor: **1.000**
Data interval (min.): **5.0**
Nozzle dia. (in.): **0.413**
Stack length (if rectangular) (in.):
Number of traverse points: **12**
% CO2 by volume (dry): **5.5**
% CO by volume (dry): **0.0**

Sample time (min)		Gas meter reading (cu. ft.)	Velocity head ΔP (in. H2O)	Orifice drop actual ΔH (in. H2O)	Stack Temp. (°F)	Dry gas meter temp. (°F) inlet	outlet
Start 0.0	Initial:	111.221					
			0.180	0.97	1437	50	56
			0.180	0.97	1414	50	55
			0.800	4.00	1430	52	56
			0.550	2.90	1451	58	56
			0.610	3.40	1417	60	56
			0.690	3.80	1409	62	56
			0.130	0.71	1426	56	56
			0.180	0.97	1449	56	56
			0.190	1.00	1446	58	56
			0.210	1.10	1435	60	56
			0.220	1.20	1436	62	56
			0.240	1.30	1462	64	56
Stop 60.0	Final:	150.126					
60.0		**38.905**	**0.348**	**1.86**	**1434**	**57**	**56**

11/21/94

INTERNATIONAL TECHNOLOGY CORPORATION

IT AIR QUALITY SERVICES

validated 8/3/94

EMISSION TEST REPORT

FIELD DATA

Plant: **Seneca Army Depot**
Sampling location: **Kiln Stack**
Test time (start-stop): **1151-1347**

Date: **11/3/94**
Run number: **S-HCl-2**

Sample type: **HCl/Part.**
Bar. press. (in. Hg): **29.60**
Static press. (in. H20): **-0.40**
Filter number(s): **9410086**
Stack dia. or width (in.): **42.00**
Pitot tube coeff.: **0.84**
Total H2O collected (ml): **205.9**
% O2 by volume (dry): **12.5**

Volume correction (cu. ft.): **0.000**
Meter calibration factor: **0.973**
Data interval (min.): **5.0**
Nozzle dia. (in.): **0.413**
Stack length (if rectangular) (in.): **0.00**
Number of traverse points: **12**
% CO2 by volume (dry): **4.5**
% CO by volume (dry): **0.0**

Sample time (min)		Gas meter reading (cu. ft.)	Velocity head ΔP (in. H2O)	Orifice drop actual ΔH (in. H2O)	Stack Temp. (°F)	Dry gas meter temp. (°F) inlet	outlet
Start 0.0	Initial:	111.593					
			0.020	0.18	1380	67	67
			0.020	0.18	1420	68	67
			0.030	0.16	1436	65	65
			0.030	0.11	1409	65	64
			0.030	0.11	1413	65	65
			0.030	0.11	1393	66	66
			0.120	0.46	1414	68	68
			0.180	0.69	1409	69	68
			0.170	0.65	1407	69	68
			0.190	0.72	1423	70	68
			0.030	0.11	1428	71	69
			0.030	0.11	1432	72	69
Stop 60.0	Final:	130.874					
60.0		**19.281**	**0.073**	**0.30**	**1414**	**68**	**67**

11/2/94

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EMISSION TEST REPORT

FIELD DATA

Plant: **Seneca Army Depot**
Sampling location: **Kiln Stack**
Test time (start-stop): **1640-1752**

Date: **11/3/94**
Run number: **S-HCl-3**

Sample type: **HCl/Part.**
Bar. press. (in. Hg): **29.60**
Static press. (in. H20): **-0.40**
Filter number(s): **9410076**
Stack dia. or width (in.): **42.00**
Pitot tube coeff.: **0.84**
Total H2O collected (ml): **440.2**
% O2 by volume (dry): **12.0**

Volume correction (cu. ft.): **0.000**
Meter calibration factor: **0.973**
Data interval (min.): **5.0**
Nozzle dia. (in.): **0.365**
Stack length (if rectangular) (in.): **0.00**
Number of traverse points: **12**
% CO2 by volume (dry): **5.0**
% CO by volume (dry): **0.0**

Sample time (min)		Gas meter reading (cu. ft.)	Velocity head ΔP (in. H2O)	Orifice drop actual ΔH (in. H2O)	Stack Temp. (°F)	Dry gas meter temp. (°F) inlet	outlet
Start 0.0	Initial:	131.569					
			0.720	1.70	1377	64	64
			0.760	1 80	1394	64	64
			0.760	1.80	1383	63	63
			0.640	1.60	1370	64	63
			0.360	0.87	1362	66	63
			0.490	1.20	1362	67	64
			0.830	2.00	1408	68	64
			0.840	2.00	1399	67	64
			0.900	2.20	1388	68	64
			0.760	1.80	1374	68	64
			0.520	1.30	1377	69	65
			0.460	1.10	1450	70	65
Stop 60.0	Final:	177.120					
60.0		**45.551**	**0.670**	**1.61**	**1387**	**67**	**64**

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INTERNATIONAL TECHNOLOGY CORPORATION

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EMISSION TEST REPORT

TEST RESULTS

Plant: **Seneca Army Depot** Test date(s): **11/2/94 11/3/94 11/3/94**

Sampling location: **Kiln Stack**

		Run Numbers			3-Run
		S-HCl-1	S-HCl-2	S-HCl-3	AVERAGE
Ø	Net time of test (min)	60.0	60.0	60.0	
NP	Number of sampling points	12	12	12	
Y	Meter calibration factor	1.000	0.973	0.973	
Dn	Sampling nozzle diameter (in)	0.413	0.413	0.365	
Cp	Pitot tube coefficient	0.84	0.84	0.84	
ΔH	Average orifice pressure drop (in. H2O)	1.86	0.30	1.61	**1.3**
Vm	Volume of dry gas sampled at meter conditions (cu. ft.)	38.905	19.281	45.551	**34.58**
Tm	Average gas meter temperature (°F)	56.6	67.5	65.2	**63.1**
Vmstd	Volume of dry gas sampled at standard conditions (scf)	38.747	18.593	44.257	**33.87**
Vlc	Total H2O collected in impingers and silica gel (ml)	431.5	205.9	440.2	**359.2**
Vwstd	Volume of water vapor at standard conditions (scf)	20.311	9.692	20.720	**16.91**
Bws	Percent moisture by volume, as measured	34.39	34.27	31.89	**33.52**
	Percent moisture by volume, at saturation	100.00	100.00	100.00	**100.00**
	Percent moisture value used in calculations	34.39	34.27	31.89	**33.52**
Fmd	Mole fraction of dry gas	0.656	0.657	0.681	**0.665**
%CO2	Percent CO2 by volume (dry)	5.5	4.5	5.0	**5.0**
%O2	Percent O2 by volume (dry)	12.0	12.5	12.0	**12.2**
%CO	Percent CO by volume (dry)	0.0	0.0	0.0	**0.0**
%N2	Percent N2 by volume (dry)	82.5	83.0	83.0	**82.8**
Md	Molecular weight - dry stack gas	29.36	29.22	29.28	**29.29**
Ms	Molecular weight - stack gas	25.45	25.38	25.68	**25.50**
Pbar	Barometric pressure (in. Hg)	29.02	29.60	29.60	**29.41**
Psi	Static pressure of stack gas (in. H2O)	-0.40	-0.40	-0.40	**-0.40**
Ps	Stack pressure - absolute (in. Hg)	28.99	29.57	29.57	**29.38**
Ts	Average stack gas temperature (°F)	1434.3	1413.7	1387.0	**1411.7**
Vh	Average square root of velocity head (in. H2O)	0.5612	0.2451	0.8116	**0.5393**
Vs	Average stack gas velocity (feet/sec.)	64.57	27.81	90.89	**61.09**
As	Stack area (sq. in.)	1385.4	1385.4	1385.4	**1385.4**
Qs	Actual stack flow rate (acfm)	37,274	16,054	52,469	~~35,266~~
Qsstd	Stack flow rate - dry (scfm)	6,604	2,939	10,097	~~6,547~~
ISO	Percent isokinetic	101.1	109.1	96.7	**102.3**

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EMISSION TEST REPORT

TEST RESULTS

Plant: **Seneca Army Depot** Test date(s): **11/2/94 11/3/94 11/3/94**

Sampling location: **Kiln Stack**

					Run Numbers			3-Run
					S-HCl-1	S-HCl-2	S-HCl-3	AVERAGE
			Mass of pollutant	=	157.3	92.7	174.2	
			If below detection limits, replace 0 with 1.		0	0	0	
Mn	**Filterable particulate**		Mass	mg	157.3	92.7	174.2	
Cs			Concentration	gr/dscf	6.264E-02	7.693E-02	6.073E-02	**6.677E-02**
Cs-7%O2			Concentration @ 7% O2	gr/dscf	9.744E-02	1.267E-01	9.448E-02	**1.062E-01**
Pmr			Emission rate	lb/h	~~3.546E+00~~ 5.867 (2)	1.938E+00	5.256E+00	**~~3.580E+00~~**
			Mass of pollutant	=	22.0	6.8	23.0	
			If below detection limits, replace 0 with 1.		0	1	0	
Mn	**HCl**		Mass	mg	22.0	<6.8	23.0	
PPMv		MW= 36.47	Concentration	PPMv	1.322E+01	<8.514E+00	1.210E+01	**1.128E+01**
Cs			Concentration	gr/dscf	8.761E-03	<5.643E-03	8.019E-03	**7.474E-03**
Pmr			Emission rate	lb/h	~~4.960E-01~~ 0.8207 (2)	<1.422E-01	6.940E-01	**4.440E-01**

AVERAGE RUNS 1+3

0.0617

0.096

5.56

(12.7)

13

0.0084

0.76

JP 11/22

RUN 2 VOID

NOTES: 1) RUN 2 VOID - WATER IN PITOT LINES; FLOWS VERY LOW

2) RUN 1 FLOW ALSO LOOKS LOW - UNLESS OPERATION DATA SHOWS VALID REASON FOR LOW GAS FLOW; ASSUME FLOWS INVALID -

⇒ RECALCULATE RUN 1 lb/h using RUN CONCENTRATION x AVERAGE VALID FLOW RATES (RUN 3 HCl + RUNS 1→3 MMS)

= 10927 DSCFM (54,746 ACFM) (1)(2)

⇒ NEW AVERAGE EMISSION RATES based on AVERAGE OF RUNS 1+3.

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EMISSION TEST REPORT

FIELD DATA

Plant: **Seneca Army Depot**
Sampling location: **Kiln Stack**
Test time (start-stop): **1203-1315**

Date: **11/4/94**
Run number: **S-MM5-1**

Sample type: **MM5-Semivol.**
Bar. press. (in. Hg): **29.55**
Static press. (in. H20): **-0.40**
Filter number(s): **NA**
Stack dia. or width (in.): **42.00**
Pitot tube coeff.: **0.84**
Total H2O collected (ml): **344.6**
% O2 by volume (dry): **12.2**

Volume correction (cu. ft.): **0.000**
Meter calibration factor: **0.973**
Data interval (min.): **5.0**
Nozzle dia. (in.): **0.413**
Stack length (if rectangular) (in.):
Number of traverse points: **12**
% CO2 by volume (dry): **5.0**
% CO by volume (dry): **0.0**

Sample time (min)		Gas meter reading (cu. ft.)	Velocity head ΔP (in. H2O)	Orifice drop actual ΔH (in. H2O)	Stack Temp. (°F)	Dry gas meter temp. (°F) inlet	outlet
Start 0.0	Initial:	177.632					
			0.850	1.50	1386	80	79
			0.870	1.50	1388	82	80
			0.920	1.40	1408	82	80
			0.770	1.40	1387	83	80
			0.420	1.40	1318	84	80
			0.370	1.50	1168	85	81
			0.750	1.30	1425	84	82
			0.900	1.30	1489	84	82
			0.950	1.30	1471	85	82
			0.800	1.30	1415	86	83
			0.490	1.30	1373	87	83
			0.360	1.30	1340	87	83
Stop 60.0	Final:	219.942					
60.0		**42.310**	**0.704**	**1.38**	**1381**	**84**	**81**

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EMISSION TEST REPORT

FIELD DATA

Plant: **Seneca Army Depot**
Sampling location: **Kiln Stack**
Test time (start-stop): **1401-1509**

Date: **11/4/94**
Run number: **S-MM5-2**

Sample type: **MM5-Semivol.**
Bar. press. (in. Hg): **29.55**
Static press. (in. H20): **-0.40**
Filter number(s): **NA**
Stack dia. or width (in.): **42.00**
Pitot tube coeff.: **0.84**
Total H2O collected (ml): **271.7**
% O2 by volume (dry): **12.2**

Volume correction (cu. ft.): **0.000**
Meter calibration factor: **0.973**
Data interval (min.): **5.0**
Nozzle dia. (in.): **0.379**
Stack length (if rectangular) (in.): **0.00**
Number of traverse points: **12**
% CO2 by volume (dry): **5.0**
% CO by volume (dry): **0.0**

Sample time (min)		Gas meter reading (cu. ft.)	Velocity head ΔP (in. H2O)	Orifice drop actual ΔH (in. H2O)	Stack Temp. (°F)	Dry gas meter temp. (°F) inlet	outlet
Start 0.0	Initial:	220.617					
			0.900	1.30	1410	81	81
			1.000	1.30	1408	81	80
			1.000	1.30	1400	81	80
			0.850	1.30	1400	81	80
			0.600	1.30	1391	81	80
			0.570	1.30	1393	81	80
			0.890	1.30	1408	80	79
			0.970	1.30	1413	80	79
			0.850	1.20	1419	81	79
			0.560	1.20	1404	81	79
			0.470	1.20	1394	81	79
			0.470	1.20	1380	81	80
Stop 60.0	Final:	261.926					
60.0		**41.309**	**0.761**	**1.27**	**1402**	**81**	**80**

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EMISSION TEST REPORT

FIELD DATA

Plant: **Seneca Army Depot**
Sampling location: **Kiln Stack**
Test time (start-stop): **1553-1659**

Date: **11/4/94**
Run number: **S-MM5-3**

Sample type: **MM5-Semivol.**
Bar. press. (in. Hg): **29.55**
Static press. (in. H20): **-0.40**
Filter number(s): **NA**
Stack dia. or width (in.): **42.00**
Pitot tube coeff.: **0.84**
Total H2O collected (ml): **398.1**
% O2 by volume (dry): **12.2**

Volume correction (cu. ft.): **0.000**
Meter calibration factor: **0.973**
Data interval (min.): **5.0**
Nozzle dia. (in.): **0.381**
Stack length (if rectangular) (in.): **0.00**
Number of traverse points: **12**
% CO2 by volume (dry): **5.0**
% CO by volume (dry): **0.0**

Sample time (min)	Gas meter reading (cu. ft.)	Velocity head ΔP (in. H2O)	Orifice drop actual ΔH (in. H2O)	Stack Temp. (°F)	Dry gas meter temp. (°F) inlet	outlet
Start 0.0 Initial:	263.290					
		0.870	2.00	1391	77	77
		0.930	1.90	1396	77	76
		0.950	1.90	1401	77	76
		0.770	1.90	1384	77	76
		0.420	1.30	1230	77	76
		0.700	1.80	1375	77	75
		0.810	1.70	1394	77	75
		0.930	1.70	1407	77	75
		0.960	1.70	1409	77	75
		0.770	1.40	1394	77	75
		0.560	1.60	1346	77	75
		0.750	1.50	1390	77	75
Stop 60.0 Final:	310.327					
60.0	**47.037**	**0.785**	**1.70**	**1376**	**77**	**76**

11/21/94

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EMISSION TEST REPORT

TEST RESULTS

Plant: **Seneca Army Depot** Test date(s): **11/4/94** **11/4/94** **11/4/94**

Sampling location: **Kiln Stack**

		Run Numbers			3-Run
		S-MM5-1	S-MM5-2	S-MM5-3	AVERAGE
Ø	Net time of test (min)	60.0	60.0	60.0	
NP	Number of sampling points	12	12	12	
Y	Meter calibration factor	0.973	0.973	0.973	
Dn	Sampling nozzle diameter (in)	0.413	0.379	0.381	
Cp	Pitot tube coefficient	0.84	0.84	0.84	
ΔH	Average orifice pressure drop (in. H2O)	1.38	1.27	1.70	**1.4**
Vm	Volume of dry gas sampled at meter conditions (cu. ft.)	42.310	41.309	47.037	**43.55**
Tm	Average gas meter temperature (°F)	82.7	80.3	76.3	**79.7**
Vmstd	Volume of dry gas sampled at standard conditions (scf)	39.695	38.919	44.694	**41.10**
Vlc	Total H2O collected in impingers and silica gel (ml)	344.6	271.7	398.1	**338.1**
Vwstd	Volume of water vapor at standard conditions (scf)	16.220	12.789	18.739	**15.92**
Bws	Percent moisture by volume, as measured	29.01	24.73	29.54	**27.76**
	Percent moisture by volume, at saturation	100.00	100.00	100.00	**100.00**
	Percent moisture value used in calculations	29.01	24.73	29.54	**27.76**
Fmd	Mole fraction of dry gas	0.710	0.753	0.705	**0.722**
%CO2	Percent CO2 by volume (dry)	5.0	5.0	5.0	**5.0**
%O2	Percent O2 by volume (dry)	12.2	12.2	12.2	**12.2**
%CO	Percent CO by volume (dry)	0.0	0.0	0.0	**0.0**
%N2	Percent N2 by volume (dry)	82.8	82.8	82.8	**82.8**
Md	Molecular weight - dry stack gas	29.29	29.29	29.29	**29.29**
Ms	Molecular weight - stack gas	26.01	26.50	25.95	**26.15**
Pbar	Barometric pressure (in. Hg)	29.55	29.55	29.55	**29.55**
Psi	Static pressure of stack gas (in. H2O)	-0.40	-0.40	-0.40	**-0.40**
Ps	Stack pressure - absolute (in. Hg)	29.52	29.52	29.52	**29.52**
Ts	Average stack gas temperature (°F)	1380.7	1401.7	1376.4	**1386.3**
Vh	Average square root of velocity head (in. H2O)	0.8276	0.8642	0.8808	**0.8575**
Vs	Average stack gas velocity (feet/sec.)	92.01	95.74	97.93	**95.23**
As	Stack area (sq. in.)	1385.4	1385.4	1385.4	**1385.4**
Qs	Actual stack flow rate (acfm)	53,117	55,267	56,532	**54,972**
Qsstd	Stack flow rate - dry (scfm)	10,672	11,640	11,299	**11,204**
ISO	Percent isokinetic	64.1	68.4	80.1	**70.9**

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Semi-Volatile Emissions Calculations

PLANT : Seneca Army Depot, Proveout Tests **DATE :** 11/4/94
PROJECT NO.: 519200-005

				Sample Volume, dscf				Volumetric Flow, dscfm		
				39.695	38.919	44.694		10,672	11,640	11,299
	µg Per Sample*			Concentration, µg/m3				Emission Rate, lb/h		
	Runs			Runs			Average	Runs		
Compound	S-MM5-1	S-MM5-2	S-MM5-3	S-MM5-1	S-MM5-2	S-MM5-3		S-MM5-1	S-MM5-2	S-MM5-3
	60	**150**	50	5.34E+01	1.36E+02	3.95E+01	7.63E+01	2.13E-03	5.93E-03	1.67E-03
ROETHYL)ETHER	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
HENOL	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
ROBENZENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
ROBENZENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
ROBENZENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
HENOL	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
(1-CHLOROPROPANE)	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
HENOL	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
DI-n-PROPYLAMINE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
ROETHANE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
ENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
IE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
NOL	**14**	50	**11**	1.25E+01	4.54E+01	8.69E+00	2.22E+01	4.98E-04	1.98E-03	3.68E-04
YLPHENOL	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
ROETHOXY)METHANE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
ROPHENOL	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
LOROBENZENE	50	50	**23**	4.45E+01	4.54E+01	1.82E+01	3.60E+01	1.78E-03	1.98E-03	7.69E-04
ENE	**7**	50	50	6.23E+00	4.54E+01	3.95E+01	3.04E+01	2.49E-04	1.98E-03	1.67E-03
NILINE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
ROBUTADIENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
3-METHYLPHENOL	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
APHTHALENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
ROCYCLOPENTADIENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
LOROPHENOL	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
LOROPHENOL	120	120	120	1.07E+02	1.09E+02	9.48E+01	1.03E+02	4.27E-03	4.75E-03	4.01E-03
IAPHTHALENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
LINE	120	120	120	1.07E+02	1.09E+02	9.48E+01	1.03E+02	4.27E-03	4.75E-03	4.01E-03
PHTHALATE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
HYLENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
OTOLUENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
LINE	120	120	120	1.07E+02	1.09E+02	9.48E+01	1.03E+02	4.27E-03	4.75E-03	4.01E-03
HENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03

old indicate measured values, although some were less than the quantitation limit; all other results were not detected,
erical quantitation limit used in calculations.

Continued :

INTERNATIONAL TECHNOLOGY CORPORATION

Semi-Volatile Emissions Calculations

PLANT : Seneca Army Depot, Proveout Tests **DATE :** 11/4/94
PROJECT NO.: 519200-005

Continued :

Compound	µg Per Sample* Runs			Concentration, µg/m3 Runs			Average	Emission Rate, lb/h Runs		
	S-MM5-1	S-MM5-2	S-MM5-3	S-MM5-1	S-MM5-2	S-MM5-3		S-MM5-1	S-MM5-2	S-MM5-3
OPHENOL	120	120	120	1.07E+02	1.09E+02	9.48E+01	1.03E+02	4.27E-03	4.75E-03	4.01E-03
ENOL	120	120	120	1.07E+02	1.09E+02	9.48E+01	1.03E+02	4.27E-03	4.75E-03	4.01E-03
URAN	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
OTOLUENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
HTHALATE	**61**	**89**	**57**	5.43E+01	8.08E+01	4.50E+01	6.00E+01	2.17E-03	3.52E-03	1.91E-03
PHENYL PHENYL ETHER	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
E	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
ILINE	120	120	120	1.07E+02	1.09E+02	9.48E+01	1.03E+02	4.27E-03	4.75E-03	4.01E-03
O-2-METHYLPHENOL	120	120	120	1.07E+02	1.09E+02	9.48E+01	1.03E+02	4.27E-03	4.75E-03	4.01E-03
ODIPHENYLAMINE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
HENYL PHENYL ETHER	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
OROBENZENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
LOROPHENOL	120	120	120	1.07E+02	1.09E+02	9.48E+01	1.03E+02	4.27E-03	4.75E-03	4.01E-03
HRENE	**5**	50	50	4.45E+00	4.54E+01	3.95E+01	2.98E+01	1.78E-04	1.98E-03	1.67E-03
ENE	50	50	**5**	4.45E+01	4.54E+01	3.95E+00	3.13E+01	1.78E-03	1.98E-03	1.67E-04
LE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
LPHTHALATE	**970**	**340**	**470**	8.63E+02	3.09E+02	3.71E+02	5.14E+02	3.45E-02	1.35E-02	1.57E-02
THENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
	50	**8**	**6**	4.45E+01	7.26E+00	4.74E+00	1.88E+01	1.78E-03	3.16E-04	2.01E-04
NZYL PHTHALATE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
OROBENZIDINE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
ANTHRACENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
E	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
YLHEXYL)PHTHALATE	**570**	**230**	**900**	5.07E+02	2.09E+02	7.11E+02	4.76E+02	2.03E-02	9.10E-03	3.01E-02
L PHTHALATE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
FLUORANTHENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
FLUORANTHENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
PYRENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
2,3-CD)PYRENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
A,H)ANTHRACENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03
H,I)PERYLENE	50	50	50	4.45E+01	4.54E+01	3.95E+01	4.31E+01	1.78E-03	1.98E-03	1.67E-03

bold indicate measured values, although some were less than the quantitation limit; all other results were not detected,
merical quantitation limit used in calculations.

NTERNATIONAL
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Volatile Emission Calculations

PLANT: Seneca Army Depot
URCE LOCATION: Kiln Stack
DATE: 11/2-3/94

		Volumetric Flow, dscfm		
		10,927	10,927	10,097

		Concentration, ppb				Concentration, µg/m3 †				Emission Rate, lb/h ††			
		RUNS				RUNS				RUNS			
	MW	STO14-1	STO14-2	STO14-3	Average	STO14-1	STO14-2	STO14-3	Average	STO14-1	STO14-2	STO14-3	A
omethane	120.91	<0.60	<0.66	<0.78	<0.68	<3.02	<3.32	<3.92	<3.42	<1.24E-04	<1.36E-04	<1.48E-04	<
rafluoroethane	170.93	<0.60	<0.66	<0.78	<0.68	<4.27	<4.69	<5.55	<4.83	<1.75E-04	<1.92E-04	<2.10E-04	<
e	50.49	3.80	1.70	5.00	3.50	7.98	3.57	10.50	7.35	3.27E-04	1.46E-04	3.97E-04	2
	62.50	<0.60	<0.66	<0.78	<0.68	<1.56	<1.72	<2.03	<1.77	<6.38E-05	<7.02E-05	<7.67E-05	<
e	94.94	<0.60	<0.66	1.50	≤0.92	<2.37	<2.61	5.92	≤3.63	<9.70E-05	<1.07E-04	2.24E-04	≤
	64.52	<0.60	<0.66	<0.78	<0.68	<1.61	<1.77	<2.09	<1.83	<6.59E-05	<7.25E-05	<7.92E-05	<
methane	137.38	<0.60	<0.66	<0.78	<0.68	<3.43	<3.77	<4.46	<3.89	<1.40E-04	<1.54E-04	<1.69E-04	<
hene	96.95	<0.60	<0.66	<0.78	<0.68	<2.42	<2.66	<3.15	<2.74	<9.90E-05	<1.09E-04	<1.19E-04	<
trifluoroethane	187.38	<0.90	<0.99	<1.20	<1.03	<7.02	<7.72	<9.35	<8.03	<2.87E-04	<3.16E-04	<3.54E-04	<
oride	84.94	<0.90	<0.99	<1.20	<1.03	<3.18	<3.50	<4.24	<3.64	<1.30E-04	<1.43E-04	<1.60E-04	<
hane	98.96	<0.60	<0.66	<0.78	<0.68	<2.47	<2.72	<3.21	<2.80	<1.01E-04	<1.11E-04	<1.21E-04	<
oethene	96.94	<0.60	<0.66	<0.78	<0.68	<2.42	<2.66	<3.15	<2.74	<9.90E-05	<1.09E-04	<1.19E-04	<
	119.38	<0.60	<0.66	<0.78	<0.68	<2.98	<3.28	<3.87	<3.38	<1.22E-04	<1.34E-04	<1.46E-04	<
ethane	133.41	<0.60	<0.66	<0.78	<0.68	<3.33	<3.66	<4.33	<3.77	<1.36E-04	<1.50E-04	<1.64E-04	<
hloride	153.82	<0.60	<0.66	<0.78	<0.68	<3.84	<4.22	<4.99	<4.35	<1.57E-04	<1.73E-04	<1.89E-04	<
	78.12	8.70	<0.66	<0.78	≤3.38	28.27	<2.14	<2.53	≤10.98	1.16E-03	<8.78E-05	<9.59E-05	≤
hane	98.96	<0.60	<0.66	<0.78	<0.68	<2.47	<2.72	<3.21	<2.80	<1.01E-04	<1.11E-04	<1.21E-04	<
e	131.29	<0.60	<0.66	<0.78	<0.68	<3.28	<3.60	<4.26	<3.71	<1.34E-04	<1.48E-04	<1.61E-04	<
opane	112.99	<0.60	<0.66	<0.78	<0.68	<2.82	<3.10	<3.67	<3.20	<1.15E-04	<1.27E-04	<1.39E-04	<
opropene	110.97	<0.60	<0.66	<0.78	<0.68	<2.77	<3.05	<3.60	<3.14	<1.13E-04	<1.25E-04	<1.36E-04	<
	92.15	2.10	<0.66	2.60	≤1.79	8.05	<2.53	9.97	≤6.85	3.29E-04	<1.04E-04	3.77E-04	≤
loropropene	110.97	<0.60	<0.66	<0.78	<0.68	<2.77	<3.05	<3.60	<3.14	<1.13E-04	<1.25E-04	<1.36E-04	<
ethane	133.41	<0.60	<0.66	<0.78	<0.68	<3.33	<3.66	<4.33	<3.77	<1.36E-04	<1.50E-04	<1.64E-04	<
ene	165.83	<0.60	<0.66	<0.78	<0.68	<4.14	<4.55	<5.38	<4.69	<1.69E-04	<1.86E-04	<2.03E-04	<
hane	187.88	<0.60	<0.66	<0.78	<0.68	<4.69	<5.16	<6.10	<5.31	<1.92E-04	<2.11E-04	<2.31E-04	<
e	112.56	<0.60	<0.66	<0.78	<0.68	<2.81	<3.09	<3.65	<3.18	<1.15E-04	<1.26E-04	<1.38E-04	<
	106.17	<0.60	<0.66	<0.78	<0.68	<2.65	<2.91	<3.44	<3.00	<1.08E-04	<1.19E-04	<1.30E-04	<
	106.17	<0.60	<0.66	1.50	≤0.92	<2.65	<2.91	6.62	≤4.06	<1.08E-04	<1.19E-04	2.51E-04	≤
	106.17	<0.60	<0.66	<0.78	<0.68	<2.65	<2.91	<3.44	<3.00	<1.08E-04	<1.19E-04	<1.30E-04	<
	104.16	<0.60	<0.66	<0.78	<0.68	<2.60	<2.86	<3.38	<2.95	<1.06E-04	<1.17E-04	<1.28E-04	<
hloroethane	167.85	<0.60	<0.66	<0.78	<0.68	<4.19	<4.61	<5.45	<4.75	<1.71E-04	<1.89E-04	<2.06E-04	<
ylbenzene	120.20	<0.60	<0.66	<0.78	<0.68	<3.00	<3.30	<3.90	<3.40	<1.23E-04	<1.35E-04	<1.47E-04	<
ylbenzene	120.20	<0.60	<0.66	<0.78	<0.68	<3.00	<3.30	<3.90	<3.40	<1.23E-04	<1.35E-04	<1.47E-04	<
enzene	147.01	<0.60	<0.66	<0.78	<0.68	<3.67	<4.04	<4.77	<4.16	<1.50E-04	<1.65E-04	<1.80E-04	<
enzene	147.01	<0.60	<0.66	<0.78	<0.68	<3.67	<4.04	<4.77	<4.16	<1.50E-04	<1.65E-04	<1.80E-04	<
enzene	147.01	<0.60	<0.66	<0.78	<0.68	<3.67	<4.04	<4.77	<4.16	<1.50E-04	<1.65E-04	<1.80E-04	<
de	126.59	<0.60	<0.66	<0.78	<0.68	<3.16	<3.48	<4.11	<3.58	<1.29E-04	<1.42E-04	<1.55E-04	<
obenzene	181.45	<0.60	<0.66	<0.78	<0.68	<4.53	<4.98	<5.89	<5.13	<1.85E-04	<2.04E-04	<2.23E-04	<
tadiene	260.76	<0.60	<0.66	<0.78	<0.68	<6.51	<7.16	<8.46	<7.38	<2.66E-04	<2.93E-04	<3.20E-04	<

tion, µg/m3 = ppb * molecular weight / 24.04
Rate, lb/hr = µg/m3 * dscfm * 60 / 35.315 / 1000000 / 453.6

12/5

12/5/9

APPENDIX B

FIELD DATA

- Field Logs and Pretest Checks
- Particulate/HCl
- Volatiles
- Semivolatiles
- Chain of Custody

INTERNATIONAL TECHNOLOGY CORPORATION

DAILY LOG	DATE	10	24	94
	NO.			1
	SHEET	1	OF	1

FIELD ACTIVITY DAILY LOG

PROJECT NAME: Seneca Army Depot | PROJECT NO.: 519200-005

FIELD ACTIVITY SUBJECT: 1st DAY set-up Activities

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

OC & RW meet & leave hotel @ 0630 - Met Scott Furlong
TAIL GATE SAFETY 0730 ON SITE - Current delay due to inability to get gas hooked up.
Site specific scheduled for afternoon
Still need 40HR & 8HR (607)869-1683
Lead blood test scheduled for 10-25 tues
Robert Rushing believes we could be testing by wedns. Afternoon
Jeff Korb believes testing won't be till friday Afternoon
* J.P. says inform them of needs for **monorail.**
TALKed to Mr. Rushing - he would like us to go to CINCI & Get needed equipment & return
JP called again & I informed him of Mr. Rushing's desire to test. Mr. Rushing will call J.P. after his meeting with others. (Jeff Korb et all)
HAVE DOUG Vehner call J.P.
1145 R.R. & J.K. have talked to J.P.
1150 CALLED J.P.
CUT-OFF ~~Leave Friday morning~~ Regardless

} site is to be tekkl 'C' R.W. DOESN'T HAVE Inserts

OC & R.W. Begin tent set-up & EQUIP. PREP.

DIRECTIONS Hotel to site
Rt 5-20 East to 96A South to 336 East to 96S to Seneca Army Depot ON Right

OC & RW off site @ 1450

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
WEATHER CONDITIONS: FAIR & COOL	IMPORTANT TELEPHONE CALLS: J.P. ITAQS says tell site they will have to prepare stack to Accept monorail,

IT PERSONNEL ON SITE: OC, RW ITAQS CINCI.

SIGNATURE: Doug Vehner DATE: 10-24-94

327A-7-86

INTERNATIONAL TECHNOLOGY CORPORATION

DAILY LOG | DATE 10 25 94 | NO. 2 | SHEET 1 OF 1

FIELD ACTIVITY DAILY LOG

PROJECT NAME Seneca Army Depot | PROJECT NO. 519200-005

FIELD ACTIVITY SUBJECT: 2nd Day on-site

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

DC & RW meet & leave hotel @ 0630
TAIL GATE Safety @ 0730 on site
talked to Robert Rushing
He would like to see monorail equipment Arrive on site & be installed although it appears that no testing will occur this week.
He would like for us to leave all equipment possable on-site, so that he could call us when ready & we could be ready on short notice,
0800 CALLED JOHN PROHASKA
He agrees to an extent - will be alright
Can do next wk or possably week after
0840 TALKED to Mr Rushing - He said that it may not do to have us come back - will discuss with J.P.
1045 CALL J.P. Cinci. FAX - GAME PLAN

Mr. Rushing & Doug Wehner want to be ready to test

SET UP CLEAN-UP & CALIBRATION AREA

DC & RW off site @ 1400 to K-MART

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS. Still awaiting final decision on CREW staying or leaving
WEATHER CONDITIONS: Cloudy & COLD	IMPORTANT TELEPHONE CALLS: JP - CINCI

IT PERSONNEL ON SITE: DC RW

SIGNATURE Doug Wehner DATE: 10-25-94

327A-7-86

INTERNATIONAL TECHNOLOGY CORPORATION

DAILY LOG | DATE 10 26 94 | NO. 3 | SHEET 1 OF 2

FIELD ACTIVITY DAILY LOG

PROJECT NAME Seneca Army Depot | PROJECT NO. 519200-005

FIELD ACTIVITY SUBJECT: MONORAIL Installation & set-up

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

DC & BG meet @ hotel @ 0615
loaded monorail onto blue van & gave white van keys to RW
ck'ed BG through gate
tail gate safety mtg. 0730 - test crew will need lead test
Began monorail intallation
Began train prep
1130 completed monorail set-up
PORTS still need to have some liner removed - told Mr. Rushing - he will have done
Looks like monday will be test day or TUESDAY
1300 completed set-up

1400 DC & BG off site to CINCI

NOTE: Site wants copies of time sheets & Expense reports faxed to them @ (607) 869-1683

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
WEATHER CONDITIONS: Cloudy & Cool	IMPORTANT TELEPHONE CALLS: J.P. CINCI

IT PERSONNEL ON SITE: DC, BG

SIGNATURE DC Curry Cahill DATE: 10-26-94

327A-7-86

INTERNATIONAL TECHNOLOGY CORPORATION

DAILY LOG				
	DATE	10	26	94
	NO.			4
	SHEET	2	OF	2

FIELD ACTIVITY DAILY LOG

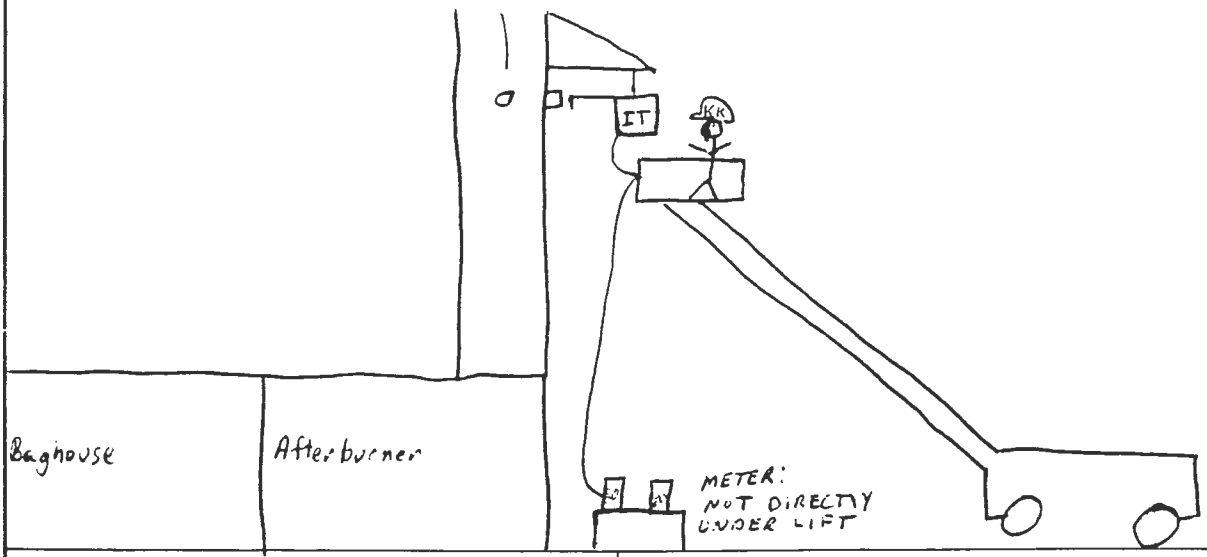
PROJECT NAME Seneca Army Depot	PROJECT NO. 519200-005
FIELD ACTIVITY SUBJECT: Test PLAN	

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

Testing at Seneca Army Depot, Romulus, NY, tentatively scheduled for 11-1-94 will be conducted using a lift to raise sampling trains to monorails already in place. By placing 2"x12"x4' boards on either side of the basket, the lift operater will be able to carefully raise the trains to the monorail and then lower the platform slightly. In this way, two trains could be run simultaneously as long as the operator is extremely careful at port change.

The meter boxes will be placed at ground level near the stack with approximately 70Ft of umbilical attached to the lift.

NOTE: ALL testing must be conducted in level 'C' P.P.E.



VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
WEATHER CONDITIONS:	IMPORTANT TELEPHONE CALLS:
IT PERSONNEL ON SITE:	
SIGNATURE Doug Cahill	DATE: 10-26-94

INTERNATIONAL TECHNOLOGY CORPORATION

FIELD ACTIVITY DAILY LOG

DAILY LOG				
	DATE	10	31	94
	NO.			5
	SHEET	1	OF	1

PROJECT NAME Seneca Army Depot	PROJECT NO. 519200-00500000

FIELD ACTIVITY SUBJECT: Travel

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

Leave for Bethesda to get blood Test @ 1100
Give blood
Leave Bethesda @ 1215 - on road to N.Y.

Stop ≈1800 to call JP - check if any info on plant. Still running according to JP. Continue drive

Arrive @ Hotel 1015 P.M.

Meet w/ Darren DeFabo and discuss plans for testing

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
None	none
WEATHER CONDITIONS:	**IMPORTANT TELEPHONE CALLS:**
Cloudy, rainy ≈50°	call to JP

IT PERSONNEL ON SITE: BGeals, Darren DeFabo

SIGNATURE Brian Geals DATE: 10/31/94

INTERNATIONAL TECHNOLOGY CORPORATION

DAILY LOG				
	DATE	11	1	94
	NO.			6
	SHEET	1	OF	1

FIELD ACTIVITY DAILY LOG

PROJECT NAME Seneca Army Depot | PROJECT NO. 519200-00500000

FIELD ACTIVITY SUBJECT: Emission Testing

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

0615 Meet w/Darren & leave for plant
0700 Arrive & show Darren DeFabo site
0730 TGSM w/ Bob Berger & crew

Weather raining - causing delay, problem feeding soil (mud) to kiln

Obtain field blanks for MM5 & cannister, ready trains for testing

DD & I review HASP w/Bob Berger

Lunch 11-12

Intermittent rain - Robert Rushing wants something done

1500 Suit up to try & test
1600 Go up to stack to get velocity — plant breaks down!

1700 Leave site

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
	No testing done
WEATHER CONDITIONS: Rain, cloudy 50°	IMPORTANT TELEPHONE CALLS: none

IT PERSONNEL ON SITE: B Gaels, Darren DeFabo

SIGNATURE Brian Gaels DATE: 11/1/94

INTERNATIONAL TECHNOLOGY CORPORATION

DAILY LOG	DATE	11	2	94
	NO.			7
	SHEET	1	OF	1

FIELD ACTIVITY DAILY LOG

PROJECT NAME Seneca Army Depot | PROJECT NO. 519200-00500000

FIELD ACTIVITY SUBJECT: Emission Testing

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

Meet @ 0615 drive to plant arrive ≈0700
0730 TGSM - Plant down

Suit up + enter EZ (exclusion zone) to get ready to test + check equip.
≈0800-1000

Call to JP 1015 - status report
Await word on kiln status
Lunch 1100-1200
Get as much ready as we can + wait - ready to test

1800 suit up, enter EZ
Try to do HCl + MM5 - not possible with manlift - too risky for equip.

Start S-HCl-1 @ 2018 (HCl + CANISTERS to better)
End @ 2136 JP

Get weights + leave site ≈1100

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
	Running one train @ a time NO CFC
WEATHER CONDITIONS: Windy 20-30 mph gusts 60° Cloudy	IMPORTANT TELEPHONE CALLS: Call to JP - status report

IT PERSONNEL ON SITE: BGuels D DeFabo

SIGNATURE Brian Guels DATE: 11/2/94

327A-7-86

INTERNATIONAL TECHNOLOGY CORPORATION

DAILY LOG	DATE	11	3	94
	NO.			8
	SHEET	1	OF	2

FIELD ACTIVITY DAILY LOG

PROJECT NAME Seneca Army Depot | PROJECT NO. 519200-00500000

FIELD ACTIVITY SUBJECT: Emission Testing

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

0715 Arrive onsite

0730 TGSM

Plant down - screen to kiln being repaired, will need confined space entry By FerTech - unknown as to when will be repaired

0815 Call to JP

Problem with first run - 25% H_2O but actually 34% → get 101% ISO? Check out box + pitot lines, fax sheets to JP - see if he can find possible mistake

0845 BG goes in to check equip run audit on box, ready for testing

ΔH of box off - pitot leaks + clear (can blow air thru it)

Change to FT-9

≈1000 Kiln back to running begin to suit up for testing

Start Test #2 @ 1201 Problem with low flow (ΔP's) use orsat pump to blow out lines Continue test @ 1243

End Test #2 @ 1347

Come out of EZ - decide to take in new pitot line + have box in basket

Enter EZ @ 1500 ΔP @ stack >0.5 in.H_2O drop pitot line down to Darren - reading >0.5 in H_2O @ his box - will use new pitot line for testing

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS. Change meter box + use new pitot line
WEATHER CONDITIONS: Sunny 60°	IMPORTANT TELEPHONE CALLS: Call to JP - discuss first test results

IT PERSONNEL ON SITE: B Gaals, D DeFabo

SIGNATURE Brian L Harker DATE: 11/3/94

INTERNATIONAL TECHNOLOGY CORPORATION

DAILY LOG	DATE	11	3	94
	NO.			9
	SHEET	2	OF	2

FIELD ACTIVITY DAILY LOG

PROJECT NAME Seneca Army Depot	PROJECT NO. 519200-00500000

FIELD ACTIVITY SUBJECT: Emission Testing

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

Begin #3 HCl test @ 1640
End Test @ 1752

(PM/HCl + CANISTER done together) JP.

Leave EZ to recover trains
Robert Rushing would like us to continue testing, but kiln goes down

Leave site @ 1930

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS. none
WEATHER CONDITIONS: Windy Sunny 60°	IMPORTANT TELEPHONE CALLS: none

IT PERSONNEL ON SITE: B Gaels, D. DeFabo

SIGNATURE Brian L Hinds

DATE: 11/3/94

INTERNATIONAL TECHNOLOGY CORPORATION

DAILY LOG				
	DATE	11	4	94
	NO.		1	0
	SHEET	1	OF	2

FIELD ACTIVITY DAILY LOG

PROJECT NAME: Seneca Army Depot | PROJECT NO.: 514200-00500000

FIELD ACTIVITY SUBJECT: Emission Testing

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

0715 Arrive on site (Plant down)
0730 TGSM - R Rushing has no info on kiln may send us home
We begin packing what we can + get ready for anything

0900 - Kiln running - breaker on motor tripped - For Tech people didn't bother to check it - begin suitting up for test

0940 - Enter EZ Leak check MM5 #1

[note: R Rushing didn't want to waste time with extra Part/HCl runs 1+3 good go with them.]

Filter won't heat - power tripping - run to new source of power still tripping check out line, meter box plug fell apart, get new line - heat on!

Start Test #1 1203 End 1315 Decide to test as long as possible - kiln still running

Start Test #2 1401 End 1509

Start Test #3 1553 End 1659

Teardown equip. + leave EZ

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
	none
WEATHER CONDITIONS: Sunny 70°F	IMPORTANT TELEPHONE CALLS: none

IT PERSONNEL ON SITE: B Gumbs D DeFabo

SIGNATURE: Brian L Gumbs DATE: 11/4/94

INTERNATIONAL TECHNOLOGY CORPORATION

DAILY LOG | DATE 11 4 94 | NO. 1 1 | SHEET 2 OF 2

FIELD ACTIVITY DAILY LOG

PROJECT NAME Seneca Army Depot | PROJECT NO. 519200-00500000

FIELD ACTIVITY SUBJECT: Emission Testing

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

Testing complete

Recover trains, pack + leave site 2030

D. DeFabo to fly home (he needs to check flight schedule)
B Gaels to drive back Sat AM

11/5/94
BGaels leave motel @ 0700
arrive in Cinti 1600

VISITORS ON SITE:	CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS.
	none
WEATHER CONDITIONS: Rain 50° 11/5/94	IMPORTANT TELEPHONE CALLS: none

IT PERSONNEL ON SITE: B Gaels, D DeFabo

SIGNATURE Brian L Gaels DATE: 11/4/94 11/5/94

327A-7-86

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

Plant SENECA ARMY DEPOT

Date 10-25-94

Sampling location Afterburner OUTLET

Inside of far wall to outside of nipple 45 1/2"

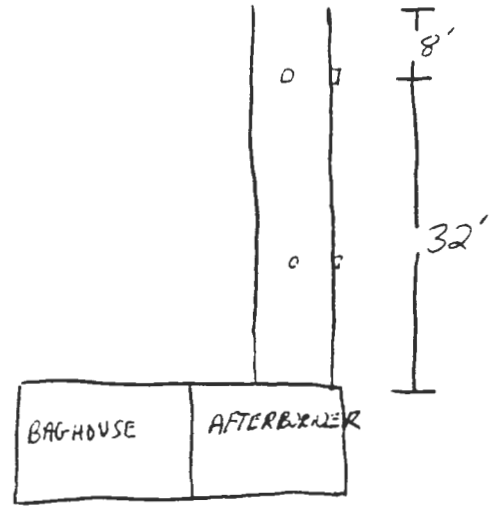
Inside of near wall to outside of nipple (nipple length):
3 1/2"

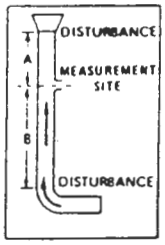
Stack inside diameter, inches 42"

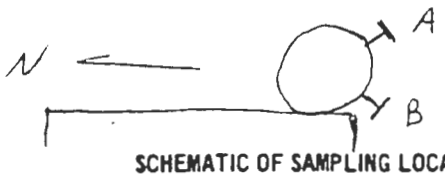
Distance downstream from flow disturbance (Distance B):
384 inches / diameter = 9.1 dd

Distance upstream from flow disturbance (Distance A):
96 inches / diameter = 2.3 dd

Calculated by D. CAHILL







SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)*	NIPPLE LENGTH	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)
1	.044	42	1 7/8	3 1/2	5 5/8
2	.146		6 1/8		9 5/8
3	.296		12 3/8		15 7/8
4	.704		29 5/8		33 1/8
5	.854		35 7/8		39 1/2
6	.956		40 1/8		43 5/8

*The first and last points must be no closer than 1 in. from the stack wall for stack diameters > 24 in. or no closer than 0.5 in. from the stack wall for stack diameters ≤ 24 in.

FIELD AUDIT REPORT: DRY GAS METER
BY CRITICAL ORIFICE

DATE: 10-26-94 CLIENT: Seneca Army Depot

BAROMETRIC PRESSURE (P_{bar}): 29.62 in.Hg METER BOX NO. FT-9

ORIFICE NO. 1 PRETEST Y: .973 ΔH@ 1.56 in.H_2O

ORIFICE K FACTOR: 4.583×10^{-4} AUDITOR: D CAHILL

Orifice manometer reading ΔH, in.H_2O	Dry gas meter reading V_i/V_f, ft³	Temperatures: Ambient T_{ai}/T_{af}, °F	Ambient Average T_a, °F	Dry gas meter Inlet T_{ii}/T_{if}, °F	Dry gas meter Outlet T_{oi}/T_{of}, °F	Dry gas meter Average T_m, °F	Duration of run Ø min.
1.53	67.1	56	56	49	48	50	13 43.05/60
	77.2	56		52	50		

Dry gas meter V_m, ft³	$V_{m_{std}}$, ft³	$V_{m_{act}}$, ft³	Audit, Y	Y deviation, %	Audit ΔH@, in.H_2O	ΔH@ Deviation, in.H_2O
10.1	10.390	9.863	.949	2.4	1.62	0.06

$$V_{m_{std}} = \frac{17.647(V_m)(P_{bar} + \Delta H/13.6)}{(T_m + 460)} \quad (P_{bar}: 29.73;\ T_m + 460: 510) = 10.390 \text{ ft}^3$$

$$V_{m_{act}} = \frac{1203(\text{Ø})(K)(P_{bar})}{(T_a + 460)^{1/2}} \quad (\text{Ø}: 13.72) = 9.863 \text{ ft}^3$$

$$\text{Audit Y} = \frac{V_{m_{act}}}{V_{m_{std}}} = .949 \qquad \text{Y deviation} = \frac{\text{Audit Y} - \text{Pretest Y}}{\text{Pretest Y}} \times 100 =$$

$$\text{Audit ΔH@} = (0.0317)(\Delta H)(P_{bar})(T_m + 460) \left[\frac{\text{Ø}}{Y\,(V_m)(P_{bar} + \Delta H/13.6)}\right]^2 \quad (T_m + 460: 510;\ \text{Ø}: 13.72;\ P_{bar} + \Delta H/13.6: 29.73) = 1.62 \text{ in.}H_2O$$

Audit Y must be in the range, pretest Y ±0.05 Y.
Audit ΔH@ must be in the range pretest ΔH@ ±0.15 inches H_2O.

INTERNATIONAL TECHNOLOGY CORPORATION

DIGITAL INDICATOR AUDIT DATA SHEET

Indicator No. FT-9
Client Seneca Army Depot
Date 10-26-94

Project No. 519200-005
Operator D CAHILL

Test Point No.	Equivalent Temperature F	Digital Indicator Temperature F	% Difference
1	400	398	.23
2	800	799	.08
3	1200	1198	.12
4	1600	1597	.15

Percent Difference Must Be Less Than or Equal To 0.5%

Percent Difference:

$$\frac{(\text{Equivalent Temperature} - \text{Digital Indicator Temperature})(100)}{(\text{Equivalent Temperature} + 460)}$$

FIELD AUDIT REPORT: DRY GAS METER
BY CRITICAL ORIFICE

DATE: 10-26-94 CLIENT: Seneca Army Depot

BAROMETRIC PRESSURE (P_{bar}): 29.62 in.Hg METER BOX NO. FT-S

ORIFICE NO. 11 PRETEST Y: 1.000 ΔH@ 1.85 in.H_2O

ORIFICE K FACTOR: 4.837×10^{-4} AUDITOR: D CAHILL

Orifice manometer reading ΔH, in.H_2O	Dry gas meter reading V_i/V_f, ft³	Temperatures: Ambient T_{ai}/T_{af}, °F	Ambient Average T_a, °F	Dry gas meter Inlet T_{ii}/T_{if}, °F	Dry gas meter Outlet T_{oi}/T_{of}, °F	Dry gas meter Average T_m, °F	Duration of run Ø min.
2.02	73.5	56	56	56	56	60	17 10.12/60
	86.6	56		64	62		

Dry gas meter V_m, ft³	$V_{m_{std}}$, ft³	$V_{m_{act}}$, ft³	Audit Y	Y deviation, %	Audit ΔH@, in.H_2O	ΔH@ Deviation, in.H_2O
13.1	13.235	13.035	.985	1.5	1.91	.06

$$V_{m_{std}} = \frac{17.647(V_m)(P_{bar} + \Delta H/13.6)}{(T_m + 460)} = \frac{17.647(13.1)(29.77 + 1.85/13.6)}{(520)} = 13.235 \text{ ft}^3$$

$$V_{m_{act}} = \frac{1203(\text{Ø})(K)(P_{bar})}{(T_a + 460)^{1/2}} = \frac{1203(17.18)(4.837 \times 10^{-4})(29.77)}{(516)^{1/2}} = 13.035 \text{ ft}^3$$

$$\text{Audit Y} = \frac{V_{m_{act}}}{V_{m_{std}}} = .985 \qquad \text{Y deviation} = \frac{\text{Audit Y} - \text{Pretest Y}}{\text{Pretest Y}} \times 100 =$$

$$\text{Audit } \Delta H@ = (0.0317)(\Delta H)(P_{bar})(T_m + 460)\left[\frac{\text{Ø}}{Y\,(V_m)(P_{bar} + \Delta H/13.6)}\right]^2 = \frac{(0.0317)(1.85)(29.77)(520)}{(17.18)} \left[\frac{17.18}{(.985)(13.1)(29.77 + 1.85/13.6)}\right]^2 = 1.91 \text{ in.}H_2O$$

Audit Y must be in the range, pretest Y ±0.05 Y.
Audit ΔH@ must be in the range pretest ΔH@ ±0.15 inches H_2O.

INTERNATIONAL TECHNOLOGY CORPORATION

DIGITAL INDICATOR AUDIT DATA SHEET

Indicator No. FT-5
Client Seneca Army Depot
Date 10-26-94

Project No. 519200-005
Operator D. CAHILL

Test Point No.	Equivalent Temperature F	Digital Indicator Temperature F	% Difference
1	40C	277	.12
2	800	774	.16
3	1200	1177	.18
4	1600	1577	.15

Percent Difference Must Be Less Than or Equal To 0.5%

Percent Difference:

$$\frac{(\text{Equivalent Temperature} - \text{Digital Indicator Temperature})(100)}{(\text{Equivalent Temperature} + 460)}$$

CANISTER SAMPLING FIELD DATA

Company Seneca Army Depot City Romulus, NY

Sampling Location Kiln Stack Operator BG

Sampling Train Description Charcoal tube, SS probe, MFC, tank

Barometric Pressure, in.Hg 29.02 Ambient Temperature, °F 50

Run No. S-TC14- Canister ID 12260 Flow Controller 53

Blank Probe ID 222 Filter ID —

11/1/94

Canister Vacuum, in.Hg: Pretest ~~29.0~~ 27 Posttest _____

Front-Half Leak Check, in.Hg/5 min: Pretest 0 in.Hg/5 min Posttest _____

Leak-check acceptance criteria: <5 in.Hg/5 min

Sampling Time: Start 1005 Stop _____

Condensate Recovery:* Total Volume, mL — Vial Size, mL —

Condensate Label ID — Liquid Level Marked? —

Run No. _____ Canister ID _____ Flow Controller _____

Probe ID _____ Filter ID _____

Canister Vacuum, in.Hg: Pretest _____ Posttest _____

Front-Half Leak Check, in.Hg/5 min: Pretest _____ Posttest _____

Leak-check acceptance criteria: <5 in.Hg/5 min

* Sampling Time: Start _____ Stop _____

Condensate Recovery:* Total Volume, mL _____ Vial Size, mL _____

Condensate Label ID _____ Liquid Level Marked? _____

Run No. _____ Canister ID _____ Flow Controller _____

Probe ID _____ Filter ID _____

Canister Vacuum, in.Hg: Pretest _____ Posttest _____

Front-Half Leak Check, in.Hg/5 min: Pretest _____ Posttest _____

Leak-check acceptance criteria: <5 in.Hg/5 min

Sampling Time: Start _____ Stop _____

Condensate Recovery:* Total Volume, mL _____ Vial Size, mL _____

Condensate Label ID _____ Liquid Level Marked? _____

---

* Store condensate samples on ice or refrigerated.

MODIFIED METHOD 5 SAMPLE RECOVERY AND INTEGRITY SHEET

Plant Seneca Army Depot — Sample date 11/1/94

Sample location Kiln Stack — Recovery date 11/1/94

Run No. 5-MM5-Blank — Recovered by B Gaels

Filter No(s). N.A

XAD-2 sorbent trap No. 30 IC

MOISTURE

	1st impinger	2nd impinger	3rd impinger	4th impinger	Silica gel
Final volume wt.	499.2 g	549.2 g	574.6 g	480.0 g	744.8 g
Initial volume wt.	499.2 g	549.2 g	574.6 g	480.0 g	744.8 g
Net volume wt.	0 g	0 g	0 g	0 g	0 g
Description of impinger contents					% spent

Total moisture _____ g

RECOVERED SAMPLE

Filter container number(s) 0301 ~~6463~~B — Sealed ✓

Description of particulate on filter none

Probe rinse Container No. 0301 ~~6463~~A _____ Blank Container No. _____

~~Back rinse~~ T-up Container No. 0301 ~~5703~~C _____ Blank Container No. _____

Condensate Container No. _____

Impinger Contents Container No. _____ _____ Blank Container No. _____

Liquid Levels marked ✓ Samples stored and locked _____

Remarks _____

LABORATORY CUSTODY

Received by _____ Date _____

Remarks _____

GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant and City SENECA ARMY DEPOT Date 11/2/94

Sampling Location KILN STACK Clock Time 17:30

Run No. PRELIMINARY Operator DD, BG

Barometric Pressure, in.Hg _____ Static Pressure, in.H_2O -0.4

Moisture, % 25.0 Molecular wt., Dry _____ Pitot Tube, Cp _____

Stack Dimension, in. Diameter or Side 1 42 in Side 2 _____

3.5 ft

$O_2 = 7$

$CO_2 = 7$

WATER IN PITOT

FIELD DATA

TRAVERSE POINT NUMBER	VELOCITY HEAD (ΔP_s), in.H_2O	STACK TEMP., °F
1	0.18	1439
2	0.33	1386
3	0.38	1421
4	0.27	1436
5	0.24	1465
6	0.26	1474

1	0.26
2	0.28
3	0.29
4	0.34
5	0.36
6	0.41

CALCULATIONS

$$M_s = Md \times \left(1 - \frac{H_2O}{100}\right) + 18\left(\frac{H_2O\ \%}{100}\right)$$

$$M_s = (\quad) \times \left(1 - \frac{25}{100}\right) + 18\left(\frac{25}{100}\right)$$

$M_s =$

$T_s =$ °F = °R = (°F + 460)

$$P_s = P_b + \frac{S.P.}{13.6} \cdot (\quad) \div 13.6$$

$P_s =$ in.Hg

$\sqrt{\Delta P} =$

$$V_s = 85.49 \times Cp \times \sqrt{\Delta P} \times \sqrt{\frac{T_s, °R}{P_s \times M_s}}$$

$V_s = 85.49 \times (\quad) \times (\quad) \times \sqrt{\quad}$

$V_s =$ ft/s

$A_s =$ ft²

$$Q_s = V_s \times A_s \times \frac{60\ s}{m}$$

$Q_s =$ x x 60

$Q_s =$ acfm

$$Q_{s_{std}} = Q_s \times 17.647 \times \frac{P_s}{T_s} \times \left(1 - \frac{H_2O\ \%}{100}\right)$$

$Q_{s_{std}} =$ x 17.647 x ——— x (1 - ———)

$Q_{s_{std}} =$ dscfm

$T_{s_{AVG}} = 1437$

FIELD AUDIT REPORT: DRY GAS METER
BY CRITICAL ORIFICE

DATE: 11/3/94 CLIENT: Seneca

BAROMETRIC PRESSURE (P_{bar}): 29.62 in.Hg METER BOX NO. FT-5

ORIFICE NO. 1 PRETEST Y: 1.000 ΔH@ 1.85 in.H_2O

ORIFICE K FACTOR: 4.583×10^{-4} AUDITOR: BG

Orifice manometer reading ΔH, in.H_2O	Dry gas meter reading V_i/V_f, ft³	Temperatures: Ambient T_{ai}/T_{af}, °F	Ambient Average T_a, °F	Dry gas meter Inlet T_{ii}/T_{if}, °F	Dry gas meter Outlet T_{oi}/T_{of}, °F	Dry gas meter Average T_m, °F	Duration of run Ø min.
1.90	161.000	61	62	73	57	65	13:26.96
	171.000	62		73	57		13.45

Dry gas meter V_m, ft³	$V_{m_{std}}$, ft³	$V_{m_{act}}$, ft³	Audit, Y	Y deviation, %	Audit ΔH@, in.H_2O	ΔH@ Deviation, in.H_2O
10.000	10.003	9.614	0.961	3.9%	2.07	0.22

$$V_{m_{std}} = \frac{17.647(V_m)(P_{bar} + \Delta H/13.6)}{(T_m + 460)} = \text{ft}^3$$

(V_m = 10, P_{bar} = 29.76, ΔH = 1.9, T_m = 525)

Recheck

$$V_{m_{act}} = \frac{1203(\text{Ø})(K)(P_{bar})}{(T_a + 460)^{1/2}} = \text{ft}^3$$

(Ø = 13.45, P_{bar} = 29.62, T_a = 522)

$$\text{Audit Y} = \frac{V_{m_{act}}}{V_{m_{std}}} = \qquad \text{Y deviation} = \frac{\text{Audit Y} - \text{Pretest Y}}{\text{Pretest Y}} \times 100 =$$

$$\text{Audit } \Delta H@ = (0.0317)(\Delta H)(P_{bar})(T_m + 460)\left[\frac{\text{Ø}}{Y\,(V_m)(P_{bar} + \Delta H/13.6)}\right]^2 = \text{in.}H_2O$$

(ΔH = 1.9, T_m = 525, Ø = 13.45, V_m = 10, P_{bar} = 29.76)

Audit Y must be in the range, pretest Y ±0.05 Y.
Audit ΔH@ must be in the range pretest ΔH@ ±0.15 inches H_2O.

Clean lines ✓ wrenches ✓
Get Radio ✓ Fyrite bulb ✓

INTERNATIONAL TECHNOLOGY CORPORATION

Emission Testing Field Data

Plant and City	Date	Sampling Location	Sample Type	Run Nu
UFCA ARMY DEPOT (ROMULUS, NY)	11/2/94	KILN STACK	HCl / PART.	S-HCl

Operator(s)	Bar. Press. (In. Hg)	Static Press. (In. H_2O)	Amb. Temp. (°F)	Filter Number(s)	Probe Length and Type	Nozzle Dia. (In.)
DeFino, Brimhall	29.02	-0.4	50	9410092	5 FOOT - QUARTZ	0.413

Meter Box No.	Meter ΔH@	Meter Cal. Factor (Y)	K Factor	Probe Heat (°F)	Box Heat (°F)	Therm. No.	Pitot No.	Imp. Therm. No.	~~Gas Bag~~ Pump No.	Gas Bag Sys. Leak Check	Train Leak Check (Initial) In. Hg	Train Leak Check (Initial) CFM	Train Leak Check (final) In. Hg	Train Leak Check (final) CFM	Pi Initi
#5	1.85	1.000	20.0	>	250	1,39	500	T-97	F75		15	0.005	12	0.002	OK

Sampling Time (min.)	Clock Time (24-hr)	Gas Meter Reading (Vm), ft^3	Velocity Head* (ΔP), In. H_2O	Orifice Pressure Differential (ΔH), In. H_2O* Desired	Orifice Pressure Differential (ΔH), In. H_2O* Actual	Temperature (°F) Stack (T_s)	Dry Gas Meter Inlet (T_{mi})	Dry Gas Meter Outlet (T_{mo})	Probe	Sample Box	Resin	Impinger	Pump Vac. (In. Hg)
0	20:18	111.221											
5	20:23	113.780	0.18	0.97	0.97	1437	50	56		220		44	3.0
10	20:28	115.21	0.18	0.97	0.97	1414	50	55		233		49	3.0
15	20:33	120.130	0.80	4.4	4.0	1430	52	56		238		46	16
20	20:38	125.24	0.55	2.9	2.9	1451	58	58		240		58	
25	20:43	129.860	0.61	3.4	3.4	1417	60	56		242		70	9.0
30	20:48	134.583	0.69	3.8	3.8	1409	62	56		238		60	11.0
	21:06	134.583											
35	21:11	136.640	0.13	0.71	0.71	1426	56	56		236		39	2.0
40	21:16	139.25	0.18	0.97	0.97	1449	56	56		236		39	3.0
45	21:21	141.74	0.19	1.0	1.0	1446	58	56		236		40	3.0
50	21:26	144.42	0.21	1.1	1.1	1435	60	56		237		41	3.5
55	21:31	147.26	0.22	1.2	1.2	1436	62	56		240		41	3.5
60	21:36	150.126	0.24	1.3	1.3	1462	64	56		242		42	4.0
		Vm = 38.905	$\sqrt{\Delta P}$ = 0.56		ΔH = 1.86	$\bar{T}_s$ = 1434	$\bar{T}_m$ = 57						

d pressure differentials to 2 significant figures, e.g., 0.015, 0.88, 1.2, etc. Comments: _____

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Emission Testing Field Data

Plant and City	Date	Sampling Location	Sample Type	Run Num
@ ARMY DEPOT (ROMULUS, NY)	11/13/94	KILN STACK	HCl / PART.	5-HCl-

Operator(s)	Bar. Press. (In. Hg)	Static Press. (In. H_2O)	Amb. Temp. (°F)	Filter Number(s)	Probe Length and Type	Nozzle Dia. (In.)	Nu
BG	29.60	-0.4	64	[redacted] 941009	5' FOOT - QUARTZ	0.413	1

Meter Box No.	Meter ΔH @	Meter Cal. Factor (Y)	K Factor	Probe Heat (°F)	Box Heat (°F)	Therm. No.	Pitot No.	Imp. Therm. No.	Gas Bag Pump No.	Gas Bag Sys. Leak Check	Train Leak Check (Initial) In. Hg	Train Leak Check (Initial) CFM	Train Leak Check (final) In. Hg	Train Leak Check (final) CFM	Pito Cl Initial
FT9	1.56	0.973	13.5	X	250	639	500	J-97	/	/	15	0.004	5.0	0.001	

Sampling Time (min.)	Clock Time (24-hr)	Gas Meter Reading (Vm), ft^3	Velocity Head* (ΔP), In. H_2O	Orifice Pressure Differential (ΔH), In. H_2O* Desired	Orifice Pressure Differential (ΔH), In. H_2O* Actual	Temperature (°F) Stack (T_s)	Dry Gas Meter Inlet (T_{mi})	Dry Gas Meter Outlet (T_{mo})	Probe	Sample Box	Resin	Imp-inger	Pump Vac. (In. Hg)
0	11:51	110.593											
5			0.02	0.09	0.18	1320	69.7	60.6		241		54	1.0
10	12:01	114.722	0.02	0.08	0.18	1470	66.5	67.3		242		54	1.0
15	12:04	115.6	0.03	0.11	0.16	1436	64.9	64.7		246		56	1.0
20		116.7	0.03	0.11	0.11	1469	64.6	64.4		246		60	1.0
25		117.87	0.03	0.11	0.11	1413	65.4	65.0		246		60	1.0
30	13:04	118.881	0.03	0.11	0.11	1373	66.0	65.6		246		60	1.0
	13:17	118.881											
35	13:22	121.20	0.12	0.46	0.46	1414	68.1	62.7		242		57	2.0
40	13:27	123.51	0.16	0.69	0.69	1409	68.9	68.2		246		55	3.0
45	13:32	126.04	0.17	0.65	0.65	1407	69.4	68.3		251		55	3.0
50	13:37	128.58	0.19	0.72	0.72	1423	70.0	68.5		249		55	3.5
55	13:42	129.745	0.07	0.11	0.11	1429	70.7	68.7		247		57	1.0
60	13:47	130.674	0.03	0.11	0.11	1432	71.5	69.1		245		59	1.0
		Vm = 19.281											
			$\overline{\Delta P}$ = 0.245		$\overline{\Delta H}$ 0.294								
						$\overline{T_s}$ = 1418	$\overline{T_m}$ = 68						

*pressure differentials to 2 significant figures, e.g., 0.015, 0.88, 1.2, etc. Comments: * Blew out pitot lines alle

(continue on reverse

INTERNATIONAL TECHNOLOGY CORPORATION

Emission Testing Field Data

Plant and City	Date	Sampling Location	Sample Type	Run
FCA ARMY DEPOT (ROMULUS, NY)	11/13/94	KILN STACK	HCl / PART.	5-H

Operator(s)	Bar. Press. (In. Hg)	Static Press. (In. H_2O)	Amb. Temp. (°F)	Filter Number(s)	Probe Length and Type	Noz Dia. (In.)
DD, BG	29.60	-0.4	65	94/0076	5' FOOT - QUARTZ	0.365 / 0.367

ure	Meter Box No.	Meter Δ H @	Meter Cal. Factor (Y)	K Factor	Probe Heat (°F)	Box Heat (°F)	Therm. No.	Pitot No.	Imp. Therm. No.	Gas Bag Pump No.	Gas Bag Sys. Leak Check	Train Leak Check (Initial) In. Hg	Train Leak Check (Initial) CFM	Train Leak Check (final) In. Hg	Train Leak Check (final) CFM
3	FT-9	1.56	0.973	8.4	X	250	479	003	T-97	X	X	25	0.004	8.0	0.002

rse No.	Sampling Time (min.)	Clock Time (24-hr)	Gas Meter Reading (Vm), ft^3	Velocity Head* (ΔP), In. H_2O	Orifice Pressure Differential (ΔH), In. H_2O* Desired	Orifice Pressure Differential (ΔH), In. H_2O* Actual	Temperature (°F) Stack (T_s)	Dry Gas Meter Inlet (T_{mi})	Dry Gas Meter Outlet (T_{mo})	Probe	Sample Box	Resin	Impinger	Pump Vac. (In. Hg)
	0	16:40	131.569											
A	5	16:45	135.32	0.72	1.7	1.7	1377	63.5	63.5		246		58	4.5
	10	16:50	139.33	0.76	1.8	1.8	1394	63.5	63.5		261		53	7.0
	15	16:55	143.25	0.76	1.8	1.8	1383	63	63		261		60	7.0
	20	17:00	147.2	0.64	1.6	1.6	1370	64	63		251		70	5.5
	25	17:05	149.93	0.36	0.87	0.87	1362	66	63		253		60	3.5
	30	17:10	153.315	0.49	1.2	1.2	1362	67	64		251		57	4.0
		17:22	153.315											
B	35	17:27	157.04	0.83	2.0	2.0	1408	68	64		249		50	6.0
	40	17:32	161.40	0.84	2.0	2.0	1399	67	64		266		46	6.5
	45	17:37	165.60	0.90	2.2	2.2	1388	68	64		266		46	7.0
	50	17:42	169.68	0.76	1.8	1.8	1374	68	64		261		50	6.0
	55	17:47	173.20	0.52	1.3	1.7	1377	69	65		247		51	4.0
	60	17:52	177.120	0.46	1.1	1.1	1450	70	65		249		53	3.5
			V_m = 45.551	$\sqrt{\Delta P}$ = 0.812		ΔH = 1.61	T_s = 1387		T_m = 65.1					

*Record pressure differentials to 2 significant figures, e.g., 0.015, 0.88, 1.2, etc. Comments: _____

(continue on

INTERNATIONAL TECHNOLOGY CORPORATION

HF/HCl/Cl_2 TRAIN
SAMPLE RECOVERY AND INTEGRITY SHEET

Plant SENECA ARMY DEPOT
Sample location KILN STACK
Run number S-HCl-1
Filter type 941009?

Sample date 11/2/94
Recovery date 11/3/94
Recovered by BG, DD

MOISTURE MT

Impingers	Condensate	1st	2nd	3rd	~~4th~~	4~~5~~th
Contents	Empty	0.1N H_2SO_4		~~0.1N NaOH~~	/	Silica gel
Final wt/vol	/ g	761.4 g	725.7 g	538.0 g	/ g	669.1 g
Initial wt/vol	/ g	586.9 g	616.1 g	508.6 g	/ g	651.1 g
Net Gain	/ g	274.5 g	109.6 g	29.4 g	/ g	18.0 g

Description of impinger water Clear

Total moisture 431.5 g ✓ JP 11/8

RECOVERED SAMPLE

	Sample solution/rinse container numbers	Sealed/liquid level marked
0.1N H_2SO_4 solution and DI water rinse	0306A	Y
0.1N NaOH solution and DI water rinse	N/A	N/A
FILTER (S-HCl-1 = 941009)	0305B	N/A
FRONT RINSE	0305A	Y

Samples stored and locked
Remarks Filter lgt brown/tan color, hvy but not loose BG 11/8/94

INTERNATIONAL TECHNOLOGY CORPORATION

HF/HCl/Cl_2 TRAIN
SAMPLE RECOVERY AND INTEGRITY SHEET

Plant Seneca Army Depot
Sample location Kiln Stack
Run number S-HCl-02
Filter type 94100886

Sample date 11/3/94
Recovery date 11/3/94
Recovered by DD

MOISTURE

MT

Impingers Contents	Condensate Empty	1st 0.1N H_2SO_4	2nd 0.1N H_2SO_4	3rd ~~0.1N NaOH~~	4th	5th Silica gel
Final wt/vol	____ g	811.3 g	593.4 g	509.7 g	____ g	711.3 g
Initial wt/vol	____ g	588.6 g	616.6 g	507.7 g	____ g	706.9 g
Net Gain	____ g	222.7 g	-23.2 g	1.0 g	____ g	4.4 g

Description of impinger water Clear

Total moisture 205.9 g ✓ JP 11/8

RECOVERED SAMPLE

	Sample solution/rinse container numbers	Sealed/liquid level marked
0.1N H_2SO_4 solution and DI water rinse	0308A	Y
0.1N NaOH solution and DI water rinse	N/A	N/A
FILTER/94100886	0307B	✓ N/A
~~Back half~~	~~0308A~~	Y
Acetone Rinse	3074	✓

Samples stored and locked
Remarks Filter- light brown, light part. BLB 11/8/94

INTERNATIONAL TECHNOLOGY CORPORATION

HF/HCl/Cl_2 TRAIN
SAMPLE RECOVERY AND INTEGRITY SHEET

Plant SENECA ARMY DEPOT
Sample location KILN STACK
Run number S-HCl-3
Filter type 94.20TF

Sample date 11/3/94
Recovery date 11/3/94
Recovered by DD

MOISTURE

Impingers Contents	Condensate Empty	1st 0.1N H_2SO_4	2nd 0.1N H_2SO_4	3rd ~~0.1N NaOH~~	4th ~~0.1N NaOH~~	5th Silica gel
Final wt/vol	____ g	693.7 g	716.8 g	530.9 g	____ g	729.7 g
Initial wt/vol	____ g	500.2 g	620.0 g	508.4 g	____ g	714.3 g
Net Gain	____ g	193.5 g	96.8 g	22.5 g	____ g	15.4 g

Description of impinger water Clear

Total moisture 446.2 g ✓ JF 11/8

RECOVERED SAMPLE

	Sample solution/rinse container numbers	Sealed/liquid level marked
0.1N H_2SO_4 solution and DI water rinse	310A	✓
0.1N NaOH solution and DI water rinse	N/A	
Filter	309B	✓
Acetone Rinse	309A	✓

Samples stored and locked
Remarks Filter lt brown in color, hazy but not loose
BLE 11/9/94

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DRY MOLECULAR WEIGHT DETERMINATION

LANT Seneca Army Depot
ATE 11/2/94 TEST NO S-HC1-1
AMPLING TIME (24-hr CLOCK)
AMPLING LOCATION Kiln Stack
AMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) Bag
NALYTICAL METHOD Orsat
MBIENT TEMPERATURE 50
PERATOR BG
ORSAT LEAK CHECKED ✓

COMMENTS: #423

RUN / GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGH STACK GAS (DRY B M_d, lb 'lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
O_2	5.5	5.5	5.5	5.5		5	5.5	44/100	
2 (NET IS ACTUAL O_2 EADING MINUS ACTUAL O_2 READING)	17.5	12.0	17.5	12.0			12.0	32/100	
O (NET IS ACTUAL CO EADING MINUS ACTUAL 2 READING)							JF 11/8	28/100	
2 (NET IS 100 MINUS CTUAL CO READING)								28/100	
							TOTAL		

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DRY MOLECULAR WEIGHT DETERMINATION

LANT Screen Army Depot
ATE 11/3/94 TEST NO S-HC1-2
AMPLING TIME (24-hr CLOCK)
AMPLING LOCATION Kiln Stack
AMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) Bag
NALYTICAL METHOD Orsat
MBIENT TEMPERATURE 45
PERATOR BG
RSAT LEAK CHECKED ✓

COMMENTS: #423

RUN / GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGH STACK GAS (DRY BA M_d, lb 'lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
O_2	4.5	4.5	4.5	4.5			4.5	44/100	
$_2$ (NET IS ACTUAL O_2 EADING MINUS ACTUAL O_2 READING)	17.0	12.5	17.0	12.5			12.5	32/100	
O (NET IS ACTUAL CO EADING MINUS ACTUAL $_2$ READING)							✓ 11/8	28/100	
$_2$ (NET IS 100 MINUS CTUAL CO READING)								28/100	
								TOTAL	

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DRY MOLECULAR WEIGHT DETERMINATION

LANT Screen Army Depot
ATE 11/3/94 TEST NO S-AC1-3
AMPLING TIME (24-hr CLOCK)
AMPLING LOCATION Kiln Stack
AMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) Bag
NALYTICAL METHOD Orsat
MBIENT TEMPERATURE 45
PERATOR BG
ORSAT LEAK CHECKED ✓

COMMENTS: #423

RUN / GAS	1		2		3		AVERAGE NET VOLUME	MULTIPLIER	MOLECULAR WEIGH STACK GAS (DRY B M_d, lb/lb-mole
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET			
O_2	5.0	5.0	5.0	5.0			5.0	44/100	
2 (NET IS ACTUAL O_2 EADING MINUS ACTUAL O_2 READING)	17.0	12.0	17.0	12.0			12.0	32/100	
0 (NET IS ACTUAL CO EADING MINUS ACTUAL 2 READING)							✓ JP 11/8	28/100	
2 (NET IS 100 MINUS CTUAL CO READING)								28/100	
								TOTAL	

CANISTER SAMPLING FIELD DATA

Company Seneca City Romulus, NY

Sampling Location Stack Operator BG

Sampling Train Description Probe, MFC, Tank

Barometric Pressure, in.Hg 29.02 Ambient Temperature, °F 40

Run No. S-TS14-1 Canister ID 12156 Flow Controller 53

11/2/94 Probe ID 222 Filter ID —

Canister Vacuum, in.Hg: Pretest 27 Posttest 10

Front-Half Leak Check, in.Hg/5 min: Pretest 0/5 Posttest 0/5

Leak-check acceptance criteria: <5 in.Hg/5 min

Sampling Time: Start (Start) 2033/2112 (Restart) Stop 2153/2138

Condensate Recovery:* Total Volume, mL — Vial Size, mL —

Condensate Label ID — Liquid Level Marked? —

Run No. _____ Canister ID _____ Flow Controller _____

Probe ID _____ Filter ID _____

Canister Vacuum, in.Hg: Pretest _____ Posttest _____

Front-Half Leak Check, in.Hg/5 min: Pretest _____ Posttest _____

Leak-check acceptance criteria: <5 in.Hg/5 min

Sampling Time: Start _____ Stop _____

Condensate Recovery:* Total Volume, mL _____ Vial Size, mL _____

Condensate Label ID _____ Liquid Level Marked? _____

Run No. _____ Canister ID _____ Flow Controller _____

Probe ID _____ Filter ID _____

Canister Vacuum, in.Hg: Pretest _____ Posttest _____

Front-Half Leak Check, in.Hg/5 min: Pretest _____ Posttest _____

Leak-check acceptance criteria: <5 in.Hg/5 min

Sampling Time: Start _____ Stop _____

Condensate Recovery:* Total Volume, mL _____ Vial Size, mL _____

Condensate Label ID _____ Liquid Level Marked? _____

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* Store condensate samples on ice or refrigerated.

CANISTER SAMPLING FIELD DATA

Company Seneca Army Depot City Romulus

Sampling Location Stack Operator BG

Sampling Train Description Probe, MFC, Tank

Barometric Pressure, in.Hg 29.62 Ambient Temperature, °F 50

Run No. S-TC14-2 Canister ID 12826 Flow Controller 53

11/3/94 Probe ID 222 Filter ID —

Canister Vacuum, in.Hg: Pretest 27.3 Posttest 9

Front-Half Leak Check, in.Hg/5 min: Pretest 0/5 Posttest 0/5

Leak-check acceptance criteria: <5 in.Hg/5 min

Sampling Time: Start 1154 / 1240 Stop 26 min 1220 / 1314 final

Condensate Recovery:* Total Volume, mL — Vial Size, mL —

Condensate Label ID — Liquid Level Marked? —

Run No. S-TC14-3 Canister ID 0040 Flow Controller 53

11/3/94 Probe ID 222 Filter ID —

Canister Vacuum, in.Hg: Pretest 28 Posttest 9

Front-Half Leak Check, in.Hg/5 min: Pretest ______ Posttest ______

Leak-check acceptance criteria: <5 in.Hg/5 min

Sampling Time: Start 1641 / restart 1716 Stop 1714 / 1743

Condensate Recovery:* Total Volume, mL — Vial Size, mL —

Condensate Label ID — Liquid Level Marked? —

Run No. ______ Canister ID ______ Flow Controller ______

Probe ID ______ Filter ID ______

Canister Vacuum, in.Hg: Pretest ______ Posttest ______

Front-Half Leak Check, in.Hg/5 min: Pretest ______ Posttest ______

Leak-check acceptance criteria: <5 in.Hg/5 min

Sampling Time: Start ______ Stop ______

Condensate Recovery:* Total Volume, mL ______ Vial Size, mL ______

Condensate Label ID ______ Liquid Level Marked? ______

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* Store condensate samples on ice or refrigerated.

C3572A-03.FM/CANISTER.SAM/sm

INTERNATIONAL TECHNOLOGY CORPORATION

Emission Testing Field Data

Plant and City	Date	Sampling Location	Sample Type	Run Nu
ICA ARMY DEPOT (ROMULUS, NY)	11 14 19 4	KILN STACK	MM5 - SEMIVOL	3 - MM5

Operator(s)	Bar. Press. (In. Hg)	Static Press. (In. H_2O)	Amb. Temp. (°F)	Filter Number(s)	Probe Length and Type	Nozzle Dia. (In.)
D, BG	29.55	-0.4	71.	2 / 0	5 FOOT - QUARTZ	0.413

Meter Box No.	Meter Δ H @	Meter Cal. Factor (Y)	K Factor	Probe Heat (°F)	Box Heat (°F)	Therm. No.	Pitot No.	Imp. Therm. No.	Gas Bag Pump No.	Gas Bag Sys. Leak Check	Train Leak Check (Initial) In. Hg	Train Leak Check (Initial) CFM	Train Leak Check (final) In. Hg	Train Leak Check (final) CFM	Pit Initia
FT. 9	1.56	0.973	14.4	X	250	429	003	I-97	X	X	16	0.004	16.5	0.007	OK

Sampling Time (min.)	Clock Time (24-hr)	Gas Meter Reading (Vm), ft^3	Velocity Head* (ΔP), In. H_2O	Orifice Pressure Differential (ΔH), In. H_2O* Desired	Orifice Pressure Differential (ΔH), In. H_2O* Actual	Temperature (°F) Stack (T_s)	Dry Gas Meter Inlet (T_{mi})	Dry Gas Meter Outlet (T_{mo})	Probe	Sample Box	Resin	Impinger	Pump Vac. (In. Hg)
0	12:03	177.632											
5	12:08	181.28	0.85	3.6	1.5	1356	[redacted]	[redacted]		263	57	57	15.
10	12:13	184.920	0.87	3.7	1.5	1388	82	80		262	58	56	15.0
15	12:18	188.530	0.92	3.8	1.4	1408	82	80		260	61	59	15.0
20	12:23	192.14	0.77	3.2	1.4	1387	83	80		257	66	60	15.0
25	12:28	195.72	0.42	1.8	1.4	1318	84	80		253	68	60	15.0
30	12:33	199.484	0.37	1.8	1.5	1168	85	81		251	65	60	15.0
	12:45	199.484											
35	12:50	202.910	0.75	3.1	1.3	1425	84	82		256	65	63	15.0
40	12:55	206.30	0.90	3.6	1.3	1489	84	82		261	68	62	15.0
45	13:00	209.94	0.95	3.9	1.3	1471	85	82		259	60	63	15.5
50	13:05	213.45	0.80	3.3	1.3	1415	86	83		261	59	65	15.5
55	13:10	216.85	0.49	2.1	1.3	1373	87	83		255	60	66	15.5
60	13:15	219.942	0.36	1.5	1.3	1340	87	83		253	61	66	15.5

* pressure differentials to 2 significant figures, e.g., 0.015, 0.88, 1.2, etc. Comments: _____

(continue on reve

INTERNATIONAL TECHNOLOGY CORPORATION

Emission Testing Field Data

Plant and City	Date	Sampling Location	Sample Type	Run Nu
A ARMY DEPOT (ROMULUS, NY)	11 14 94	KILN STACK	MM5- SEMIVOL	5- MM

Operator(s)	Bar. Press. (In. Hg)	Static Press. (In. H2O)	Amb. Temp. (°F)	Filter Number(s)	Probe Length and Type	Nozzle Dia. (in.)	N
BG	29.55	-0.4	27	N/A	5 FOOT - QUARTZ	0.379	

Meter Box No.	Meter ΔH @	Meter Cal. Factor (Y)	K Factor	Probe Heat (°F)	Box Heat (°F)	Therm. No.	Pitot No.	Imp. Therm. No.	Gas Bag Pump No.	Gas Bag Sys. Leak Check	Train Leak Check (Initial) In. Hg	Train Leak Check (Initial) CFM	Train Leak Check (final) In. Hg	Train Leak Check (final) CFM	Pitot C Initia
FT-9	1.56	0.973	16.2	X	250	~~5~~ 128 (F)	H1	I-97	X	X	15.5	0.007	20	0.01	1.0

Sampling Time (min.)	Clock Time (24-hr)	Gas Meter Reading (Vm), ft³	Velocity Head* (ΔP), in. H2O	Orifice Pressure Differential (ΔH), in. H2O* Desired	Orifice Pressure Differential (ΔH), in. H2O* Actual	Temperature (°F) Stack (Ts)	Dry Gas Meter Inlet (Tmi)	Dry Gas Meter Outlet (Tmo)	Probe	Sample Box	Resin	Impinger	Pump Vac. (in. Hg)
0	14:01	220.617											
5	14:06	224.14	0.90	2.7	1.3	1410	81	81		254	60	61	15.5
10	14:11	227.67	1.0	3.0	1.3	1408	81	80		255	62	60	15.5
15	14:16	231.3	1.0	3.0	1.3	1400	81	80		253	60	58	15.5
20	14:21	234.7	0.85	2.5	1.3	1400	81	80		253	59	61	15.5
25	14:26	238.3	0.60	~~1.8~~ 1.8	1.3	1391	81	80		253	61	63	16.5
30	14:31	241.835	0.57	1.7	1.3	1393	81	80		253	63	63	15.5
	14:39	241.835	0			~~1408~~							
35	14:44	245.1	0.89	2.6	1.3	1408	80	79		251	59	57	15.5
40	14:49	248.5	0.97	2.8	1.3	1413	80	79		254	61	57	15.5
45	14:54	252.0	0.85	2.5	1.2	1419	81	79		251	65	58	16.0
50	14:59	255.3	0.56	1.7	1.2	1404	81	79		251	62	57	16.0
55	15:04	258.6	0.47	1.4	1.2	1394	81	78		251	56	58	16.0
60	15:09	261.926	0.47	1.4	1.2	1380	81	80			55	59	16.0

pressure differentials to 2 significant figures, e.g., 0.015, 0.88, 1.2, etc. Comments: _____

(continue on revers

INTERNATIONAL TECHNOLOGY CORPORATION

Emission Testing Field Data

Plant and City	Date	Sampling Location	Sample Type	Run Nu
FEA ARMY DEPOT (ROMULUS, NY)	11/14/84	KILN STACK	MM5 - SEMIVOL	5-MM5

Operator(s)	Bar. Press. (In. Hg)	Static Press. (In. H₂O)	Amb. Temp. (°F)	Filter Number(s)	Probe Length and Type	Nozzle Dia. (In.)	N
, BG	29.55	-0.4	75	N/A	5 FOOT - QUARTZ	0.381	

Meter Box No.	Meter ΔH @	Meter Cal. Factor (Y)	K Factor	Probe Heat (°F)	Box Heat (°F)	Therm. No.	Pitot No.	Imp. Therm. No.	Gas Bag Pump No.	Gas Bag Sys. Leak Check	Train Leak Check (Initial) In. Hg	Train Leak Check (Initial) CFM	Train Leak Check (final) In. Hg	Train Leak Check (final) CFM	Pit C Initia
FT-9	1.56	0.973	10.4	X	250	1 97	556	576	✓	✓	15	0.013	17	0.01	OK

Sampling Time (min.)	Clock Time (24-hr)	Gas Meter Reading (Vm), ft³	Velocity Head* (ΔP), In. H₂O	Orifice Pressure Differential (ΔH), In. H₂O* Desired	Orifice Pressure Differential (ΔH), In. H₂O* Actual	Temperature (°F) Stack (Ts)	Dry Gas Meter Inlet (Tmi)	Dry Gas Meter Outlet (Tmo)	Probe	Sample Box	Resin	Imp-inger	Pump Vac. (In. Hg)
0	15:53	263.290											
5	15:58	267.3	0.87	2.6	2.0	1391	77	77		256	54	56	13.5
10	16:03	271.6	0.93	2.8	1.9	1396	77	76		254	56	55	14.0
15	16:08	275.7	0.95	2.8	1.9	1401	77	76		258	57	57	14.0
20	16:13	279.9	0.77	2.3	1.9	1384	77	76		256	57	60	14.5
25	16:18	284.0	0.42	1.3	1230	[redacted]	77	76		250	58	61	14.5
30	16:23	288.0	0.70	2.1	1.8	1375	77	75		254	60	62	14.5
	16:28	288.0											
35	16:34	292.1	0.81	2.4	1.7	1394	77	75		256	66	60	15.0
40	16:39	293.8	0.93	2.8	1.7	1407	77	75		263	67	60	15.0
45	16:44	295.5	0.96	2.9	1.7	1409	77	75		270	61	62	15.0
50	16:49	299.3	0.77	2.3	1.4	1394	77	75		257	62	64	16.0
55	16:54	302.6	0.56	1.7	1.6	1346	77	75		248	58	65	15.0
60	16:59	306.0	[redacted]	2.3	1.5	1390	77	75		252	59	66	15.0
		310.327	0.75										

pressure differentials to 2 significant figures, e.g., 0.015, 0.88, 1.2, etc. Comments: _____

(continue on reverse)

MODIFIED METHOD 5 SAMPLE RECOVERY AND INTEGRITY SHEET

Plant Seneca Army Depot
Sample location Kiln Stack
Run No. S-MM5-1
Filter No(s). NA
XAD-2 sorbent trap No. ~~&~~ 311C

Sample date 11/4/94
Recovery date 11/4/94
Recovered by BG, DD

MOISTURE

	Condensate (1st impinger)	2nd impinger	3rd impinger	4th impinger	Silica gel
Final volume wt.	829.9 g	601.1 g	575.8 g	480.3 g	755.3 g
Initial volume wt.	499.2 g	599.2 g	574.6 g	480.0 g	744.8 g
Net volume wt.	330.7 g	1.9 g	1.2 g	0.3 g	10.5 g
Description of impinger contents		Clear →			30% spent

Total moisture 344.6 g ✓ JP 11/8

RECOVERED SAMPLE

Filter container number(s) 0311B Sealed ✓
Description of particulate on filter Light gray

Probe rinse
Container No. 0311A Blank Container No. 301A

Back rinse
Container No. NA Blank Container No. "

Condensate Container No. 0312A

Impinger Contents
Container No. NA Blank Container No.

Liquid Levels marked ✓ Samples stored and locked

Remarks Trap 0311C

LABORATORY CUSTODY

Received by Date

Remarks

MODIFIED METHOD 5 SAMPLE RECOVERY AND INTEGRITY SHEET

Plant Seneca Army Depot — Sample date 11/4/97
Sample location Main Stack — Recovery date 11/4/97
Run No. 5-MM5-2 — Recovered by BG, DD
Filter No(s). NA
XAD-2 sorbent trap No. 313C

MOISTURE

	1st impinger (Condensate)	2nd impinger	3rd impinger	4th impinger	Silica gel
Final volume wt.	753.5 g	603.4 g	567.8 g	499.8 g	785.5 g
Initial volume wt.	495.3 g	603.5 g	568.6 g	498.7 g	772.2 g
Net volume wt.	258.2 g	-0.1 g	-0.8 g	1.1 g	13.3 g
Description of impinger contents					40% spent

Total moisture 271.7 g ✓ JF 11/8

RECOVERED SAMPLE

Filter container number(s) 313B — Sealed ✓
Description of particulate on filter Lgt Brown

Probe rinse
Container No. 3134 — Blank Container No.

Back rinse
Container No. NA — Blank Container No.

Condensate Container No. 314A

Impinger Contents
Container No. NA — Blank Container No.

Liquid Levels marked ✓ — Samples stored and locked

Remarks Trap 313C

LABORATORY CUSTODY

Received by — Date

Remarks

MODIFIED METHOD 5 SAMPLE RECOVERY AND INTEGRITY SHEET

Plant SENECA ARMY DEPOT
Sample location KILN STACK
Run No. S-MM5-3
Filter No(s). N/A
XAD-2 sorbent trap No. 315C

Sample date 11/4/94
Recovery date 11/4/94
Recovered by DD

MOISTURE

	1st impinger (Condensate)	2nd impinger	3rd impinger	4th impinger	Silica gel
Final volume wt.	869.6 g	590.8 g	590.0 g	503.0 g	762.7 g
Initial volume wt.	503.8 g	574.3 g	589.7 g	502.0 g	748.2 g
Net volume wt.	365.8 g	16.5 g	0.3 g	1.0 g	14.5 g
Description of impinger contents					50% spent

Total moisture 398.1 g

JP 11/8

RECOVERED SAMPLE

Filter container number(s) 315B Sealed ✓
Description of particulate on filter lgt Brown

Probe rinse
Container No. 315A Blank Container No.

Back rinse
Container No. NA Blank Container No.

Condensate Container No. 316A

Impinger Contents
Container No. NA Blank Container No.

Liquid Levels marked ✓ Samples stored and locked

Remarks Trap 315C

LABORATORY CUSTODY

Received by Date

Remarks

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD*

Reference Document No.
Page 1 of 3

Project Name/No.[1] Seneca Army Depot 519200-00500000
Team Members[2] Brian Gaels, Darren DeFabo
Profit Center No.[3] 3272001
Project Manager[4] Jeff Korb
Purchase Order No.[6] See J Korb IT-Rochester
Requested Report Date[11] 11

Samples Shipment Date[7] 11/7/94
Lab Destination[8] Quanterra
Lab Contact[9] K Mueller
Project Contact/Phone[12]
Carrier/Waybill No.[13]

Bill to:[5] Jeff Korb IT-Rochester

Report to:[10] Jeff Korb IT-Rochester

ONE CONTAINER PER LINE

Sample Number[14]	Sample Description/Type[15]	Date/Time Collected[16]	Container Type[17]	Sample Volume[18]	Preservative[19]	Requested Testing Program[20]	Condition on Receipt[21]	D Rec
-1 0305B	Air/F.Hex	11/2/94	Petri	NA	None	See P.O. from Jeff Korb IT-Rochester	FOR LAB USE	
-2 0307B		11/3/94						
-3 0309B		11/3/94						
-Blank 0303B		11/1/94						
-1 0305A	Air/Acetone Rinse	11/2/94	Amber Glass	3/100	None		FOR LAB USE	
-2 0307A		11/3/94						
-3 0309A		11/3/94						
-Blank 0307AA		11/1/94						

COPY

Special Instructions:[23]

Possible Hazard Identification:[24] Hazard ☐ Flammable ☒ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal:[25] Return to Client ☐ Disposal by Lab ☒ Archive

Turnaround Time Required:[26] Unknown — Normal ☐ Rush ☐

QC Level:[27] I. ☒ II. ☐ III. ☐ Project Specific (specify):

Relinquished by[28] (Signature/Affiliation)	Date/Time	1. Received by[28] (Signature/Affiliation)	Date/Time
Brian T Gaels IT-Cincinnati	Date: 11/7/94 Time: 1540		Date: Time:
Relinquished by (Signature/Affiliation)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
Relinquished by (Signature/Affiliation)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

Comments:[29]

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.[30] 4 2

Page 2 of 3

t Name Seneca Army Depot

Project No. 519200-00500000

Samples Shipment Date 11/7/

ONE CONTAINER PER LINE

Sample[14] Number	Sample[15] Description/Type	Date/Time[16] Collected	Container[17] Type	Sample[18] Volume	Pre-[19] servative	Requested Testing[20] Program	Condition on[21] Receipt	Dis Reco
-1 0306A	Air/H_2SO_4 Backhalf	11/2/94	Poly	≈600ml	None	See P.O. from		
2 0308A		11/3/94		≈400ml		Jeff Korb	FOR USE	
3 0310A		11/3/94		≈600ml		IT-Rochester		
Blank 0303A	0.1N H_2SO_4	11/1/94		≈200ml				
Blank 0302A	DI H_2O Rinse	11/1/94		≈200ml				
5-1 0311B	Air/Filter	11/4/94	~~Ice~~ Glass Petri	NA	Ice		FOR USE	
-2 0313B		11/4/94						
-3 0315B		11/4/94						
5-Blank 0301B		11/1/94						
-1 0311A	Air/Backhalf Rinse	11/4/94	Amber Glass	≈100ml				
-2 0313A		11/4/94					FOR USE	
5-3 0315A		11/4/94						
5-Blank 0301A	Air/Backhalf ~~Condensate~~ Rinse	11/1/94						
5-1 0312A	Air/Backhalf Condensate	11/4/94		≈300ml			FOR USE	
5-2 0314A		11/4/94						
5-3 0316A		11/4/94					FOR USE	

COPY

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No.[30] 42
Page 3 of 3

Name Seneca Army Depot

Project No. 519200-0050.0000

Samples Shipment Date 11/7/94

ONE CONTAINER PER LINE

Sample[14] Number	Sample[15] Description/Type	Date/Time[16] Collected	Container[17] Type	Sample[18] Volume	Pre-[19] servative	Requested Testing[20] Program	Condition on[21] Receipt	Disp Recor
H-1	Air/Summa	11/2/94	Summa	~4 l	None	See P.O. from		
-2	↓	11/3/94	↓	↓	↓	Jeff Korb	FOR LAB USE	
H-3		11/3/94				IT - Rochester		
-Blank		11/1/94						
							FOR USE	
5-1	Air/XAD Trap	11/4/94	XAD Trap	NA	Ice	See P.O. from		
5-2	↓	11/4/94	↓	↓	↓	Jeff Korb	FOR USE	
-3		11/4/94				IT Rochester		
-Blank		11/1/94						
							FOR USE	
							FOR USE	
							FOR USE	
							FOR USE	
							FOR LAB USE ONLY	

APPENDIX C

LABORATORY DATA

- Volatiles
- HCl
- Particulate
- Semivolatiles

Quanterra

Environmental Services

TELECOPY REQUEST

TELECOPY NUMBER: 513-782-4807

TO: John Prohaska

FROM: Ken Moeller

DATE: 11/18/94

NUMBER OF PAGES: 23 **(INCLUDING COVER SHEET)**

REMARKS: John - Here are the Seneca results for Method 5, HCl & TO-14.

5815 MIDDLEBROOK PIKE
KNOXVILLE, TN 37921
(615) 588-6401

IF ALL PAGES ARE NOT RECEIVED, PLEASE NOTIFY THE RECEPTIONIST AT THE ABOVE NUMBER. THANK YOU.

MIDDLEBROOK FAX NO. (615) 584-4315
Regional Office
5815 Middlebrook Pike • Knoxville, Tennessee 37921 • 615-588-6401

Quanterra Incorporated
5815 Middlebrook Pike
Knoxville, Tennessee 37921

615 588-6401 Telephone
615 584-4315 Fax

IT Engineering Services
140 Allen's Creek Road
Suite 150
Rochester, NY 14618
Attn: Jeff Korb

November 18, 1994

Job Number: 1979

P.O. Number: 162254

This is the Certificate of Analysis for the following samples:

Client Project ID:	Seneca Army Depot 519200-0500000
Date Received by Lab:	November 8, 1994
Number of Samples:	Four (4)
Sample Type:	Summa Canister

I. Introduction

Four (4) samples arrived at Quanterra Environmental Services, Knoxville, Tennessee on November 8, 1994 for chemical analysis. The samples were collected from November 1 through November 3, 1994 and were labeled as follows:

Client Sample ID	Lab Sample ID
S-TO14-1	AC8544
S-TO14-2	AC8546
S-TO14-3	AC8547
S-TO14-BLANK	AC8548

Reviewed and Approved:

Kenneth Mueller
Project Manager

II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. The data will include sample identification information, the analytical results, and the appropriate detection limits.

The sample was analyzed for Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry; EPA Method TO-14.

III. Quality Control

Immediately following the analytical data for the samples can be found the QA/QC information that pertains to these samples. The purpose of this information is to demonstrate that the data enclosed is scientifically valid and defensible. This QA/QC data is used to assess the laboratory's performance during the analysis of the samples it accompanies. All quantitations were performed within the calibrated range of the analytical instrument.

IV. Data Report Qualifiers

Following are descriptions of data report qualifiers which may have been used in this analytical report.

U	-	The analyte was not detected in the sample or extract. The value reported with the "U" is the detection limit for that compound in that sample.
VALUE	-	The result is a value equal to or greater than the detection limit for that compound.
J	-	Indicates an estimated value. This flag is used when mass spectral data indicates the presence of the compound, but the result is less than the specified detection limit.
D	-	This flag indicates that the compound was analyzed at a secondary dilution factor.
E	-	This flag indicates that the quantity of this compound detected in this sample is above the linear range of the instrument. Results are probably lower than actual.
ND	-	Not detected.

Client: SENECA
Workorder: 1979

Quanterra Environmental Services

TO-14 Volatile Organics

Client Sample ID: SYSTEM BLANK

Lab Sample ID: ABLKH8

Analysis Date: 11/16/94

Dilution Factor: 1

CAS #	Compound	Result ppb(V/V)	Detection Limit
75-71-8	Dichlorodifluoromethane	ND	0.20
76-14-2	1,2-Dichlorotetrafluoroethane	ND	0.20
74-87-3	Chloromethane	ND	0.20
75-01-4	Vinyl Chloride	ND	0.20
74-83-9	Bromomethane	ND	0.20
75-00-3	Chloroethane	ND	0.20
75-69-4	Trichlorofluoromethane	ND	0.20
75-35-4	1,1-Dichloroethene	ND	0.20
76-13-1	1,1,2-Trichlorotrifluoroethane	ND	0.30
75-09-2	Methylene Chloride	ND	0.30
75-34-3	1,1-Dichloroethane	ND	0.20
156-59-2	cis-1,2-Dichloroethene	ND	0.20
67-66-3	Chloroform	ND	0.20
71-55-6	1,1,1-Trichloroethane	ND	0.20
56-23-5	Carbon Tetrachloride	ND	0.20
71-43-2	Benzene	ND	0.20
107-06-2	1,2-Dichloroethane	ND	0.20
79-01-6	Trichloroethene	ND	0.20
78-87-5	1,2-Dichloropropane	ND	0.20
10061-01-5	cis-1,3-Dichloropropene	ND	0.20
108-88-3	Toluene	ND	0.20
10061-02-6	trans-1,3-Dichloropropene	ND	0.20
79-00-5	1,1,2-Trichloroethane	ND	0.20
127-18-4	Tetrachloroethene	ND	0.20
106-93-4	1,2-Dibromoethane	ND	0.20
108-90-7	Chlorobenzene	ND	0.20
100-41-4	Ethylbenzene	ND	0.20
IT15-30-5	m/p-Xylene	ND	0.20
95-47-6	o-Xylene	ND	0.20
100-42-5	Styrene	ND	0.20
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.20
108-67-8	1,3,5-Trimethylbenzene	ND	0.20
95-63-6	1,2,4-Trimethylbenzene	ND	0.20
541-73-1	1,3-Dichlorobenzene	ND	0.20

Client: SENECA
Workorder: 1979

TO-14 Volatile Organics

Client Sample ID: SYSTEM BLANK

Lab Sample ID: ABLKH8

Analysis Date: 11/16/94

Dilution Factor: 1

CAS #	Compound	Result ppb(V/V)	Detection Limit
106-46-7	1,4-Dichlorobenzene	ND	0.20
95-50-1	1,2-Dichlorobenzene	ND	0.20
100-44-7	Benzyl Chloride	ND	0.20
120-82-1	1,2,4-Trichlorobenzene	ND	0.20
87-68-3	Hexachlorobutadiene	ND	0.20

Surrogate Compound	% Recovery
D4-1,2-Dichloroethane	99
D8-Toluene	100
Bromofluorobenzene	95

Client: SENECA
Workorder: 1979

Quanterra Environmental Services

TO-14 Volatile Organics

Client Sample ID: S-TO14-1

Lab Sample ID: AC8544

Analysis Date: 11/16/94

Dilution Factor: 3.01

CAS #	Compound	Result ppb(V/V)	Detection Limit
75-71-8	Dichlorodifluoromethane	ND	0.60
76-14-2	1,2-Dichlorotetrafluoroethane	ND	0.60
74-87-3	Chloromethane	3.8	0.60
75-01-4	Vinyl Chloride	ND	0.60
74-83-9	Bromomethane	ND	0.60
75-00-3	Chloroethane	ND	0.60
75-69-4	Trichlorofluoromethane	ND	0.60
75-35-4	1,1-Dichloroethene	ND	0.60
76-13-1	1,1,2-Trichlorotrifluoroethane	ND	0.90
75-09-2	Methylene Chloride	ND	0.90
75-34-3	1,1-Dichloroethane	ND	0.60
156-59-2	cis-1,2-Dichloroethene	ND	0.60
67-66-3	Chloroform	ND	0.60
71-55-6	1,1,1-Trichloroethane	ND	0.60
56-23-5	Carbon Tetrachloride	ND	0.60
71-43-2	Benzene	8.7	0.60
107-06-2	1,2-Dichloroethane	ND	0.60
79-01-6	Trichloroethene	ND	0.60
78-87-5	1,2-Dichloropropane	ND	0.60
10061-01-5	cis-1,3-Dichloropropene	ND	0.60
108-88-3	Toluene	2.1	0.60
10061-02-6	trans-1,3-Dichloropropene	ND	0.60
79-00-5	1,1,2-Trichloroethane	ND	0.60
127-18-4	Tetrachloroethene	ND	0.60
106-93-4	1,2-Dibromoethane	ND	0.60
108-90-7	Chlorobenzene	ND	0.60
100-41-4	Ethylbenzene	ND	0.60
IT15-30-5	m/p-Xylene	ND	0.60
95-47-6	o-Xylene	ND	0.60
100-42-5	Styrene	ND	0.60
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.60
108-67-8	1,3,5-Trimethylbenzene	ND	0.60
95-63-6	1,2,4-Trimethylbenzene	ND	0.60
541-73-1	1,3-Dichlorobenzene	ND	0.60

Client: SENECA
Workorder: 1979

TO-14 Volatile Organics

Client Sample ID: S-TO14-1

Lab Sample ID: AC8544

Analysis Date: 11/16/94

Dilution Factor: 3.01

CAS #	Compound	Result ppb(V/V)	Detection Limit
106-46-7	1,4-Dichlorobenzene	ND	0.60
95-50-1	1,2-Dichlorobenzene	ND	0.60
100-44-7	Benzyl Chloride	ND	0.60
120-82-1	1,2,4-Trichlorobenzene	ND	0.60
87-68-3	Hexachlorobutadiene	ND	0.60

Surrogate Compound	% Recovery
D4-1,2-Dichloroethane	98
D8-Toluene	100
Bromofluorobenzene	97

Client: SENECA
Workorder: 1979

TO-14 Volatile Organics

Client Sample ID: S-TO14-2

Lab Sample ID: AC8546

Analysis Date: 11/16/94

Dilution Factor: 3.3

CAS #	Compound	Result ppb(V/V)	Detection Limit
75-71-8	Dichlorodifluoromethane	ND	0.66
76-14-2	1,2-Dichlorotetrafluoroethane	ND	0.66
74-87-3	Chloromethane	1.7	0.66
75-01-4	Vinyl Chloride	ND	0.66
74-83-9	Bromomethane	ND	0.66
75-00-3	Chloroethane	ND	0.66
75-69-4	Trichlorofluoromethane	ND	0.66
75-35-4	1,1-Dichloroethene	ND	0.66
76-13-1	1,1,2-Trichlorotrifluoroethane	ND	0.99
75-09-2	Methylene Chloride	ND	0.99
75-34-3	1,1-Dichloroethane	ND	0.66
156-59-2	cis-1,2-Dichloroethene	ND	0.66
67-66-3	Chloroform	ND	0.66
71-55-6	1,1,1-Trichloroethane	ND	0.66
56-23-5	Carbon Tetrachloride	ND	0.66
71-43-2	Benzene	ND	0.66
107-06-2	1,2-Dichloroethane	ND	0.66
79-01-6	Trichloroethene	ND	0.66
78-87-5	1,2-Dichloropropane	ND	0.66
10061-01-5	cis-1,3-Dichloropropene	ND	0.66
108-88-3	Toluene	ND	0.66
10061-02-6	trans-1,3-Dichloropropene	ND	0.66
79-00-5	1,1,2-Trichloroethane	ND	0.66
127-18-4	Tetrachloroethene	ND	0.66
106-93-4	1,2-Dibromoethane	ND	0.66
108-90-7	Chlorobenzene	ND	0.66
100-41-4	Ethylbenzene	ND	0.66
IT15-30-5	m/p-Xylene	ND	0.66
95-47-6	o-Xylene	ND	0.66
100-42-5	Styrene	ND	0.66
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.66
108-67-8	1,3,5-Trimethylbenzene	ND	0.66
95-63-6	1,2,4-Trimethylbenzene	ND	0.66
541-73-1	1,3-Dichlorobenzene	ND	0.66

Client: SENECA
Workorder: 1979

TO-14 Volatile Organics

Client Sample ID: S-TO14-2

Lab Sample ID: AC8546

Analysis Date: 11/16/94

Dilution Factor: 3.3

CAS #	Compound	Result ppb(V/V)	Detection Limit
106-46-7	1,4-Dichlorobenzene	ND	0.66
95-50-1	1,2-Dichlorobenzene	ND	0.66
100-44-7	Benzyl Chloride	ND	0.66
120-82-1	1,2,4-Trichlorobenzene	ND	0.66
87-68-3	Hexachlorobutadiene	ND	0.66

Surrogate Compound	% Recovery
D4-1,2-Dichloroethane	97
D8-Toluene	100
Bromofluorobenzene	97

Client: SENECA
Workorder: 1979

Quanterra Environmental Services

TO-14 Volatile Organics

Client Sample ID: S-TO14-3

Lab Sample ID: AC8547

Analysis Date: 11/16/94

Dilution Factor: 3.89

CAS #	Compound	Result ppb(V/V)	Detection Limit
75-71-8	Dichlorodifluoromethane	ND	0.78
76-14-2	1,2-Dichlorotetrafluoroethane	ND	0.78
74-87-3	Chloromethane	5.0	0.78
75-01-4	Vinyl Chloride	ND	0.78
74-83-9	Bromomethane	1.5	0.78
75-00-3	Chloroethane	ND	0.78
75-69-4	Trichlorofluoromethane	ND	0.78
75-35-4	1,1-Dichloroethene	ND	0.78
76-13-1	1,1,2-Trichlorotrifluoroethane	ND	1.2
75-09-2	Methylene Chloride	ND	1.2
75-34-3	1,1-Dichloroethane	ND	0.78
156-59-2	cis-1,2-Dichloroethene	ND	0.78
67-66-3	Chloroform	ND	0.78
71-55-6	1,1,1-Trichloroethane	ND	0.78
56-23-5	Carbon Tetrachloride	ND	0.78
71-43-2	Benzene	ND	0.78
107-06-2	1,2-Dichloroethane	ND	0.78
79-01-6	Trichloroethene	ND	0.78
78-87-5	1,2-Dichloropropane	ND	0.78
10061-01-5	cis-1,3-Dichloropropene	ND	0.78
108-88-3	Toluene	2.6	0.78
10061-02-6	trans-1,3-Dichloropropene	ND	0.78
79-00-5	1,1,2-Trichloroethane	ND	0.78
127-18-4	Tetrachloroethene	ND	0.78
106-93-4	1,2-Dibromoethane	ND	0.78
108-90-7	Chlorobenzene	ND	0.78
100-41-4	Ethylbenzene	ND	0.78
IT15-30-5	m/p-Xylene	1.5	0.78
95-47-6	o-Xylene	ND	0.78
100-42-5	Styrene	ND	0.78
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.78
108-67-8	1,3,5-Trimethylbenzene	ND	0.78
95-63-6	1,2,4-Trimethylbenzene	ND	0.78
541-73-1	1,3-Dichlorobenzene	ND	0.78

Client: SENECA
Workorder: 1979

TO-14 Volatile Organics

Client Sample ID: S-TO14-3

Lab Sample ID: AC8547

Analysis Date: 11/16/94

Dilution Factor: 3.89

CAS #	Compound	Result ppb(V/V)	Detection Limit
106-46-7	1,4-Dichlorobenzene	ND	0.78
95-50-1	1,2-Dichlorobenzene	ND	0.78
100-44-7	Benzyl Chloride	ND	0.78
120-82-1	1,2,4-Trichlorobenzene	ND	0.78
87-68-3	Hexachlorobutadiene	ND	0.78

Surrogate Compound	% Recovery
D4-1,2-Dichloroethane	100
D8-Toluene	100
Bromofluorobenzene	96

Client: SENECA
Workorder: 1979

Quanterra Environmental Services

TO-14 Volatile Organics

Client Sample ID: S-TO14-3

Lab Sample ID: AC8547DP

Analysis Date: 11/16/94

Dilution Factor: 3.89

CAS #	Compound	Result ppb(V/V)	Detection Limit
75-71-8	Dichlorodifluoromethane	ND	0.78
76-14 2	1,2-Dichlorotetrafluoroethane	ND	0.78
74-87-3	Chloromethane	5.0	0.78
75-01-4	Vinyl Chloride	ND	0.78
74-83-9	Bromomethane	1.5	0.78
75-00-3	Chloroethane	ND	0.78
75-69-4	Trichlorofluoromethane	ND	0.78
75-35-4	1,1-Dichloroethene	ND	0.78
76-13-1	1,1,2-Trichlorotrifluoroethane	ND	1.2
75-09-2	Methylene Chloride	ND	1.2
75-34-3	1,1-Dichloroethane	ND	0.78
156-59-2	cis-1,2-Dichloroethene	ND	0.78
67-66-3	Chloroform	ND	0.78
71-55-6	1,1,1-Trichloroethane	ND	0.78
56-23-5	Carbon Tetrachloride	ND	0.78
71-43-2	Benzene	ND	0.78
107-06-2	1,2-Dichloroethane	ND	0.78
79-01-6	Trichloroethene	ND	0.78
78-87-5	1,2-Dichloropropane	ND	0.78
10061-01-5	cis-1,3-Dichloropropene	ND	0.78
108-88-3	Toluene	2.6	0.78
10061-02-6	trans-1,3-Dichloropropene	ND	0.78
79-00-5	1,1,2-Trichloroethane	ND	0.78
127-18-4	Tetrachloroethene	ND	0.78
106-93-4	1,2-Dibromoethane	ND	0.78
108-90-7	Chlorobenzene	ND	0.78
100-41-4	Ethylbenzene	ND	0.78
IT15-30-5	m/p-Xylene	1.5	0.78
95-47-6	o-Xylene	ND	0.78
100-42-5	Styrene	ND	0.78
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.78
108-67-8	1,3,5-Trimethylbenzene	ND	0.78
95-63-6	1,2,4-Trimethylbenzene	ND	0.78
541-73-1	1,3-Dichlorobenzene	ND	0.78

Client: SENECA
Workorder: 1979

TO-14 Volatile Organics

Client Sample ID: S-TO14-3

Lab Sample ID: AC8547DP

Analysis Date: 11/16/94

Dilution Factor: 3.89

CAS #	Compound	Result ppb(V/V)	Detection Limit
106-46-7	1,4-Dichlorobenzene	ND	0.78
95-50-1	1,2-Dichlorobenzene	ND	0.78
100-44-7	Benzyl Chloride	ND	0.78
120-82-1	1,2,4-Trichlorobenzene	ND	0.78
87-68-3	Hexachlorobutadiene	ND	0.78

Surrogate Compound	% Recovery
D4-1,2-Dichloroethane	97
D8-Toluene	101
Bromofluorobenzene	95

Client: SENECA
Workorder: 1979

Quanterra Environmental Services

Duplicate Recovery of Volatile Organics

Client Sample ID: S-TO14-3

Lab Sample ID: AC8547 Analysis Date: 11/16/94

Duplicate Sample ID: AC8547DP Analysis Date: 11/16/94

Dilution Factor: 3.89 Units: ppb(V/V)

Compound	Sample Amount	Duplicate Amount	%RPD
Dichlorodifluoromethane	ND	ND	NA
1,2-Dichlorotetrafluoroethane	ND	ND	NA
Chloromethane	4.99	5.05	1
Vinyl Chloride	ND	ND	NA
Bromomethane	1.52	1.48	3
Chloroethane	ND	ND	NA
Trichlorofluoromethane	ND	ND	NA
1,1-Dichloroethene	ND	ND	NA
1,1,2-Trichlorotrifluoroethane	ND	ND	NA
Methylene Chloride	ND	ND	NA
1,1-Dichloroethane	ND	ND	NA
cis-1,2-Dichloroethene	ND	ND	NA
Chloroform	ND	ND	NA
1,1,1-Trichloroethane	ND	ND	NA
Carbon Tetrachloride	ND	ND	NA
Benzene	ND	ND	NA
1,2-Dichloroethane	ND	ND	NA
Trichloroethene	ND	ND	NA
1,2-Dichloropropane	ND	ND	NA
cis-1,3-Dichloropropene	ND	ND	NA
Toluene	2.56	2.64	3
trans-1,3-Dichloropropene	ND	ND	NA
1,1,2-Trichloroethane	ND	ND	NA
Tetrachloroethene	ND	ND	NA
1,2-Dibromoethane	ND	ND	NA
Chlorobenzene	ND	ND	NA
Ethylbenzene	ND	ND	NA
m/p-Xylene	1.50	1.53	2
o-Xylene	ND	ND	NA
Styrene	ND	ND	NA
1,1,2,2-Tetrachloroethane	ND	ND	NA
1,3,5-Trimethylbenzene	ND	ND	NA

Instrument M

Client: SENECA
Workorder: 1979

Duplicate Recovery of Volatile Organics

Client Sample ID: S-TO14-3

Lab Sample ID: AC8547 Analysis Date: 11/16/94

Duplicate Sample ID: AC8547DP Analysis Date: 11/16/94

Dilution Factor: 3.89 Units: ppb(V/V)

Compound	Sample Amount	Duplicate Amount	%RPD
1,2,4-Trimethylbenzene.....	ND	ND	NA
1,3-Dichlorobenzene.....	ND	ND	NA
1,4-Dichlorobenzene.....	ND	ND	NA
1,2 Dichlorobenzene.....	ND	ND	NA
Benzyl Chloride.....	ND	ND	NA
1,2,4-Trichlorobenzene.....	ND	ND	NA
Hexachlorobutadiene.....	ND	ND	NA

Surrogate Compound	Run % Recovery	Duplicate % Recovery
D4-1,2-Dichloroethane.....	100	97
D8-Toluene.....	100	101
Bromofluorobenzene.....	96	95

Instrument M

Client: SENECA
Workorder: 1979

Quanterra Environmental Services

TO-14 Volatile Organics

Client Sample ID: S-TO14-BLANK

Lab Sample ID: AC8548A

Analysis Date: 11/16/94

Dilution Factor: 2.61

CAS #	Compound	Result ppb(V/V)	Detection Limit
75-71-8	Dichlorodifluoromethane	ND	0.52
76-14-2	1,2-Dichlorotetrafluoroethane	ND	0.52
74-87-3	Chloromethane	ND	0.52
75-01-4	Vinyl Chloride	ND	0.52
74-83-9	Bromomethane	ND	0.52
75-00-3	Chloroethane	ND	0.52
75-69-4	Trichlorofluoromethane	ND	0.52
75-35-4	1,1-Dichloroethene	ND	0.52
76-13-1	1,1,2-Trichlorotrifluoroethane	ND	0.78
75-09-2	Methylene Chloride	3.0	0.78
75-34-3	1,1-Dichloroethane	ND	0.52
156-59-2	cis-1,2-Dichloroethene	ND	0.52
67-66-3	Chloroform	ND	0.52
71-55-6	1,1,1-Trichloroethane	ND	0.52
56-23-5	Carbon Tetrachloride	ND	0.52
71-43-2	Benzene	ND	0.52
107-06-2	1,2-Dichloroethane	ND	0.52
79-01-6	Trichloroethene	ND	0.52
78-87-5	1,2-Dichloropropane	ND	0.52
10061-01-5	cis-1,3-Dichloropropene	ND	0.52
108-88-3	Toluene	0.54	0.52
10061-02-6	trans-1,3-Dichloropropene	ND	0.52
79-00-5	1,1,2-Trichloroethane	ND	0.52
127-18-4	Tetrachloroethene	ND	0.52
106-93-4	1,2-Dibromoethane	ND	0.52
108-90-7	Chlorobenzene	ND	0.52
100-41-4	Ethylbenzene	ND	0.52
IT15-30-5	m/p-Xylene	ND	0.52
95-47-6	o-Xylene	ND	0.52
100-42-5	Styrene	ND	0.52
79-34-5	1,1,2,2-Tetrachloroethane	ND	0.52
108-67-8	1,3,5-Trimethylbenzene	ND	0.52
95-63-6	1,2,4-Trimethylbenzene	ND	0.52
541-73-1	1,3-Dichlorobenzene	ND	0.52

Client: SENECA
Workorder: 1979

TO-14 Volatile Organics

Client Sample ID: S-TO14-BLANK

Lab Sample ID: AC8548A

Analysis Date: 11/16/94

Dilution Factor: 2.61

CAS #	Compound	Result ppb(V/V)	Detection Limit
106-46-7	1,4-Dichlorobenzene	ND	0.52
95-50-1	1,2-Dichlorobenzene	ND	0.52
100-44-7	Benzyl Chloride	ND	0.52
120-82-1	1,2,4-Trichlorobenzene	ND	0.52
87-68-3	Hexachlorobutadiene	ND	0.52

Surrogate Compound	% Recovery
D4-1,2-Dichloroethane	101
D8-Toluene	103
Bromofluorobenzene	98

Quanterra - Knoxville Laboratory
General Chemistry Result Sheet

Work Order: 1993 Parameter: 9057 HCl

Analysis Date: 11/15/94 Detection Limit:

Analyst: JLK Units: mg/L (ppm), mg/kg (ppm), other mg
CIRCLE ONE

mg ✓ per Km 11/8

Lab Sample #	Client ID	Det. Limit	Result	Qualifier	Blank #	Blank Result
AC8738	J-HCl-1 Backhalf	8.8	22 ✓	+	AC9405	1.6U
AC8739	J-HCl-2 Backhalf	6.8	6.8 ✓	U		
AC8740	J-HCl-3 Backhalf	6.4	23 ✓	+		
AC8741	J-HCl-DUP Backhalf	1.6	1.6 ✓	U		
AC8761	J-HCl-DUP on H_2SO_4	1.8	~~1.8~~ 1.8	U		
			JLK 11/17/94			

Laboratory Control Sample (LCS) Results

LCS ID	Analysis Date	Blank Result	LCS True Value	LCS Result	% R
AC9466	11/15/94	1.6U	16	14	100

Matrix Spike (MS) or Spiked Blank (SB) Results

Lab Sample #	Client ID	Anal Date	Original	Spike	MS or SB	% R

Duplicate Analysis Results

Lab Sample #	Client ID	Anal Date	Original	Duplicate	RPD

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results

Lab Sample #	Client ID	Anal Date	Original	Spike	MS	%R	MSD	%R	RPD
AC8761		11/15/94	1.8U	18	16	89	14	89	0

Second-Level Review: CW Kanter

11/17/94

Method 5 Blank Analytical Results

Plant: SENECA ARMY DEPOT

Density of Acetone 0.7899 g/ml (pa)

Blank Type	Sample Identifiable	Liquid level at mark and/or container sealed
Acetone	YES	YES
Filter	YES	YES

Acetone Blank Container No. 0302 B
Volume of Acetone: 119 ml. (Va)

Lab #: AC 8737

Date & Time of Wt. 11/14/94 19:00
Date & Time of Wt. 11/15/94 10:30

Ca,(mg/g) (ma) / (Va) (pa)

Beaker Gross Wt.:	98620.1	mg.
Beaker Gross Wt.:	98620.5	mg.
Average Gross Wt.:	98620.3	mg.
Beaker Tare Wt.:	98619.0	mg.
Beaker Net Wt.:	1.3	mg.(ma)
Acetone Blank Value:	0.0138	mg/g (Ca)

Blank Value used for Calculations: 0.0100 mg/g

Filter #: 9410079

Lab #: AC 8733

Date & Time of Wt. 11/14/94 19:00
Date & Time of Wt. 11/15/95 10:30

Filter Gross Wt.:	336.0	mg
Filter Gross Wt.:	336.0	mg
Average Gross Wt.:	336.0	mg
Filter Tare Wt.:	335.2	mg
Difference:	0.8	mg

Remarks

Signature of Analyst: Date:
Signature of Reviewer: Kenneth R. Mueller Date: 11/17/94

Method 5 Analytical Results

Plant: SENECA ARMY DEPOT — Run No.: S-HCL-1

Sample Location: KILN STACK — Density of Acetone: 0.7899 g/ml

Sample Type	Sample Identifiable	Liquid level at mark and/or container sealed
Acetone	YES	YES
Filter	YES	YES

Acetone Blank Residue Conc.: 0.0100 mg/g — Lab #: AC 8734

Acetone Volume: 175 ml.

Date & Time of Wt.	11/14/94 19:00	Beaker Gross Wt.:	107963.3 mg
Date & Time of Wt.	11/15/94 10:30	Beaker Gross Wt.:	107963.3 mg
		Average Gross Wt.:	107963.3 mg
		Beaker Tare Wt.:	107897.8 mg
		Less acetone blank wt.:	1.4 mg
		Particulate Wt.:	64.1 mg

Filter # 9410092 — Lab #: AC 8730

Date & Time of Wt.	11/14/94 19:00	Filter Gross Wt.:	427.3 mg
Date & Time of Wt.	11/15/94 10:30	Filter Gross Wt.:	427.2 mg
		Average Gross Wt.:	427.3 mg
		Filter Tare Wt.:	334.1 mg
		Weight of Particulate on Filter:	93.2 mg

Weight of Particulate in Acetone Rinse: 64.1 mg

Total Wt. of Particulate: 157.3 mg

Signature of Analyst: _____ Date: _____

Signature of Reviewer: Kenneth L Mueller Date: 11/17/94

Method 5 Analytical Results

Plant: SENECA ARMY DEPOT
Run No.: S-HCL-2
Sample Location: KILN STACK
Density of Acetone: 0.7899 g/ml

Sample Type	Sample Identifiable	Liquid level at mark and/or container sealed
Acetone	YES	YES
Filter	YES	YES

Acetone Blank Residue Conc.: 0.0100 mg/g
Lab #: AC 8735
Acetone Volume: 119 ml.

Date & Time of Wt.: 11/14/94 19:00
Beaker Gross Wt.: 103651.4 mg
Date & Time of Wt.: 11/15/94 10:30
Beaker Gross Wt.: 103651.4 mg
Average Gross Wt.: 103651.4 mg
Beaker Tare Wt.: 103610.0 mg
Less acetone blank wt.: 0.9 mg
Particulate Wt.: 40.5 mg

Filter # 9410086
Lab #: AC 8731
Date & Time of Wt.: 11/14/94 19:00
Filter Gross Wt.: 389.1 mg
Date & Time of Wt.: 11/15/94 10:30
Filter Gross Wt.: 389.1 mg
Average Gross Wt.: 389.1 mg
Filter Tare Wt.: 336.9 mg
Weight of Particulate on Filter: 52.2 mg

Weight of Particulate in Acetone Rinse: 40.5 mg

Total Wt. of Particulate: 92.7 mg

Signature of Analyst: _____ Date: _____

Signature of Reviewer: Kenneth P. Mueller Date: 11/17/94

Method 5 Analytical Results

Plant: SENECA ARMY DEPOT — Run No.: S-HCL-3

Sample Location: KILN STACK — Density of Acetone: 0.7899 g/ml

Sample Type	Sample Identifiable	Liquid level at mark and/or container sealed
Acetone	YES	YES
Filter	YES	YES

Acetone Blank Residue Conc.: 0.0100 mg/g — Lab #: AC 8736

Acetone Volume: 97 ml.

Date & Time of Wt.	11/14/94 19:00	Beaker Gross Wt.:	102417.7 mg
Date & Time of Wt.	11/15/94 10:30	Beaker Gross Wt.:	102417.8 mg
		Average Gross Wt.:	102417.8 mg
		Beaker Tare Wt.:	102330.4 mg
		Less acetone blank wt.:	0.8 mg
		Particulate Wt.:	86.6 mg

Filter # 9410076 — Lab #: AC 8732

Date & Time of Wt.	11/14/94 19:00	Filter Gross Wt.:	425.7 mg
Date & Time of Wt.	11/15/94 10:30	Filter Gross Wt.:	425.5 mg
		Average Gross Wt.:	425.6 mg
		Filter Tare Wt.:	338.0 mg
		Weight of Particulate on Filter:	87.6 mg

Weight of Particulate in Acetone Rinse: 86.6 mg

Total Wt. of Particulate: 174.2 mg

Signature of Analyst: _____ Date: _____

Signature of Reviewer: Laura L. Mueller Date: 11/17/94

RAW DATA WORKSHEET (SOLIDS OR OIL & GREASE)

000090

ect Code: _____

/Date: _____ Checked and Approved by/Date: _____

	Parameter/Method	Sample No.	Sample Type	Sample Volume	Gross Wt.	Tare Wt.	~~Residue~~ 2nd weight	Residue Wt. (mg)	Final Concentration*	Analyst/Date	% M Com
	Method 5	AC8737	ACETONE FRACTION	119ml	~~98.6023~~ 98.6201	98.6190	98.6205			RKM 11/11/94	S-H
		AC8734		175ml	107.9633 107.9633	107.8978					S-H
		AC8735		119ml	103.6514 103.6514	103.6100					S-H
		AC8736		97ml	102.4177 102.4178	102.3304					S-H
		AC8730	Filter	N/A	0.42731 0.42723	334.1					# 941
		AC8733			0.33518 0.33600	335.2					#94
		AC8732			0.42570 0.42553	338.0					#94
		AC8731			0.38913 0.38910	336.9					#94

1st Weighing 11/14/94 1900
2nd Weighing 11/15/94 1030

11/15/94

al Concentration = Residue Wt. (mg) x 1000/Sample Volume or Weight (ml or g)

G x 100

/2)

Parameter	Batch QC with Proje

ITAS

Quanterra Environmental Services

Quanterra Incorporated
5815 Middlebrook Pike
Knoxville, Tennessee 37921

615 588-6401 Telephone
615 584-4315 Fax

rec'd 12/13 JP circ

December 12, 1994

IT Engineering Services
140 Allen's Creek Road, Suite 150
Rochester, NY 14618
Attn: Jeff Korb

Job Number: 1993

This is the Certificate of Analysis for the following samples:

Client Project ID:	Seneca Army Depot 519200-00500000
Date Received by Lab:	November 8, 1994
Number of Samples:	Fifteen (15)
Sample Type:	Air

I. Introduction

On November 8, 1994, fifteen (15) air samples arrived at Quanterra Environmental Services, Knoxville, Tennessee, from IT Engineering Services, Rochester, New York. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results.

The samples were analyzed for semivolatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8270/TO-13/Method 5.

Reviewed and Approved:

Kenneth Mueller
Project Manager

NOTE C25-45 were DRAFT LAB REPORT FOR MMS. C46 → end REPLACES IT. (JP)

C25 → C-46

III. Quality Control

Routine laboratory level I QC was followed.

IV. Comments

All of the samples (except S-MM5-Blank) were analyzed at a five-fold dilution. Samples S-MM5-1 and S-MM5-3 required additional fifty-fold dilutions due to the presence of high levels of phthalates. Sample S-MM5-Blank was initially analyzed undiluted. An additional five-fold dilution was required for di-n-butylphthalate. The samples, method blank and laboratory control sample exhibited poor surrogate standards. Recoveries were non-existent in some samples, and high in others, including the method blank and laboratory control sample. Sample S-MM5-2 appeared to have been double-spiked with surrogate solution. There was no sample remaining for re-extraction. Nonconformances were issued.

IT Engineering Services
December 12, 1994

Quanterra Environmental Services

Client Project ID: Seneca Army Depot 519200-00500000

Job Number: 1993

SEMIVOLATILE ANALYSIS

Results in total μg

Sample Matrix: Air

Client Sample ID: Method Blank
Lab Sample ID: AC9533

Compound	Concentration	Compound	Concentration
phenol	10 U	2,4-dichlorophenol	10 U
bis(2-chloroethyl)ether	10 U	1,2,4-trichlorobenzene	10 U
2-chlorophenol	10 U	naphthalene	10 U
1,3-dichlorobenzene	10 U	4-chloroaniline	10 U
1,4-dichlorobenzene	10 U	hexachlorobutadiene	10 U
1,2-dichlorobenzene	10 U	4-chloro-3-methylphenol	10 U
2-methylphenol	10 U	2-methylnaphthalene	10 U
2,2'-oxybis(1-chloropropane)	10 U	hexachlorocyclopentadiene	10 U
4-methylphenol	10 U	2,4,6-trichlorophenol	10 U
n-nitroso-di-n-propylamine	10 U	2,4,5-trichlorophenol	25 U
hexachloroethane	10 U	2-chloronaphthalene	10 U
nitrobenzene	10 U	2-nitroaniline	25 U
isophorone	10 U	dimethylphthalate	10 U
2-nitrophenol	10 U	acenaphthylene	10 U
2,4-dimethylphenol	10 U	2,6-dinitrotoluene	10 U
bis(2-chloroethoxy)methane	10 U	3-nitroaniline	25 U
		acenaphthene	10 U

Extraction Date: 11/09/94
Analysis Date: 11/16/94

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

SEMIVOLATILE ANALYSIS (continued)

Results in total µg

Sample Matrix: Air

Client Sample ID: Method Blank
Lab Sample ID: AC9533

Compound	Concentration	Compound	Concentration
2,4-dinitrophenol	25 U	carbazole	10 U
4-nitrophenol	25 U	di-n-butylphthalate	10 U
dibenzofuran	10 U	fluoranthene	10 U
2,4-dinitrotoluene	10 U	pyrene	10 U
diethylphthalate	10 U	butylbenzylphthalate	10 U
4-chlorophenyl-phenylether	10 U	3,3'-dichlorobenzidine	10 U
fluorene	10 U	benzo(a)anthracene	10 U
4-nitroaniline	25 U	chrysene	10 U
4,6-dinitro-2-methylphenol	25 U	bis(2-ethylhexyl)phthalate	7 J
n-nitrosodiphenylamine(1)	10 U	di-n-octylphthalate	10 U
4-bromophenyl-phenylether	10 U	benzo(b)fluoranthene	10 U
hexachlorobenzene	10 U	benzo(k)fluoranthene	10 U
pentachlorophenol	25 U	benzo(a)pyrene	10 U
phenanthrene	10 U	indeno(1,2,3-cd)pyrene	10 U
anthracene	10 U	dibenzo(a,h)anthracene	10 U
		benzo(g,h,i)perylene	10 U

J - Indicates an estimated value less than the detection limit.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
(1) - Cannot be separated from diphenylamine.

Client Project ID: Seneca Army Depot 519200-00500000 Job Number: 1993

LABORATORY CONTROL SAMPLE % RECOVERY

Results in total µg

Sample Matrix: Air

Client Sample ID: LCS
Lab Sample ID: AC9534

Compound	Spike Added	Sample Concentration	Spike Concentration	Spike % Recovery	QC Limits % Recovery
phenol	100.0	0	72.80	73	12-89
2-chlorophenol	100.0	0	85.00	85	27-123
1,4-dichlorobenzene	50.0	0	42.20	84	36-97
n-nitroso-di-n-propylamine	50.0	0	42.70	85	41-116
1,2,4-trichlorobenzene	50.0	0	43.10	86	39-98
4-chloro-3-methylphenol	100.0	0	81.80	82	23-97
acenaphthene	50.0	0	44.20	88	46-118
4-nitrophenol	100.0	0	48.90	49	10-80
2,4-dinitrotoluene	50.0	0	47.10	94	24-96
pentachlorophenol	100.0	0	80.20	80	9-103
pyrene	50.0	0	67.00	134 *	26-127

* - Value outside of QC limits.

IT Engineering Services
December 12, 1994

Quanterra Environmental Services

Client Project ID: Seneca Army Depot 519200-00500000

Job Number: 1993

SEMIVOLATILE ANALYSIS

Results in total μg

Sample Matrix: Air

Client Sample ID: S-MM5-1
Lab Sample ID: AC8742

Compound	Concentration		Compound	Concentration	
phenol	60	J	2,4-dichlorophenol	50	U
bis(2-chloroethyl)ether	50	U	1,2,4-trichlorobenzene	50	U
2-chlorophenol	50	U	naphthalene	7	J
1,3-dichlorobenzene	50	U	4-chloroaniline	50	U
1,4-dichlorobenzene	50	U	hexachlorobutadiene	50	U
1,2-dichlorobenzene	50	U	4-chloro-3-methylphenol	50	U
2-methylphenol	50	U	2-methylnaphthalene	50	U
2,2'-oxybis(1-chloropropane)	50	U	hexachlorocyclopentadiene	50	U
4-methylphenol	50	U	2,4,6-trichlorophenol	50	U
n-nitroso-di-n-propylamine	50	U	2,4,5-trichlorophenol	120	U
hexachloroethane	50	U	2-chloronaphthalene	50	U
nitrobenzene	50	U	2-nitroaniline	120	U
isophorone	50	U	dimethylphthalate	50	U
2-nitrophenol	14	J	acenaphthylene	50	U
2,4-dimethylphenol	50	U	2,6-dinitrotoluene	50	U
bis(2-chloroethoxy)methane	50	U	3-nitroaniline	120	U
			acenaphthene	50	U

Extraction Date: 11/09/94
Analysis Date: 11/17/94 (Original), 11/16/94 (Dilution 1:50)

J - Indicates an estimated value less than the detection limit.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

SEMIVOLATILE ANALYSIS (continued)

Results in total μg

Sample Matrix: Air

Client Sample ID: S-MM5-1
Lab Sample ID: AC8742

Compound	Concentration		Compound	Concentration	
2,4-dinitrophenol	120	U	carbazole	50	U
4-nitrophenol	120	U	di-n-butylphthalate	970	D_{50} +
dibenzofuran	50	U	fluoranthene	50	U
2,4-dinitrotoluene	50	U	pyrene	50	U
diethylphthalate	61	+	butylbenzylphthalate	50	U
4-chlorophenyl-phenylether	50	U	3,3'-dichlorobenzidine	50	U
fluorene	50	U	benzo(a)anthracene	50	U
4-nitroaniline	120	U	chrysene	50	U
4,6-dinitro-2-methylphenol	120	U	bis(2-ethylhexyl)phthalate	570	B D_{50} +
n-nitrosodiphenylamine(1)	50	U	di-n-octylphthalate	50	U
4-bromophenyl-phenylether	50	U	benzo(b)fluoranthene	50	U
hexachlorobenzene	50	U	benzo(k)fluoranthene	50	U
pentachlorophenol	120	U	benzo(a)pyrene	50	U
phenanthrene	5	J	indeno(1,2,3-cd)pyrene	50	U
anthracene	50	U	dibenzo(a,h)anthracene	50	U
			benzo(g,h,i)perylene	50	U

Dilution Factor: 5.0

+ - Positive result.
B - Analyte was found in the blank as well as the sample.
D50 - Compound analyzed at a secondary dilution factor (D1:50).
J - Indicates an estimated value less than the detection limit.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
(1) - Cannot be separated from diphenylamine.

IT Engineering Services
December 12, 1994

Quanterra Environmental Services

Client Project ID: Seneca Army Depot 519200-00500000 Job Number: 1993

SEMIVOLATILE ANALYSIS

Results in total μg

Sample Matrix: Air

Client Sample ID: S-MM5-2
Lab Sample ID: AC8747

Compound	Concentration	Compound	Concentration
phenol	150 +	2,4-dichlorophenol	50 U
bis(2-chloroethyl)ether	50 U	1,2,4-trichlorobenzene	50 U
2-chlorophenol	50 U	naphthalene	50 U
1,3-dichlorobenzene	50 U	4-chloroaniline	50 U
1,4-dichlorobenzene	50 U	hexachlorobutadiene	50 U
1,2-dichlorobenzene	50 U	4-chloro-3-methylphenol	50 U
2-methylphenol	50 U	2-methylnaphthalene	50 U
2,2'-oxybis(1-chloropropane)	50 U	hexachlorocyclopentadiene	50 U
4-methylphenol	50 U	2,4,6-trichlorophenol	50 U
n-nitroso-di-n-propylamine	50 U	2,4,5-trichlorophenol	120 U
hexachloroethane	50 U	2-chloronaphthalene	50 U
nitrobenzene	50 U	2-nitroaniline	120 U
isophorone	50 U	dimethylphthalate	50 U
2-nitrophenol	50 U	acenaphthylene	50 U
2,4-dimethylphenol	50 U	2,6-dinitrotoluene	50 U
bis(2-chloroethoxy)methane	50 U	3-nitroaniline	120 U
		acenaphthene	50 U

Extraction Date: 11/09/94
Analysis Date: 11/17/94

\+ - Positive result.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

Client Project ID: Seneca Army Depot 519200-00500000

Job Number: 1993

SEMIVOLATILE ANALYSIS (continued)

Results in total μg

Sample Matrix: Air

Client Sample ID: S-MM5-2
Lab Sample ID: AC8747

Compound	Concentration		Compound	Concentration	
2,4-dinitrophenol	120	U	carbazole	50	U
4-nitrophenol	120	U	di-n-butylphthalate	340	+
dibenzofuran	50	U	fluoranthene	50	U
2,4-dinitrotoluene	50	U	pyrene	8	J
diethylphthalate	89	+	butylbenzylphthalate	50	U
4-chlorophenyl-phenylether	50	U	3,3'-dichlorobenzidine	50	U
fluorene	50	U	benzo(a)anthracene	50	U
4-nitroaniline	120	U	chrysene	50	U
4,6-dinitro-2-methylphenol	120	U	bis(2-ethylhexyl)phthalate	230	B +
n-nitrosodiphenylamine(1)	50	U	di-n-octylphthalate	50	U
4-bromophenyl-phenylether	50	U	benzo(b)fluoranthene	50	U
hexachlorobenzene	50	U	benzo(k)fluoranthene	50	U
pentachlorophenol	120	U	benzo(a)pyrene	50	U
phenanthrene	50	U	indeno(1,2,3-cd)pyrene	50	U
anthracene	50	U	dibenzo(a,h)anthracene	50	U
			benzo(g,h,i)perylene	50	U

Dilution Factor: 5.0

+ - Positive result.
B - Analyte was found in the blank as well as the sample.
J - Indicates an estimated value less than the detection limit.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
(1) - Cannot be separated from diphenylamine.

Client Project ID: Seneca Army Depot 519200-00500000

Job Number: 1993

SEMIVOLATILE ANALYSIS

Results in total μg

Sample Matrix: Air

Client Sample ID: S-MM5-3
Lab Sample ID: AC8752

Compound	Concentration	Compound	Concentration
phenol	50 U	2,4-dichlorophenol	50 U
bis(2-chloroethyl)ether	50 U	1,2,4-trichlorobenzene	23 J
2-chlorophenol	50 U	naphthalene	50 U
1,3-dichlorobenzene	50 U	4-chloroaniline	50 U
1,4-dichlorobenzene	50 U	hexachlorobutadiene	50 U
1,2-dichlorobenzene	50 U	4-chloro-3-methylphenol	50 U
2-methylphenol	50 U	2-methylnaphthalene	50 U
2,2'-oxybis(1-chloropropane)	50 U	hexachlorocyclopentadiene	50 U
4-methylphenol	50 U	2,4,6-trichlorophenol	50 U
n-nitroso-di-n-propylamine	50 U	2,4,5-trichlorophenol	120 U
hexachloroethane	50 U	2-chloronaphthalene	50 U
nitrobenzene	50 U	2-nitroaniline	120 U
isophorone	50 U	dimethylphthalate	50 U
2-nitrophenol	11 J	acenaphthylene	50 U
2,4-dimethylphenol	50 U	2,6-dinitrotoluene	50 U
bis(2-chloroethoxy)methane	50 U	3-nitroaniline	120 U
		acenaphthene	50 U

Extraction Date: 11/09/94
Analysis Date: 11/17/94

J - Indicates an estimated value less than the detection limit.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

SEMIVOLATILE ANALYSIS (continued)

Results in total μg

Sample Matrix: Air

Client Sample ID: S-MM5-3
Lab Sample ID: AC8752

Compound	Concentration		Compound	Concentration	
2,4-dinitrophenol	120	U	carbazole	50	U
4-nitrophenol	120	U	di-n-butylphthalate	470	D_{50} J
dibenzofuran	50	U	fluoranthene	50	U
2,4-dinitrotoluene	50	U	pyrene	6	J
diethylphthalate	57	+	butylbenzylphthalate	50	U
4-chlorophenyl-phenylether	50	U	3,3'-dichlorobenzidine	50	U
fluorene	50	U	benzo(a)anthracene	50	U
4-nitroaniline	120	U	chrysene	50	U
4,6-dinitro-2-methylphenol	120	U	bis(2-ethylhexyl)phthalate	900	B D_{50} +
n-nitrosodiphenylamine(1)	50	U	di-n-octylphthalate	50	U
4-bromophenyl-phenylether	50	U	benzo(b)fluoranthene	50	U
hexachlorobenzene	50	U	benzo(k)fluoranthene	50	U
pentachlorophenol	120	U	benzo(a)pyrene	50	U
phenanthrene	50	U	indeno(1,2,3-cd)pyrene	50	U
anthracene	5	J	dibenzo(a,h)anthracene	50	U
			benzo(g,h,i)perylene	50	U

Dilution Factor: 5.0

+ - Positive result.
B - Analyte was found in the blank as well as the sample.
D_{50} - Compound analyzed at a secondary dilution factor (1:50)
J - Indicates an estimated value less than the detection limit.
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
(1) - Cannot be separated from diphenylamine.

IT Engineering Services
December 12, 1994

Quanterra Environmental Services

Client Project ID: Seneca Army Depot 519200-00500000

Job Number: 1993

SEMIVOLATILE ANALYSIS

Results in total μg

Sample Matrix: Air

Client Sample ID: S-MM5-Blank
Lab Sample ID: AC8757

Compound	Concentration		Compound	Concentration	
phenol	10	U	2,4-dichlorophenol	10	U
bis(2-chloroethyl)ether	10	U	1,2,4-trichlorobenzene	10	U
2-chlorophenol	10	U	naphthalene	10	U
1,3-dichlorobenzene	10	U	4-chloroaniline	10	U
1,4-dichlorobenzene	10	U	hexachlorobutadiene	10	U
1,2-dichlorobenzene	10	U	4-chloro-3-methylphenol	10	U
2-methylphenol	10	U	2-methylnaphthalene	10	U
2,2'-oxybis(1-chloropropane)	10	U	hexachlorocyclopentadiene	10	U
4-methylphenol	10	U	2,4,6-trichlorophenol	10	U
n-nitroso-di-n-propylamine	10	U	2,4,5-trichlorophenol	25	U
hexachloroethane	10	U	2-chloronaphthalene	10	U
nitrobenzene	10	U	2-nitroaniline	25	U
isophorone	10	U	dimethylphthalate	10	U
2-nitrophenol	10	U	acenaphthylene	10	U
2,4-dimethylphenol	10	U	2,6-dinitrotoluene	10	U
bis(2-chloroethoxy)methane	10	U	3-nitroaniline	25	U
			acenaphthene	10	U

Extraction Date: 11/09/94
Analysis Date: 11/16/94

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

SEMIVOLATILE ANALYSIS (continued)

Results in total μg

Sample Matrix: Air

Client Sample ID: S-MM5-Blank
Lab Sample ID: AC8757

Compound	Concentration	Compound	Concentration
2,4-dinitrophenol	25 U	carbazole	10 U
4-nitrophenol	25 U	di-n-butylphthalate	340 D_5 +
dibenzofuran	10 U	fluoranthene	10 U
2,4-dinitrotoluene	10 U	pyrene	10 U
diethylphthalate	28 +	butylbenzylphthalate	10 U
4-chlorophenyl-phenylether	10 U	3,3'-dichlorobenzidine	10 U
fluorene	10 U	benzo(a)anthracene	10 U
4-nitroaniline	25 U	chrysene	10 U
4,6-dinitro-2-methylphenol	25 U	bis(2-ethylhexyl)phthalate	13 B +
n-nitrosodiphenylamine(1)	10 U	di-n-octylphthalate	10 U
4-bromophenyl-phenylether	10 U	benzo(b)fluoranthene	10 U
hexachlorobenzene	10 U	benzo(k)fluoranthene	10 U
pentachlorophenol	25 U	benzo(a)pyrene	10 U
phenanthrene	10 U	indeno(1,2,3-cd)pyrene	10 U
anthracene	10 U	dibenzo(a,h)anthracene	10 U
		benzo(g,h,i)perylene	10 U

\+ - Positive result.
D_5 - Compound analyzed at a secondary dilution factor (D1:5).
U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
(1) - Cannot be separated from diphenylamine.

SEMIVOLATILE SURROGATE PERCENT RECOVERY SUMMARY

Client Sample ID	nitro-benzene-d5 (35-114)**	2-fluoro-biphenyl (43-116%)**	terphenyl (33-141%)**	phenol-d5 (10-94%)**	2-fluorophenol (21-100%)**	2,4,6-tribromo-phenol (10-123%)**
S-MM5-1	115 *	98	116	97	91	98
S-MM5-1 (Dilution 1:50)	D	102	141	90	D	D
S-MM5-2	164 *	156 *	200 *	178 *	189 *	219 *
S-MM5-3	112	88	119	D	D	D
S-MM5-3 (Dilution 1:50)	D	D	115	D	D	D
S-MM5-Blank	45	47	60	54	51	55
S-MM5-Blank (Dilution 1:5)	39	41 *	57	49	51	59
Method Blank (AC9533)	94	94	164 *	110	117 *	136 *
LCS (AC9534)	88	87	145 *	100	114 *	114

* - Values outside of contract required QC limits.
** - Values in parentheses represent required QC limits.
D - Surrogate diluted out.

COC NO. [redacted]

NATIONAL [redacted]
CHNOLOGY
RPORATION 10002250

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD *

WO # 1111-2277

Reference Document No.
Page 1 of 3

Name/No.: Seneca Army Depot 519200-00500000
Samples Shipment Date [7]: 11/7/94
Bill to: [5] Jeff Korb IT - Rochester

Members [2]: B. Ingels, D. DeFabo
Lab Destination [8]: Quanterra

Center No. [3]: 327200
Lab Contact [9]: K Mueller

t Manager [4]: Jeff Korb
Project Contact/Phone [12]:
Report to: [10] Jeff Korb IT - Rochester

Order No. [6]: See J Korb IT - Rochester
Carrier/Waybill No. [13]:

eport Date [11]: [redacted]

ONE CONTAINER PER LINE

[14]	Sample Description/Type [15]	Date/Time Collected [16]	Container Type [17]	Sample Volume [18]	Preservative [19]	Requested Testing Program [20]	Condition on Receipt [21]
B	Air/Filter	11/2/94	Petri	NA	None	See P.O. from	FOR L
B		11/3/94				Jeff Korb	NOT O
B		11/3/94				IT - Rochester	
K 2B		11/1/94					
SA	Air/Acetone Rinse	11/2/94	Amber Glass	2x100	None		FOR L USE O
A		11/3/94					
9A		11/3/94					
K 2,BA		11/1/94					

Instructions: [23]

Hazard Identification: [24] ☐ Flammable ☒ Skin Irritant ☐ Poison B ☐ Unknown ☐

Sample Disposal: [25] Return to Client ☐ Disposal by Lab ☒ Archive ☐

Required Time Required: [26] Unknown
Rush ☐

QC Level: [27] I ☒ II ☐ III ☐ Project Specific (specify):

shed by [28] (on) Brent Early IT-Cincinnati	Date: 11/7/94 Time: 1540	1. Received by [28] (Signature/Affiliation) Kenya Klemm	Date: 11/ Time:
shed by (on)	Date: Time:	2. Received by (Signature/Affiliation)	Date: Time:
shed by (on)	Date: Time:	3. Received by (Signature/Affiliation)	Date: Time:

s: [29]

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ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

Reference Document No. 30
Page 3 of 3

me Seneca Army Depot Project No. 519200-0050 0000 Samples Shipment Date 11/7/

ONE CONTAINER PER LINE

14	Sample 15 Description/Type	Date/Time 16 Collected	Container 17 Type	Sample 18 Volume	Pre- 19 servative	Requested Testing 20 Program	Condition on 21 Receipt	
	Air/Summa	11/2/94	Summa	4 l	None	See P.O. from		
	↓	11/3/94	↓	↓	↓	Jeff Korb	FOR LA	
	↓	11/3/94	↓	↓	↓	IT - Rochester	USE ONL	
k	↓	11/1/94	↓	↓	↓	↓	↓	
							FOR LA	
							USE ONL	
	Air/XAD Trap	11/4/94	XAD Trap	NA	Ice	See P.O. from		
	↓	11/4/94	↓	↓	↓	Jeff Korb		
	↓	11/4/94	↓	↓	↓	IT Rochester		
k	↓	11/1/94	↓	↓	↓	↓	↓	
							F	
							U	
							F	
							U	

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ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD (cont.)*

WO # 1111

Reference Document No.30

Page 2 of 3

me Seneca Army Depot

Project No. 519200-00500000

Samples Shipment Date 11/

ONE CONTAINER PER LINE

14 r	Sample 15 Description/Type	Date/Time 16 Collected	Container 17 Type	Sample 18 Volume	Pre- 19 servative	Requested Testing 20 Program	Condition on 21 Receipt	R
GA	Air / H_2SO_4 Backhalf	11/2/94	Poly	≈600ml	None	See P.O. from		
A	↓	11/3/94	↓	≈400ml	↓	Jeff Korb	FOR LA	
A		11/3/94		≈600ml		IT-Rochester	USE ONL	
A	0.1N H_2SO_4	11/1/94		≈200ml				
A	DI H_2O Rinse	11/1/94		≈200ml				
1B	Air / Filter	11/4/94	~~Ice~~ Poly. Glass	NA	Ice			
B	↓	11/4/94	↓	↓	↓			
B		11/4/94						
nk 1B	↓	11/1/94	↓	↓	↓			
A	Air / Backhalf Rinse	11/4/94	Amber Glass	≈100ml				
A	↓	11/4/94	↓	↓	↓			
A		11/4/94						
nk A	Air / Backhalf ~~Canister~~ Rinse	11/1/94	↓	↓	↓			
A	Air / Backhalf Condensate	11/4/94		≈300ml			Leaked	
A	↓	11/4/94	↓	↓	↓		Leaked.	
A	↓	11/4/94	↓	↓	↓			

APPENDIX D

STACK SAMPLING AND ANALYTICAL PROCEDURES

DETERMINATION OF PARTICULATE AND HCl/Cl_2 EMISSIONS

This sampling procedure is based on BIF Method 0050, published by the U.S. EPA* and proposed EPA Method 26A.** The sample is collected isokinetically in accordance with the procedures of U.S. EPA Method 5.*** The sampling train consists of a glass nozzle, a heated glass probe, a Pallflex® quartz-fiber or Teflon filter, and a series of Greenburg-Smith impingers. The first two impingers contain acidified water (0.1 N H_2SO_4) to collect HCl and separate the chlorine (Cl_2) fraction. The next two impingers contain a weak base (0.1 N NaOH) to collect Cl_2. The acidified water (and NaOH if Cl_2 is measured) is analyzed by ion chromatography (IC) in accordance with BIF Method 9057. The filter and probe catch are recovered and analyzed gravimetrically for particulate (if required) in accordance with EPA Method 5.

Sample Apparatus

The sampling train is shown in Figure PCl2-1. It consists of:

Nozzle - Glass with accurately measured round opening.

Probe - Borosilicate glass with a heating system capable of maintaining a gas temperature of 248° ±25°F at the exit end during sampling.

Pitot Tube - A Type-S pitot tube that meets all geometric standards is attached to the probe to monitor stack gas velocity.

Filter Holder - Pyrex glass with a heating system capable of maintaining a filter temperature of 248° ±25°F. A Teflon filter support is used.

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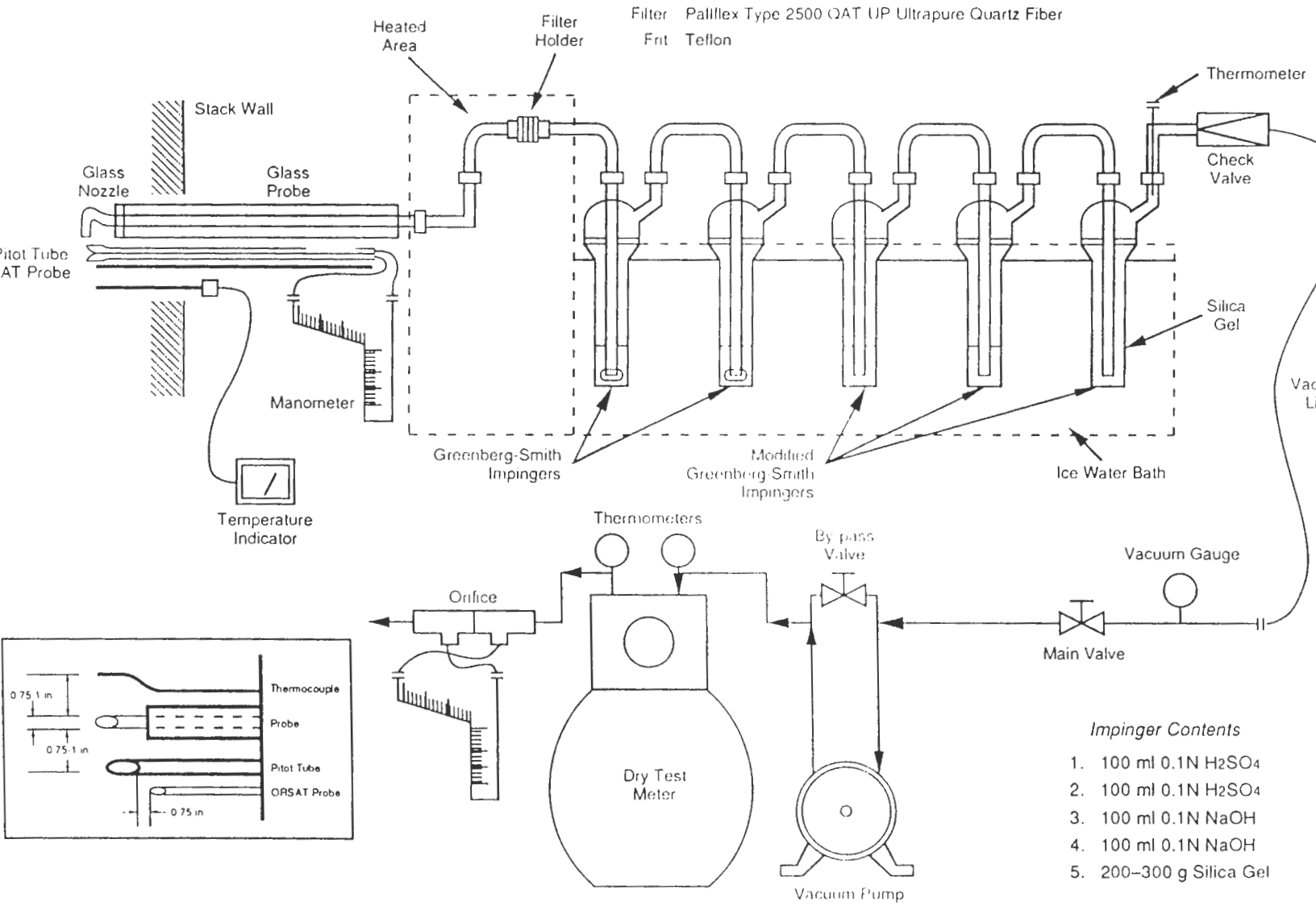
* Methods Manual for Compliance with the BIF Regulations, EPA/530-SW-91-010, December 1990.

** Proposed EPA Method 26A. Federal Register, Vol. 57, No. 252, December 31, 1992.

*** 40 CFR 60, Appendix A, July 1992.



INTERNATIONAL TECHNOLOGY CORPORATION

Figure PCL2-1. Particulate/HCl/Cl2 sampling train.

DRAWING BY	JHS III 4/23/92	CHECKED BY APPROVED BY	DH	4/24/92	DRAWI S-33212

Temperature Gauge - Type-K thermocouple attached to the pitot tube in an interference-free arrangement to monitor stack gas temperature with a digital readout to within 1.5 percent Rankine.

Filter - 87-mm (3-in.) -diameter, Teflon or Pallflex Type 2500 QAT-UP ultrapure, low-alkalinity, quartz-fiber filter.

Draft Gauge - A dual inclined manometer made by Dwyer with a readability of 0.01 in.H_2O in the 0- to 1-in. range and 0.1 in.H_2O in the 1- to 10-in. range.

Impingers - Five impingers connected in series with glass ball joints. The first two impingers are of the Greenburg-Smith design; the last three are modified by replacing the tip with a ½-in.-i.d. glass tube extending to within ½ in. of the bottom of the flask. For gas streams with high moisture content, an optional empty impinger may be used before the first impinger as a condensate collector.

Metering System - Vacuum gauge, leak-free pump, thermometers capable of measuring temperature to within 5°F, a dry gas meter with 2 percent accuracy, and related equipment.

Barometer - Aneroid barometer capable of measuring atmospheric pressure within ±0.1 in.Hg.

Sampling Procedures

Prior to each test run, the stack pressure, velocity, temperature, and composition (O_2 and CO_2) are measured according to procedures described in EPA Methods 1 through 3.* Gas moisture content is determined during each test run by using procedures described in EPA Method 4.* Sampling is conducted by using the minimum number of traverse points specified in EPA Method 1.*

The train is assembled as shown in Figure PCl2-1. One hundred mL of 0.1 N H_2SO_4 is placed in each of the first two impingers; the third and fourth impingers each contain 100 mL of 0.1 N NaOH; and the fifth contains 200 to 300 g of silica gel. If used, the empty impinger is placed before the first impinger. Teflon or Pallflex Type 2500 QAT-UP quartz-fiber filters are used because they contain very low residual alkalinity. The sampling train is leak-checked at the sampling site before and after each test. The initial leak check is conducted by plugging the inlet to the probe and pulling a 15-in.Hg vacuum. A pretest leakage rate in excess of 0.02 ft^3/min is corrected prior to sampling. The posttest leak check is conducted at the highest vacuum recorded during the run.

NaOH not used, JP.

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* 40 CFR 60, Appendix A, July 1992.

The pitot tube and lines are leak-checked at the test site prior to and at the conclusion of each test run. The check is made by blowing into the impact opening of the pitot tube until 3 or more inches of water is recorded on the manometer and then capping the impact opening and holding it for 15 seconds to assure it is leak-free. The static pressure side of the pitot tube is leak-checked by the same procedure, except that suction is used to obtain the 3-in.H_2O manometer reading. Crushed ice is placed around the impingers to keep the temperature of the gases leaving the last impinger at 68°F or less.

During sampling and whenever significant changes occur in stack flow conditions, stack gas and sampling train data are recorded at each sampling point. Isokinetic sampling rates are set throughout the sampling period with the aid of a calculator. All sampling data are recorded on the Particulate Field Data Sheet.

Sample Recovery Procedures

The volume of liquid from the first four impingers (and condensate collector if used) is measured, and sample fractions are recovered as follows:

Container No. 1 - If particulate is to be determined, the filter is removed from its holder and placed in a petri dish and sealed.

Container No. 2 - If particulate is to be determined, loose particulate and acetone washings from all sample-exposed surfaces prior to the filter are placed in a glass container, which is sealed and labeled. Particulate is removed from the probe with the aid of a brush and acetone rinsing. The liquid level is marked after the container is sealed.

Container No. 3 - The contents of the first and second impingers (and condensate collector if used) are measured and placed along with a deionized water rinse of the glassware into a 1-liter polyethylene container. The container is labeled for HCl analysis.

Container No. 4 - The contents of the third and fourth impingers are measured and placed into a 500-mL polyethylene container if chlorine analysis is to be performed; otherwise, the contents are discarded after measurement. If chlorine analysis is to be performed, a DI water rinse of the glassware is added to the container.

The silica gel from the last impinger is weighed, and this value is recorded on the Sample Recovery and Integrity Sheet along with other pertinent data.

Blank samples of the Pallflex filter, acetone, H_2SO_4, and DI water used in rinsing are also taken for analysis. A blank sample of NaOH is also taken if chlorine analysis is to be performed.

Analysis Procedures

Particulate (If Applicable)

The analytical procedures followed during this program are those described in EPA Method 5.

Container No. 1 - The filter and any loose particulate matter from this sample container are placed into a tared glass weighing dish, desiccated for 24 hours to a constant weight, and weighed to the nearest 0.1 mg.

Container No. 2 - The acetone washings are transferred to a tared beaker and evaporated to dryness at ambient temperature and pressure, desiccated for 24 hours to a constant weight, and weighed to the nearest 0.1 mg.

The filter and acetone blanks are analyzed in the same way as the samples. The term "constant weight" means a difference of no more than 0.5 mg or 1 percent of total weight less tare weight, whichever is greater between two consecutive readings, with no less than 6 hours of desiccation between weighings. All analytical data are recorded on the Analytical Particulate Data Sheet.

HCl (and Cl_2 if Applicable)

Analytical procedures followed during this program are those described in BIF Method 9057.

Container No. 3 - An aliquot of the impinger solution is taken for HCl analysis by IC. A Waters IC with Model 431 conductivity detector or equivalent is used for the HCl analysis. Calibrating standards are prepared from reagent grade or better chemicals and diluted in IC eluent. A minimum three-point plus blank calibration curve is generated and a reference solution is analyzed to verify the calibration prior to analysis of any samples. Each sample is analyzed by direct injection. If a sample value is determined to be higher than the highest calibration value, the sample is diluted with IC eluent and reanalyzed. Quantitation is based on a linear regression of the calibration data. The H_2SO_4 and DI water blanks are analyzed using the same procedure.

Container No. 4 - Aliquots of the solution and the NaOH blank are analyzed in the same manner as for HCl. Results for Cl_2 are based on twice the measured Cl^- value to account for dissociation of Cl_2 into Cl^- and ClO^-.

DETERMINATION OF SEMIVOLATILE ORGANIC EMISSIONS

The following procedures are used to measure semivolatile organic emissions. The sampling train is a modified Method 5 sampling train as described in Method 0010 of U.S. EPA SW 846.* The filter, sorbent resin, condensate, and solvent rinses are combined for analysis by gas chromatography/mass spectroscopy (GC/MS) procedures in SW 846 Method 8270.

Sampling Apparatus

The sampling train, which is shown in Figure SV-1, consists of the following:

Nozzle - Stainless steel (316) with sharp, tapered, leading edge and accurately measured round opening.

Probe - Borosilicate glass with a heating system capable of maintaining minimum temperature of 250°F at the exit end during sampling.

Impingers - A condensate flask and four impingers connected in series with glass ball joints. The second impinger is of the Greenburg-Smith design. The first, third, and fourth impingers are of the Greenburg-Smith design, modified by replacing the tip with a ½-in.-i.d. glass tube extending to ½ in. from the bottom of the flask.

XAD-2 Resin Module - Pyrex glass with a resin capacity of approximately 25 g of XAD-2 with a glass frit on the outlet end and glass wool packed at the inlet end.

Metering System - Vacuum gauge, leak-free pump, thermometers capable of measuring temperature to within 5°F, dry gas meter with 2 percent accuracy, and related equipment to maintain an isokinetic sampling rate and to determine

* Test Methods for Evaluating Solid Wastes. Physical/Chemical Methods, U.S. EPA 846, November 1986.

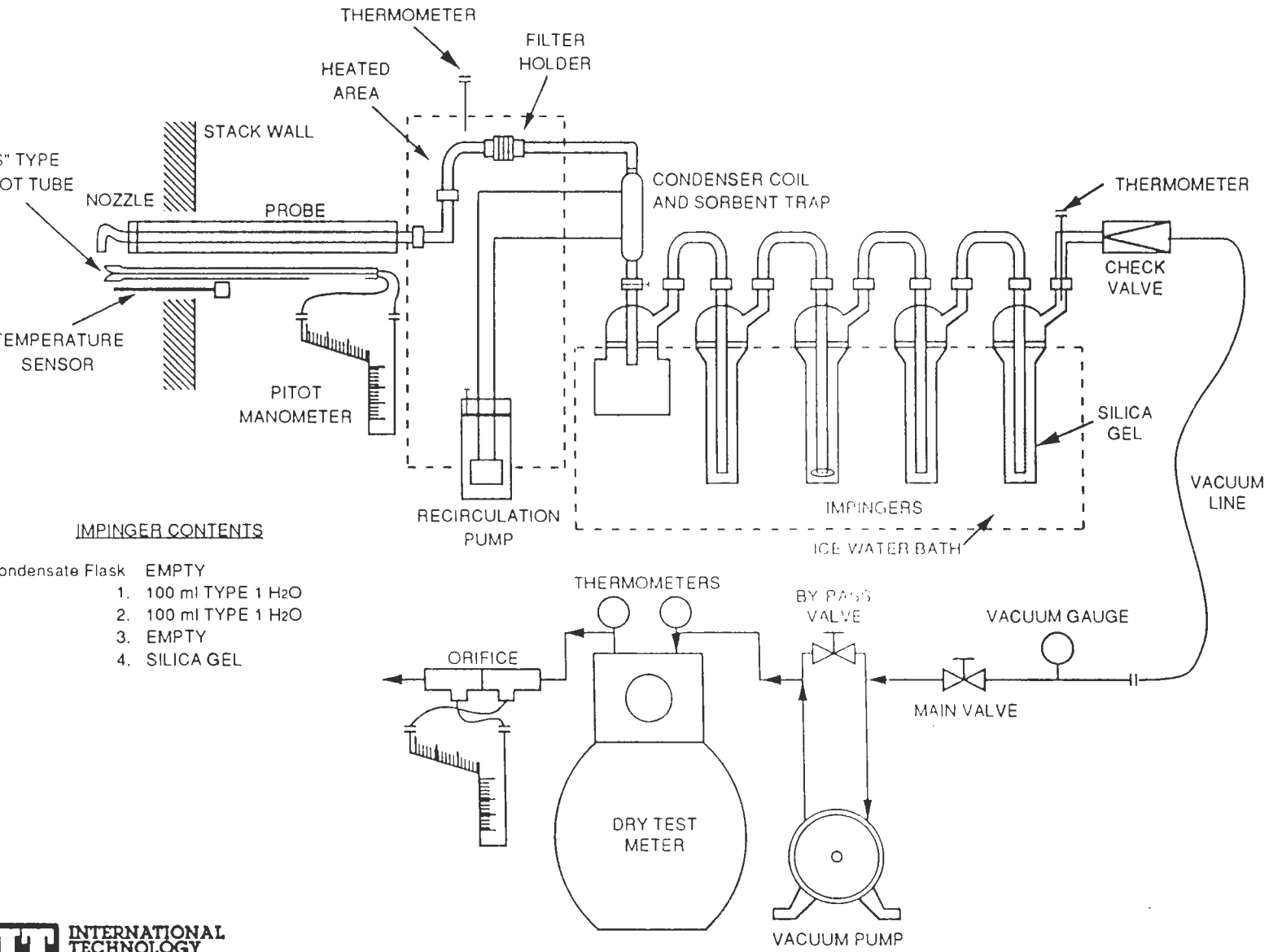

Figure SV-1. Modified Method 5 sampling train.

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DRAWING BY	JJS, III 1/28/94	CHECKED BY APPROVED BY	CSH	1/27/94	DRAWING NO. 8-332350-1-1/94-1

sample volume. The dry gas meter is made by Rockwell and the fiber vane pump is made by Gast.

Barometer - Aneroid type to measure atmospheric pressures to ±0.1 in.Hg.

Recirculation Pump - Submersible water pump to cool sample gas prior to resin module.

Pitot Tube - Type-S pitot tube that meets all geometric standards, attached to the probe to monitor stack gas velocity.

Temperature Gauge - Chromel/Alumel Type-K thermocouple (or equivalent) attached to the probe to monitor stack gas temperature within 1.5 percent absolute Rankine by use of a digital readout.

Filter - Glass-fiber filter placed between the probe and resin module to remove any particulate in the sample gas. The filter is a Whatman Reeve Angel 934 AH type. The filter holder is Pyrex glass and has a heating system capable of maintaining a temperature of approximately 250°F. A recessed Teflon/Teflon-coated filter support and removable Viton gasket are used to make a leak-free seal around the filter.

Equipment Preparation

The probe, impingers, and all glassware used during the sampling and recovery are prepared by a soapy-water wash, a distilled-water rinse followed by a methanol rinse and methylene chloride rinse, and oven drying. After drying, all open areas of each component are sealed with aluminum foil to prevent contamination.

The XAD-2 resin is purchased in a precleaned state; i.e., the resin has been soxhlet extracted twice with methylene chloride. Prior to resin use, an additional soxhlet extraction with methylene chloride is performed. This extract is concentrated and analyzed to determine the blank level by GC/MS. If an acceptable blank is not obtained, the XAD is reextracted and checked again. After an acceptable blank level is obtained, the XAD-2 resin is stored in methylene chloride in an amber glass bottle until just prior to use. Approximately 1 week before the test, the resin is dried and packed into the glass sorbent module. The module is capped with glass caps and wrapped in aluminum foil to protect the resin from light.

Sampling Procedure

Samples are collected isokinetically in accordance with the procedures of U.S. EPA Method 5.* Sampling train components are assembled in the sample preparation area (as shown in Figure SV-1). The condensate trap and a third impinger are initially empty. The first and second impingers contain 100 mL of deionized, distilled Type 1 water. The fourth impinger is filled with a weighed amount of silica gel. Each impinger is weighed prior to assembly so that the total moisture collected can be determined.

No type of sealing grease is used on the glass joints ahead of the silica gel.

The sampling train is leak-checked at the sampling site prior to each test run by plugging the inlet to the nozzle and pulling a 15-in.Hg vacuum, and at the conclusion of the test by plugging the inlet to the nozzle and pulling a vacuum equal to the highest vacuum reached during the test run. A leakage rate less than 0.02 ft^3/min is considered acceptable. The pitot tube and lines are leak-checked before and after each run. The check is made by blowing into the impact opening of the pitot tube until 3 or more inches of water is indicated on the manometer and then capping the impact opening and holding it for 15 seconds to assure that it is leak free (no change in manometer reading). The static pressure side of the pitot tube is checked in a similar manner except that suction is used to obtain the manometer depletion.

During sampling, crushed ice is placed around the impingers, and cooling water is circulated through the condenser coil to maintain the XAD-2 module gas inlet temperature at 68°F or less. Stack gas and sampling train data are recorded at each traverse point and whenever significant changes are observed in stack flow conditions. Isokinetic sampling rates are set throughout the sampling period with the aid of a programmable calculator.

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* 40 CFR 60, Appendix A, July 1990.

Sample Recovery Procedures

At the completion of the test, the sample is capped and transported to the sample recovery area. Figure SV-2 is a schematic of the sample recovery procedures. The samples are recovered as follows:

Container No. 1 - The particulate filter is removed and placed in a glass petri dish, which is wrapped in aluminum foil.

Container No. 2 - The nozzle, probe, and connecting glassware between the probe and filter are brushed and rinsed with 1:1 vol/vol methanol/methylene chloride, pesticide grade or distilled-in-glass (MeOH/$MeCl_2$). A nylon brush is used to ensure complete removal of particulate matter. The probe is brushed a minimum of three times. The connecting glassware between the filter and sorbent module and the condensate trap are rinsed with 1:1 vol/vol MeOH/$MeCl_2$ and stored in the container. An amber glass jar with a Teflon-lined cap is used to recover the rinse.

Container No. 3 - The XAD-2 sorbent trap is removed from the train, capped with glass ball joint caps, and wrapped in aluminum foil.

Container No. 4 - After weighing, the condensate collected in the condensate trap impinger is transferred to an amber glass jar.

All liquid levels are marked, and all samples are stored on ice or refrigerated at 4°C. The volume or weight of liquid in the impingers is determined to the nearest 1 mL or 1 g, then the liquid is discarded. The silica gel impinger is weighed, and the silica gel is discarded.

One sampling train field blank is taken during the test program by assembling the train, leak-checking it at the sampling site, and then recovering it as a sample. The sampling train blank is analyzed as a sample.

Analytical Procedures

Organic Analysis

Figure SV-3 presents a flow chart of Modified Method 5 sampling train analysis. Semivolatile organic analysis is conducted in accordance with SW 846 Method 8270 procedures. The analysis is conducted by GC/MS with a capillary column. The

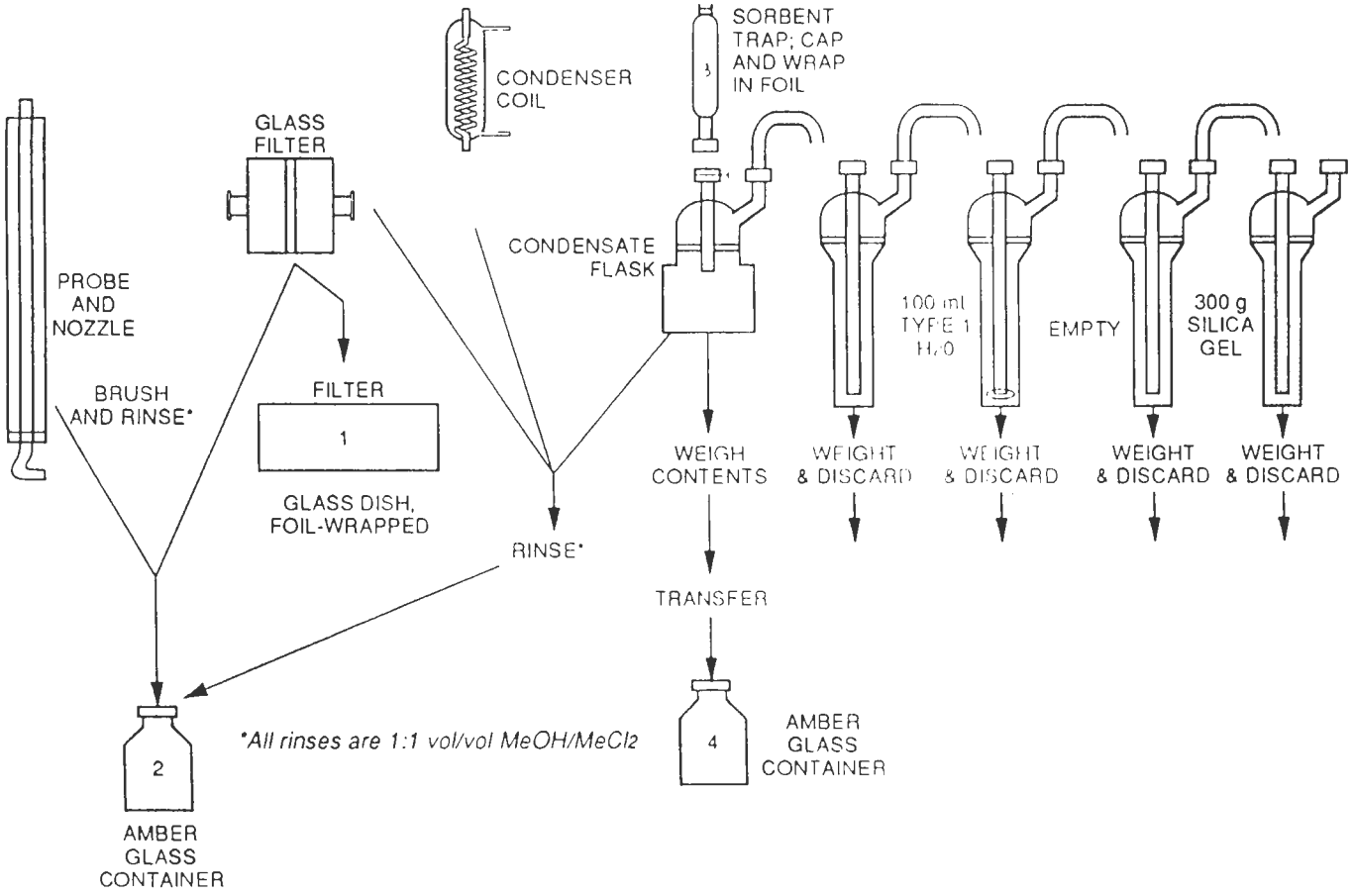

Figure SV-2. Recovery procedure for semivolatile organic sampling train.

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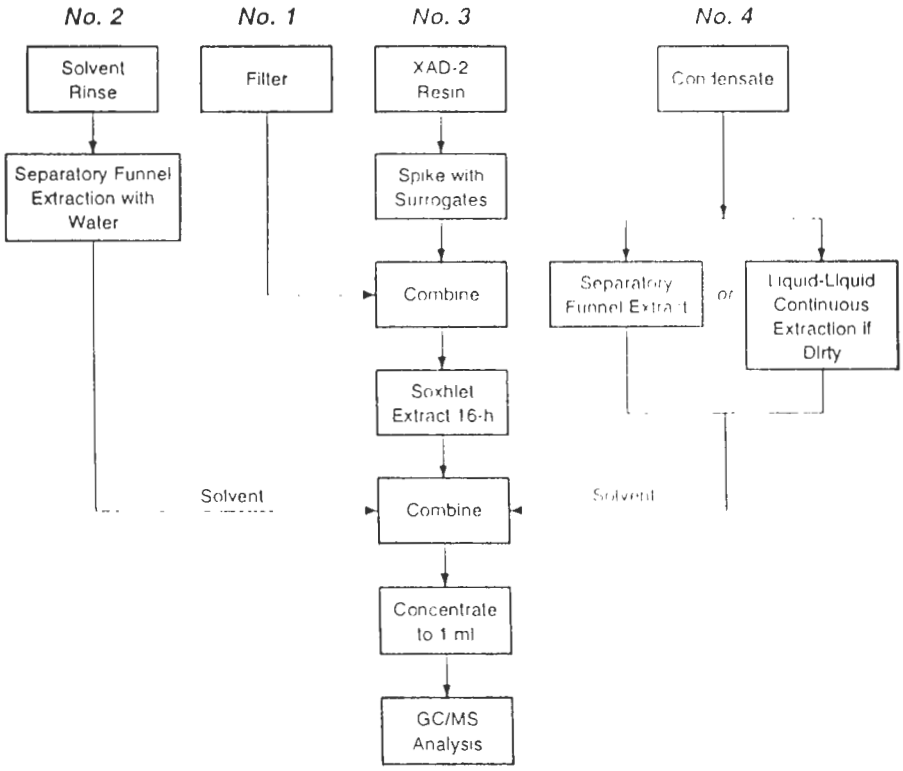

INTERNATIONAL TECHNOLOGY CORPORATION

Figure SV-3.
Modified Method 5 sampling train analysis flow chart

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		APPROVED BY			

XAD-2 resin, the filter, and the MeOH/$MeCl_2$ rinse of the connecting glassware and condensate flask are combined in a soxhlet extractor and extracted for 16 hours. The XAD-2 resin is spiked with a surrogate standard prior to extraction. Condensate is extracted by separatory funnel or liquid-liquid continuous extraction with methylene chloride. Both extracts are then combined and concentrated to 1 mL volume in a Kūderna-Danish concentrator for analysis.

A 30-meter fused silica capillary column is used to analyze the samples in accordance with the procedures of Method 8270. Prior to analysis all calibration standards and samples are spiked with the internal standards specified in Method 8270.

Standards of the compounds of interest are prepared for calibration in solvent at five concentration levels. If the relative standard deviation (RSD) of the response factors for the five standards are less than 30 percent, the average response factor is used for quantitation. If the RSD is greater than 30 percent, the calibration curve may be calculated by quadratic fit and used for quantitation.

Subsequent daily calibrations are conducted with one concentration level with the specification that the daily response factor must be within ±30 percent of the original calibration curve or the initial calibration is repeated.

April 8, 1993

Field Operating Procedures for Source Testing: Collection of Volatile Organic Compound (VOC) Samples in Summa® Passivated Canisters

Applicability

Use of Summa® canisters is an accepted procedure for collecting volatile organic samples from ambient air. With increasing frequency, we are also being asked to collect these samples from stationary sources. Some of our sampling is for screening purposes. In some cases, such as landfill gas flares, the sampling data have been accepted for compliance determination. In either case, the samples must be collected with due regard for source conditions such as water content, gas temperature, and the potential presence of corrosive gases.

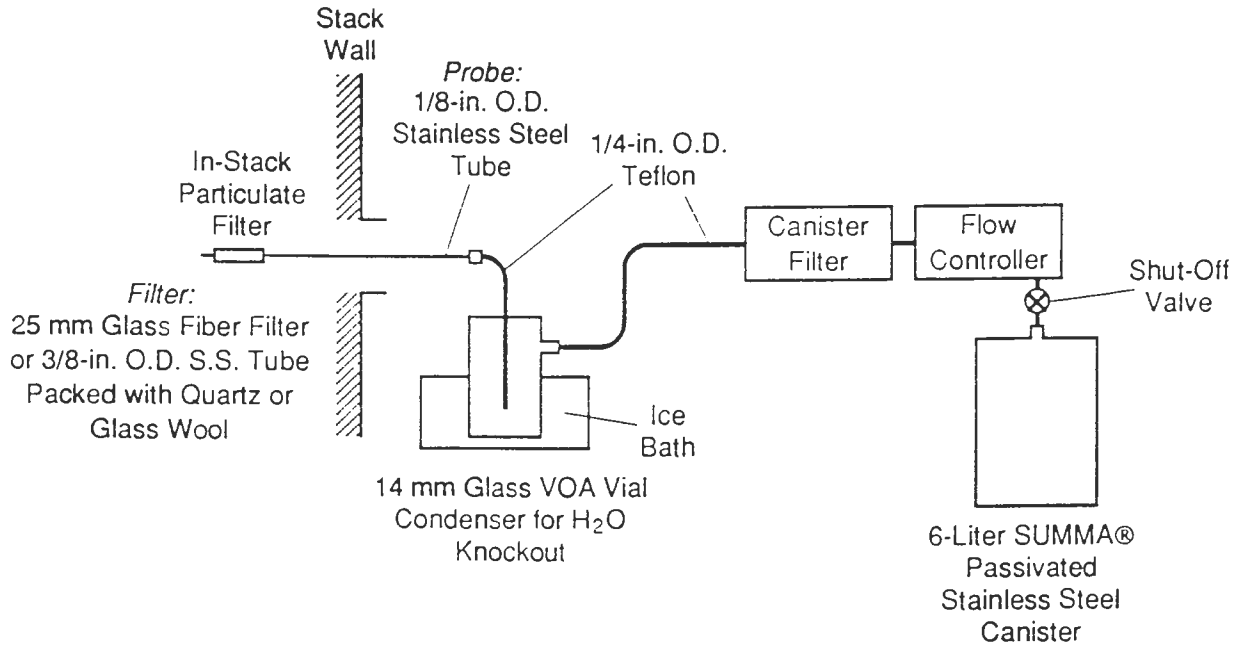
One advantage of canister sampling is the ability to sample a wide range of concentrations from low parts-per-billion levels to relatively high parts-per-million levels. To achieve detection limits in the parts-per-billion range, all sampling equipment must be specially prepared and handled to minimize the risk of contaminating field samples.

The procedures in this document are intended to account for the cases where canister sampling may be applicable. Canisters should not be used on any source that is likely to contain corrosive gases such as chlorine, HCl, HF, or H_2SO_4. Corrosive gases could destroy the canister or at least ruin the effect of the Summa® passivation.

Percent level concentrations of CO_2 will necessitate a large dilution of the canister sample before analysis. The CO_2 is collected in the cryogenic trap used for organic compound concentration and will interfere with analysis. If the source contains CO_2, the detection limit may be as high as 50 to 100 parts per billion compared with levels of less than 1 part per billion in ambient air samples.

Sampling Equipment

The sampling apparatus is shown in Figure 1. In the case of a dry, particulate-free gas stream, the in-stack particulate filter and the glass condenser are omitted.



NOTE: All apparatus requires special cleaning.

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Figure 1.
Canister Sampling Apparatus
for Source Testing.

In a very severe case of particulate and moisture content, a more elaborate gas conditioning system may be required. A heated out-of-stack filter or a larger filter and condenser system would have a large dead volume in the sampling train relative to the small sample volume in the canister. In that case, gas should be drawn through the conditioning system at a relatively high rate (1 to 2 liters/min) and the canister sample should be collected from a manifold after the gas conditioning system (not shown in this procedure).

The sampling apparatus consists of the following:

Canister - Approximately 6-liter Summa® passivated stainless steel canister. Canisters are obtained from IT Analytical Services (ITAS) in a precleaned, evacuated state. ITAS is responsible for measuring sample volume by measuring the pretest and posttest canister temperature and absolute pressure.

Flow Controller - Stainless steel flow regulator. The regulator is cleaned and preset to the desired sampling rate by ITAS. For a 1-hour test, the sampling rate should be in the range of 80 to 90 mL/min.

Canister Filter - Sintered-screen-type stainless steel filter. These filters are also obtained from ITAS in a cleaned state.

Glass Condenser - A 14-mL vial modified by attaching a 1/4-in. outside-diameter (o.d.) glass stem on the side and adding a Teflon gasket with a 1/4-in. hole in the cap. The condenser connects to the flow controller and the probe line with 1/4-in.-o.d. Teflon tubing and fittings. To prepare the equipment for sampling, the glass flask, Teflon line, and fittings are cleaned with nonionic detergent; rinsed with HPLC-grade organic-free water; and oven-dried at 110°C for 8 hours. Cleaned parts are wrapped in aluminum foil for transport to the field.

NOT USED (JP)

Probe Line - A suitable length of 1/8-in.-o.d. Supelco Brand premium Grade 304 stainless steel tubing. The tubing is cleaned before use by rinsing with methanol, hexane, and HPLC-grade organic-free water. After rinsing, the tubing is placed in an oven at 110°C and heated for 2 hours while being purged with zero-grade air or nitrogen at 20 to 30 mL/min. When cooled, the probe is sealed with Swagelok® caps.

In-Stack Filter - An in-stack particulate filter is used where needed. The filter will usually consist of a 2- to 3-in. piece of 3/8-in.-o.d. stainless steel tubing packed with glass or quartz-glass wool. The tubing and fittings are cleaned with nonionic detergent, rinsed with methanol, hexane, and HPLC-grade water, and baked at 110°C for 8 hours. The glass or quartz-glass wool is prepared by rinsing with methanol, hexane, and HPLC water and baking at 110°C for 8 hours.

For low-temperature sources [<200°C (<392°F)], a 25-mm Gelman® model stainless steel filter holder with a glass-fiber filter can be used. The filter holder parts and Teflon o-rings are cleaned with nonionic detergent; rinsed with water, methanol, hexane, and HPLC water; and heated at 110°C for 8 hours. Glass-fiber filters are treated by heating at 300°C for 2 hours.

Sampling Procedures

The canister initial vacuum and temperature are measured in the laboratory before the canister is shipped to the field site. In the field, a hand-operated vacuum pump and gauge are used to check the tank vacuum and ensure that the tank did not leak in transport. The hand-operated pump is connected to the canister sampling valve and the line and gauge are evacuated to the highest extent possible (>28 in.Hg). (IMPORTANT: To minimize possible sample contamination, the hand-operated pump must be fully evacuated before the canister valve is opened!) The canister valve is opened and the gauge reading is recorded. An initial vacuum greater than 27 in.Hg is acceptable. The canister valve is closed and the hand-operated pump is removed.

After checking the canister vacuum, the rest of the sampling train is assembled as shown in Figure 1 except for the in-stack filter. The filter does not need to be leak-checked because it is completely in the stack during sampling. The hand-operated vacuum pump is connected to the probe inlet using precleaned stainless steel fittings, and the sampling train is evacuated to a 10- to 15-in.Hg vacuum. After allowing 1 minute for the vacuum to equilibrate across the flow controller, the gauge vacuum is recorded and observed for a 5-minute period for any change in vacuum which would indicate leakage. The leakage rate is acceptable if the change in gauge vacuum is less than 5 in.Hg in a 5-minute period.

After the leak check is successfully completed, the in-stack filter is attached to the probe and inserted into the gas stream. Sampling is begun by opening the canister valve. When the sampling period is completed, the valve is closed and the train withdrawn from the stack. The front half of the train is leak-checked in the same manner as it was during the pretest leak check. The canister vacuum is checked by evacuating the vacuum gauge and line and then opening the canister valve. A final vacuum between 0 (ambient) and 5 in.Hg is desirable. All field data are recorded on the Canister Field Data Sheet shown in Figure 2.

CANISTER SAMPLING FIELD DATA

Company ____________________ City ____________________

Sampling Location ____________________ Operator ______________

Sampling Train Description ______________________________

Barometric Pressure, in.Hg __________ Ambient Temperature, °F __________

Run No. ______ Canister ID ______________ Flow Controller ________

Probe ID ____________ Filter ID ______________

Canister Vacuum, in.Hg: Pretest __________ Posttest __________

Front-Half Leak Check, in.Hg/5 min: Pretest __________ Posttest __________

Leak-check acceptance criteria: <5 in.Hg/5 min

Sampling Time: Start __________ Stop __________

Condensate Recovery:* Total Volume, mL ________ Vial Size, mL __________

Condensate Label ID ____________________ Liquid Level Marked? ______

Run No. ______ Canister ID ______________ Flow Controller ________

Probe ID ____________ Filter ID ______________

Canister Vacuum, in.Hg: Pretest __________ Posttest __________

Front-Half Leak Check, in.Hg/5 min: Pretest __________ Posttest __________

Leak-check acceptance criteria: <5 in.Hg/5 min

Sampling Time: Start __________ Stop __________

Condensate Recovery:* Total Volume, mL ________ Vial Size, mL __________

Condensate Label ID ____________________ Liquid Level Marked? ______

Run No. ______ Canister ID ______________ Flow Controller ________

Probe ID ____________ Filter ID ______________

Canister Vacuum, in.Hg: Pretest __________ Posttest __________

Front-Half Leak Check, in.Hg/5 min: Pretest __________ Posttest __________

Leak-check acceptance criteria: <5 in.Hg/5 min

Sampling Time: Start __________ Stop __________

Condensate Recovery:* Total Volume, mL ________ Vial Size, mL __________

Condensate Label ID ____________________ Liquid Level Marked? ______

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* Store condensate samples on ice or refrigerated.

Figure 2. Canister Sampling Field Data Sheet.

The condensate collected in the condenser flask is recovered at the end of one or three runs, depending on the amount of condensate collected. Condensate is recovered by pouring the contents into a 5- or 7-mL glass vial with a Teflon-lined septum and screw cap. The volume of any remaining condensate is measured in a graduated cylinder and discarded. The total volume of condensate is recorded on the field data sheet. Condensate samples are stored in a cooler at 4°C for shipment to the laboratory. If there is insufficient condensate to completely fill the vial, the vial is stored cap-side-down for transport to the laboratory.

A field blank is collected by assembling and leak-checking a sampling train, then attaching a jumbo-sized charcoal tube to the inlet of the filter by means of a 10-mm to 3/8-in. Swage-lok® union with Teflon ferrules. A sample is then collected through the charcoal tube over the same time period used for the stack sampling.

APPENDIX E

CALIBRATION PROCEDURES AND RESULTS

CALIBRATION PROCEDURES AND RESULTS

All of the equipment used is calibrated in accordance with the procedures outlined in the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III.* The following pages describe these procedures and include the data sheets.

*EPA 600/4-77-027b.

Nozzle Diameter

Each nozzle used in these tests is calibrated by making three separate measurements and calculating the average. If a deviation of more than 0.004 inch is found between any two measurements, the nozzle is either discarded or reamed out and remeasured. A micrometer is used for measuring. These calibration data are shown in the following Nozzle Calibration data sheet(s).

INTERNATIONAL TECHNOLOGY CORPORATION

NOZZLE CALIBRATION

Client SENECA ARMY DEPOT Project No. 519200-005-00000

Date 11/1/94 Calibrated By Dawn Dutcher

500

Nozzle I.D.	D1 in.	D2 in.	D3 in.	&D in.	D avg.
#1	0.411	0.417	0.414	0.004	0.413
#2	0.367	0.364	0.363	0.004	0.365
#3	0.379	0.379	0.380	0.001	0.379
#4	0.380	0.381	0.383	0.003	0.381

✓ 11/8

Where:

D 1, 2, 3 = nozzle diameter measured on a different diameter, in.
Tolerance = measure within 0.001 in.

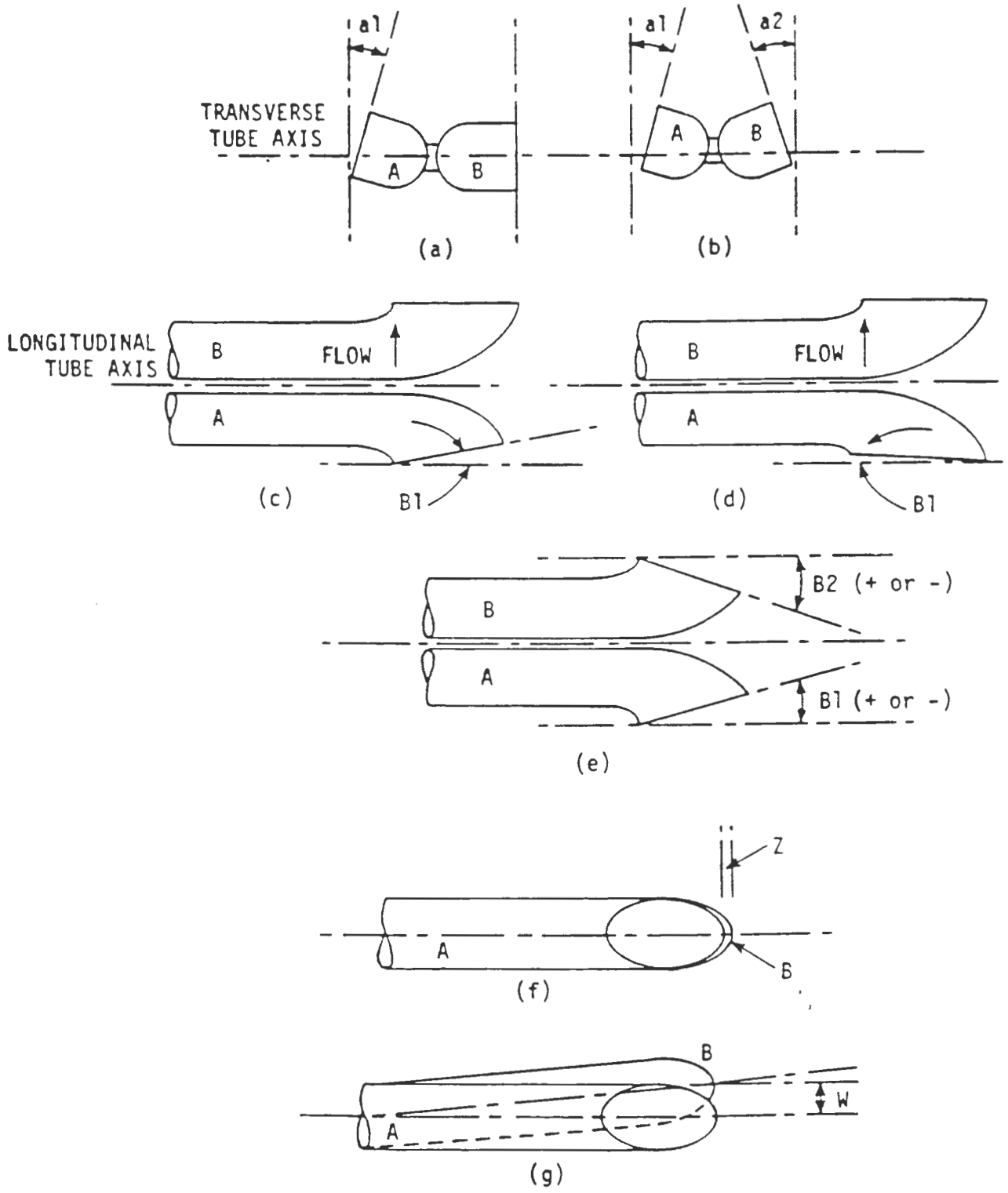
&D = maximum difference in any two measurements, in.
Tolerance = 0.004 in.

D avg. = average of D1, D2, and D3

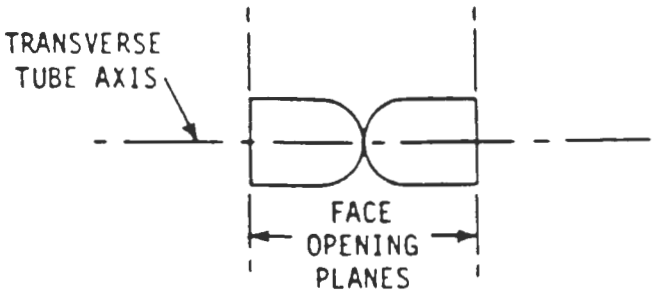
Pitot Tube Calibration

Each pitot tube used in sampling is constructed by ITAQS and meets all requirements of EPA Method 2, Section 4.1.* Therefore, a baseline coefficient of 0.84 is assigned to each pitot tube. The following pages show the alignment requirements of Method 2 and the Pitot Tube Inspection Data Sheet(s) for each pitot tube used during the test program.

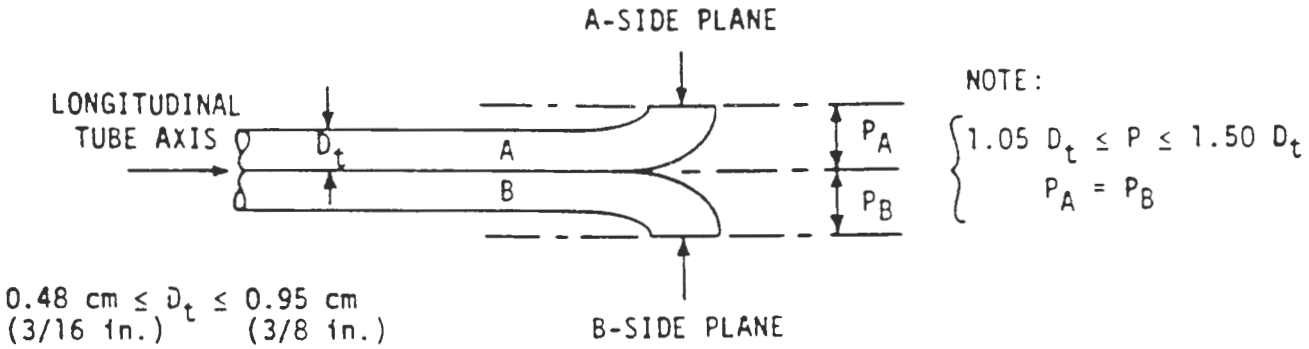
*40 CFR 60, Appendix A, July 1989.



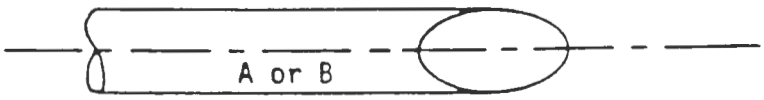
Types of face-opening misalignment that can result from field use or improper construction of Type S pitot tubes. These will not affect Cp as long as a_1 and a_2 are $<10°$, B_1 and B_2 are $<5°$, z is <0.32 (1/8 in.), and w is <0.08 cm (1/32 in.).



(a) ENDVIEW



(b)



(c)

Properly constructed Type S pitot tubes shown in: (a) end view, face opening planes perpendicular to transverse axis; (b) top view, face opening planes parallel to longitudinal axis; (c) side view, both legs of equal length and centerlines coincident when viewed from both sides. Baseline coefficient values of 0.84 may be assigned to pitot tubes constructed this way.

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PITOT TUBE INSPECTION DATA SHEET

Pitot Tube No. 556 Date 12-29-93 Inspector C. Miller

α_1 degrees	α_2 degrees	β_1 degrees	β_2 degrees
0	0	1	1
<10°	<10°	<5°	<5°

D_t inches	P inches	1.05 D_t inches	1.50 D_t inches
.361	1.44	.379	542
$0.185 \leq P_t < 0.380$	-	-	-

γ degrees	φ degrees	$P_{sin(\gamma)}$ inches	$P_{sin(\varphi)}$ inches
1	1	.025	.025
-	-	<0.125	<0.03125

P_1 inches	P_2 inches	$\lvert P_1 - P_2 \rvert$ inches	Meet specifications
.424	.415	.009	✓
$1.05\ D_t < P_1 < 1.50\ D_t$	$1.05\ D_t < P_2 < 1.50\ D_t$	≤0.010	

Lower line in each table is limits for meeting specifications.

Checked by HB Date 1-3-94

INTERNATIONAL TECHNOLOGY CORPORATION

PITOT TUBE INSPECTION DATA SHEET

Pitot Tube No. 003 Date 1-24-94 Inspector [illegible]

α_1 degrees	α_2 degrees	β_1 degrees	β_2 degrees
2	0	1	0
<10°	<10°	<5°	<5°

D_t inches	P inches	1.05 D_t inches	1.50 D_t inches
.376	1.049	.395	.564
$0.185 \leq P_t < 0.380$	-	-	-

γ degrees	φ degrees	$P_{sin(\gamma)}$ inches	$P_{sin(\varphi)}$ inches
1	0	.018	0
-	-	<0.125	<0.03125

P_1 inches	P_2 inches	$\lvert P_1 - P_2 \rvert$ inches	Meet specifications
.485	.487	.002	✓
$1.05\ D_t < P_1 < 1.50\ D_t$	$1.05\ D_t < P_2 < 1.50\ D_t$	≤0.010	

Lower line in each table is limits for meeting specifications.

Checked by [signature] Date 1/24/94

INTERNATIONAL TECHNOLOGY CORPORATION

5 FT

PITOT TUBE INSPECTION DATA SHEET

Pilot Tube No. 500 Date 12-15-92 Inspector D. CAHILL

α_1 degrees	α_2 degrees	β_1 degrees	β_2 degrees
4	1	1	0
<10°	<10°	<5°	<5°

D_t inches	P inches	1.05 D_t inches	1.50 D_t inches
.378	1.056	.397	.567
$0.185 \leq P_t < 0.380$	-	-	-

γ degrees	φ degrees	$P_{sin(\gamma)}$ inches	$P_{sin(\varphi)}$ inches
4	1	.070	.017
-	-	<0.125	<0.03125

P_1 inches	P_2 inches	$\lvert P_1 - P_2 \rvert$ inches	Meet specifications
.502	.504	.002	✓
1.05 D_t <P_1 <1.50 D_t	1.05 D_t <P_2 <1.50 D_t	<0.010	

Lower line in each table is limits for meeting specifications.

Checked by JR Date 12/30/92

INTERNATIONAL TECHNOLOGY CORPORATION

PITOT TUBE INSPECTION DATA SHEET

Pitot Tube No. H1 Date 12-28-93 Inspector C. Miller

α_1 degrees	α_2 degrees	β_1 degrees	β_2 degrees
0	0	0	0
<10°	<10°	<5°	<5°

D_t inches	P inches	1.05 D_t inches	1.50 D_t inches
.372	1.05	.391	.558
$0.185 \leq P_t < 0.380$	-	-	-

γ degrees	φ degrees	$P_{sin(\gamma)}$ inches	$P_{sin(\varphi)}$ inches
1	0	.018	0
-	-	<0.125	<0.03125

P_1 inches	P_2 inches	$\lvert P_1 - P_2 \rvert$ inches	Meet specifications
.509	.502	.007	✓
$1.05\ D_t < P_1 < 1.50\ D_t$	$1.05\ D_t < P_2 < 1.50\ D_t$	≤0.010	

Lower line in each table is limits for meeting specifications.

Checked by HB Date 1/3/94

Dry Gas Meter and Orifice Meter

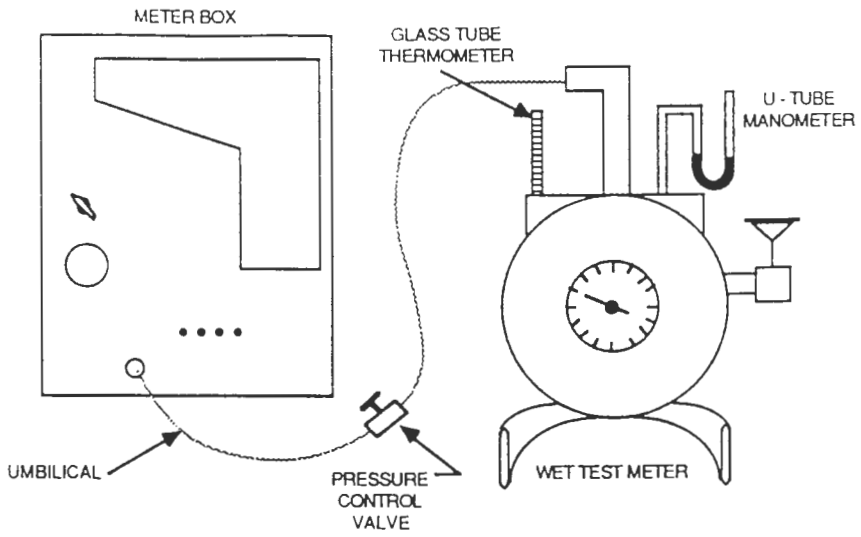
The following page shows the Calibration Setup used for the initial and post-test calibration. A wet-test meter with a 2-cubic-feet-per-minute capacity and ±1 percent accuracy is used. The pump is run for approximately 15 minutes at an orifice manometer setting of 0.5 in.H_2O to heat up the pump and wet the interior surface of the wet-test meter. The information in the following example Calibration Data Sheet is gathered for the initial calibration; the ratio of accuracy of the wet-test meter to the dry-test meter and the ΔH@ are then calculated.

Post-Test Meter Calibration Check

A post-test meter calibration check is made on each meter box used during the test to check its accuracy against the last calibration check. This post-test calibration must be within ±5 percent of the initial calibration. The initial calibration is performed as described in APTD-0576. The post-test calibration is performed by the same method. Three calibration runs are made by using the average orifice setting obtained during each test run and setting the vacuum at the maximum value obtained during each test run. The post-test calibration check indicated that all three runs for each meter box were within the ± 5 percent range allowed by EPA Method 5.*

The Particulate Sampling Meter Box Initial Calibration and Post-Test Calibration data sheets are included in the following pages.

* 40 CFR 60, Appendix A, July 1990.



Calibration setup.

DATE _____ METER BOX NO. _____

BAROMETRIC PRESSURE, P_b = _____ in. Hg. DRY GAS METER NO. _____

ORIFICE MANOMETER SETTING ΔH in. H_2O	GAS VOLUME WET TEST METER V_w, ft_3	GAS VOLUME DRY GAS METER V_d, ft_3	WET TEST METER T_w, °F	DRY GAS METER			TIME $\varnothing$, min.	Y	$\Delta H@$
				INLET t_{di}, °F	OUTLET t_{do}, °F	AVERAGE t_d, °F			
0.5	5								
1.0	5								
1.5	10								
2.0	10								
3.0	10								
4.0	10								

AVERAGE _____

ΔH	$\frac{\Delta H}{13.6}$	Y: $\frac{V_w P_b (t_d + 460)}{V_d (P_b + \frac{\Delta H}{13.6}) (t_w + 460)}$	$\Delta H@$: $\frac{0.0317\ \Delta H}{P_b (t_d + 460)} \left[\frac{(t_w + 460)\varnothing}{V_w}\right]^2$
0.5	0.0368		
1.0	0.0737		
1.5	0.110		
2.0	0.147		
3.0	0.221		
4.0	0.294		

Y = Ratio of accuracy of wet test meter to dry test meter. Tolerance = ± 0.01
$\Delta H@$ = Orifice of pressure differential that gives 0.75 cfm of air at 70° F and 29.92 inches of mercury, in H_g). Tolerance = ± 0.15.

Calibration data sheet.

INTERNATIONAL TECHNOLOGY CORPORATION

METER BOX INITIAL CALIBRATION

validated 11/8/90

Date: 9/26/94 Meter Box No.: FT-5

Barometric Pressure, (Pbar): 29.78 Calibrator: Neese

Run No.	Orifice manometer setting* ΔH in. H2O	Wet test meter volume Vw ft3	Dry gas meter volume Vd ft3	Temperatures: Wet test meter Tw °F	Temperatures: Dry gas meter Inlet Tdi °F	Temperatures: Dry gas meter Outlet Tdo °F	Temperatures: Dry gas meter Average Td °F	Vacuum setting** In. Hg	Duration of run, Ø min.	Duration of run, Ø sec
1	0.50	5.000	47.410	68	86	70	77.3	10	12	51
			52.539	68	83	70				
2	1.00	10.000	35.814	68	88	70	78.5	10	18	21
			46.038	68	86	70				
3	1.50	11.000	992.008	68	82	69	76.8	10	16	30
			1003.133	68	86	70				
4	2.00	10.000	25.329	68	90	70	79.5	10	13	2
			35.495	68	88	70				
5	3.00	10.500	14.410	68	90	70	80.0	10	11	6
			25.018	68	90	70				
6	4.00	10.000	4.024	68	86	70	79.0	10	9	10
			14.054	68	90	70				

Run No.	Y	ΔH@
1	0.991	1.82
2	0.995	1.86
3	1.001	1.87
4	1.000	1.87
5	1.005	1.84
6	1.008	1.85
Pretest average	1.000	1.85
Difference*=	0.009	0.04

$$y = \frac{(Vw)(Pbar)(Td+460)}{(Vd)(Pbar+\Delta H/13.6)(Tw+460)}$$

$$\Delta H@ = \frac{(0.0317)(\Delta H)}{(Pbar)(Td+460)} \times \left[\frac{(Tw+460)(Ø)}{Vw}\right]^2$$

Data checked by: D Cahill

Date: 9-26-94

* Y must not deviate by more than ±0.02Y.
ΔH@ must not deviate by more than ±0.15 ΔH@

INTERNATIONAL TECHNOLOGY CORPORATION

METER BOX POST-TEST CALIBRATION

validated 10/24/90

Date: 11/10/94
Barometric Pressure, (Pbar): 29.78
Plant: Seneca
Project Manager: J Korb

Meter Box No.: FT-5
Initial Y: 1.000
Project No.: 519200-005
Calibrator: GT

ΔH@: 1.85

Run No.	Orifice manometer setting* ΔH in. H2O	Wet test meter volume Vw ft3	Dry gas meter volume Vd ft3	Temperatures: Wet test meter Tw °F	Temperatures: Dry gas meter Inlet Tdi °F	Temperatures: Dry gas meter Outlet Tdo °F	Temperatures: Dry gas meter Average Td °F	Vacuum setting** in. Hg	Duration of run, Ø min.	Duration of run, Ø sec
			191.612	64	74	66				
1	1.50	11.000	202.499	64	80	72	73.0	7	16	40
			202.499	64	80	72				
2	1.50	10.000	212.458	64	84	72	77.0	7	15	11
			212.458	64	84	72				
3	1.50	12.600	225.172	64	86	72	78.5	7	19	9

Run No.	Y	ΔH@
1	1.024	1.98
2	1.025	1.88
3	1.015	1.88
Post-test average***	1.021	1.91
Difference from Pretest ***=	0.021	0.06

$$y = \frac{(Vw)(Pbar)(Td+460)}{(Vd)(Pbar+\Delta H/13.6)(Tw+460)}$$

$$\Delta H@ = \frac{(0.0317)(\Delta H)}{(Pbar)(Td+460)} \times \left[\frac{(Tw+460)\ (Ø)}{Vw}\right]^2$$

* To be the average ΔH used during the test series.
** To be the highest vacuum used during the test series.
*** Post-test Y must be within ±0.05 initial Y.
ΔY = (Posttest Y - Initial Y) / Initial Y
Post-test ΔH@ must be within ±0.15 In.H2O of the Intial ΔH@.
ΔH@ difference = Posttest ΔH@ - Initial ΔH@

Data checked by: JJ
Date: 11/11/94

INTERNATIONAL TECHNOLOGY CORPORATION

METER BOX INITIAL CALIBRATION

validated 11/8/90

Date: 9/28/94 Meter Box No.: FT-9

Barometric Pressure, (Pbar): 29.82 Calibrator: Neese

Run No.	Orifice manometer setting* ΔH in. H2O	Wet test meter volume Vw ft3	Dry gas meter volume Vd ft3	Temperatures: Wet test meter Tw °F	Temperatures: Dry gas meter Inlet Tdi °F	Temperatures: Dry gas meter Outlet Tdo °F	Temperatures: Dry gas meter Average Td °F	Vacuum setting** in. Hg	Duration of run, Ø min.	Duration of run, Ø sec
1	0.50	5.000	714.316	65	74	68	70.8	10	11	40
			719.477	65	73	68				
2	1.00	10.000	703.527	65	72	67	70.3	10	16	45
			713.864	65	74	68				
3	1.50	10.000	719.944	65	74	68	71.0	10	13	47
			730.297	65	74	68				
4	2.00	12.000	730.638	65	74	68	71.8	10	14	24
			743.085	65	76	69				
5	3.00	10.000	743.425	65	76	69	73.0	10	9	39
			753.804	65	77	70				
6	4.00	13.000	754.330	65	77	70	73.8	10	11	12
			767.811	65	78	70				

Run No.	Y	ΔH@
1	0.978	1.50
2	0.975	1.55
3	0.973	1.57
4	0.972	1.59
5	0.971	1.54
6	0.971	1.63
Pretest average	0.973	1.56
Difference*=	0.005	0.13

$$y = \frac{(Vw)(Pbar)(Td+460)}{(Vd)(Pbar+\Delta H/13.6)(Tw+460)}$$

$$\Delta H@ = \frac{(0.0317)(\Delta H)}{(Pbar)(Td+460)} \times \left[\frac{(Tw+460)(\Theta)}{Vw}\right]^2$$

Data checked by: HWB

Date: 9/28/94

* Y must not deviate by more than ±0.02Y.
ΔH@ must not deviate by more than ±0.15 ΔH@i

IT INTERNATIONAL TECHNOLOGY CORPORATION

METER BOX POST-TEST CALIBRATION

validated 10/24/90

Date: 11/11/94
Barometric Pressure, (Pbar): 29.85
Plant: Seneca
Project Manager: J Korb

Meter Box No.: FT-9
Initial Y: 0.973
Project No.: 519200-005
Calibrator: GT

ΔH@: 1.56

Run No.	Orifice manometer setting* ΔH in. H2O	Wet test meter volume Vw ft3	Dry gas meter volume Vd ft3	Temperatures: Wet test meter Tw °F	Temperatures: Dry gas meter Inlet Tdi °F	Temperatures: Dry gas meter Outlet Tdo °F	Temperatures: Dry gas meter Average Td °F	Vacuum setting** in. Hg	Duration of run, Ø min.	Duration of run, Ø sec
1	2.00	10.000	337.838	65	70	68				
			348.291	65	73	70	70.3	15	12	26
2	2.00	15.000	348.291	65	73	70				
			363.971	65	74	71	72.0	15	18	44
3	2.00	10.000	363.971	65	74	71				
			374.455	65	75	71	72.8	15	12	23

Run No.	Y	ΔH@
1	0.961	1.71
2	0.965	1.72
3	0.963	1.69
Post-test average***	0.963	1.70
Difference from Pretest ***=	-0.010	0.14

$$y = \frac{(Vw)(Pbar)(Td+460)}{(Vd)(Pbar+\Delta H/13.6)(Tw+460)}$$

$$\Delta H@ = \frac{(0.0317)(\Delta H)}{(Pbar)(Td+460)} \times \left[\frac{(Tw+460)(\emptyset)}{Vw}\right]^2$$

* To be the average ΔH used during the test series.
** To be the highest vacuum used during the test series.
*** Post-test Y must be within ±0.05 Initial Y.
ΔY = (Posttest Y - Initial Y) / Initial Y
Post-test ΔH@ must be within ±0.15 In.H2O of the Intial ΔH@.
ΔH@ difference = Posttest ΔH@ - Initial ΔH@

Data checked by: MM
Date: 11/11/94

Stack Thermocouples

Each thermocouple is calibrated by comparing it with an ASTM-3F thermometer at approximately 32°F, ambient temperature, 100°F, and 500°F. The thermocouple read within 1.5 percent of the reference thermometer throughout the entire range when expressed in degrees Rankine. If the stack gas is saturated with moisture, the thermocouple is calibrated at 10° intervals between 70° and 180°F using a water bath. The thermocouple agreed within ±2°F of the reference thermometer over the entire range. The thermocouples may be checked at ambient temperature at the test site to verify the calibration. Calibration data are included in the following Thermocouple Calibration Data Sheet(s).

INTERNATIONAL TECHNOLOGY CORPORATION

THERMOCOUPLE CALIBRATION DATA SHEET

Date: 1/24/94 Thermocouple No: 576

Calibrator: R. Webb Reference: ASTM

Range: _____

Reference point no.	Source*	Reference thermometer temperature °F	Thermocouple temperature °F	Difference %**
1	2	70	70	0
2	1	34	36	.40
3	3	206	206	0
4	4	495	496	.10

* Source: 1) Ice bath
2) Ambient
3) Water bath
4) Oil bath

** Percent difference.

$$\frac{\text{Reference temp. °R - thermocouple temp. °R}}{\text{(Reference temp. °R)}} \times 100\%$$

where °R = °F + 460

Each percent difference must be less than or equal to 1.5%.

Checked by _____ Date 1/24/94

INTERNATIONAL TECHNOLOGY CORPORATION

THERMOCOUPLE CALIBRATION DATA SHEET

Date: 1/24/94 Thermocouple No: 429

Calibrator: R. Webb Reference: ASTM

Range: _____

Reference point no.	Source*	Reference thermometer temperature °F	Thermocouple temperature °F	Difference %**
1	2	72	74	.38
2	1	37	37	Ø
3	3	210	210	Ø
4	4	493	492	.10

* Source: 1) Ice bath
2) Ambient
3) Water bath
4) Oil bath

** Percent difference.

$$\frac{\text{Reference temp. °R - thermocouple temp. °R}}{\text{(Reference temp. °R)}} \times 100\%$$

where °R = °F + 460

Each percent difference must be less than or equal to 1.5%.

Checked by _____ Date 1/24/94

INTERNATIONAL TECHNOLOGY CORPORATION

THERMOCOUPLE CALIBRATION DATA SHEET

Date: 12/27/93 Thermocouple No: 639

Calibrator: H-Bowles Reference: ASTM-31F

Range: _____

Reference point no.	Source*	Reference thermometer temperature °F	Thermocouple temperature °F	Difference %**
1	2	72	71	.19
2	1	33	34	-.20
3	3	186	187	-.15
4	4	436	439	-.33

* Source: 1) Ice bath
2) Ambient
3) Water bath
4) Oil bath

** Percent difference.

$$\frac{\text{Reference temp. °R - thermocouple temp. °R}}{\text{(Reference temp. °R)}} \times 100\%$$

where °R = °F + 460

Each percent difference must be less than or equal to 1.5%.

Checked by B Fowler Date 1/3/94

INTERNATIONAL TECHNOLOGY CORPORATION

THERMOCOUPLE CALIBRATION DATA SHEET

Date: 12/27/93 Thermocouple No: 128

Calibrator: H. Bowles Reference: ASTM-3F

Range: _____

Reference point no.	Source*	Reference thermometer temperature °F	Thermocouple temperature °F	Difference %**
1	2	72	72	—
2	1	33	34	-.20
3	3	185	186	-.16
4	4	433	436	-.34

* Source: 1) Ice bath
2) Ambient
3) Water bath
4) Oil bath

** Percent difference.

$$\frac{\text{Reference temp. °R - thermocouple temp. °R}}{\text{(Reference temp. °R)}} \times 100\%$$

where °R = °F + 460

Each percent difference must be less than or equal to 1.5%.

Checked by _____ Date 1/19/94

Digital Indicators for Thermocouple Readout

A digital indicator is calibrated by feeding a series of millivolt signals to the input and comparing the indicator reading with the reading the signal should have generated. Error did not exceed 0.5 percent when the temperatures were expressed in degrees Rankine. Calibration data are included in the following Thermocouple Digital Indicator Calibration Data Sheet(s).

INTERNATIONAL TECHNOLOGY CORPORATION

DIGITAL INDICATOR CALIBRATION DATA SHEET

DATE: 9-26-94 INDICATOR: FT-5

OPERATOR: J. Neese

Test Point Number	Equivalent Temperature, °F T_e	Digital Indicator Temperature, °F T_{dI}	Difference,* %
1	0	0	0
2	100	98	.36
3	200	200	0
4	300	297	.39
5	400	397	.35
6	500	497	.31
7	1000	999	.07
8	1300	1296	.23
9	1600	1597	.15
10	1900	1895	.21

*PERCENT DIFFERENCE MUST BE LESS THAN OR EQUAL TO 0.5%

$$\% \text{ DIFFERENCE} = \frac{(T_e, °F - T_{di}, °F)}{(T_e, °F + 460)} \times 100$$

Checked By JT Date 9/26/94

INTERNATIONAL TECHNOLOGY CORPORATION

DIGITAL INDICATOR CALIBRATION DATA SHEET

DATE: 1-26-94 INDICATOR: FT-9

OPERATOR: J. Neese

Test Point Number	Equivalent Temperature, °F T_e	Digital Indicator Temperature, °F T_{dI}	Difference,* %
1	0	0	0
2	100	99	.18
3	200	201	.15
4	300	298	.26
5	400	398	.23
6	500	497	.31
7	1000	996	.27
8	1300	1293	.40
9	1600	1592	.39
10	1900	1889	.47

*PERCENT DIFFERENCE MUST BE LESS THAN OR EQUAL TO 0.5%

$$\% \text{ DIFFERENCE} = \frac{(T_e, °F - T_{di}, °F)}{(T_e, °F + 460)} \times 100$$

Checked By: _____ Date: _____

Dry Gas Thermocouples and Impinger Thermocouples

The dry gas thermocouples are calibrated by comparing them with an ASTM-3F thermometer at approximately 32°F, ambient temperature, and a higher temperature between approximately 100° and 200°F. The thermocouples agreed within 5°F of the reference thermometer. The impinger thermocouples are checked in a similar manner at approximately 32°F and ambient temperature, and they agreed within 2°F. The thermocouples may be checked at ambient temperature prior to the test series to verify calibration. Calibration data are included in the following Dry Gas Thermometer and Impinger Thermocouple Calibration Data Sheet(s).

INTERNATIONAL TECHNOLOGY CORPORATION

DRY GAS THERMOCOUPLE CALIBRATION DATA SHEET

Date: 9-26-94 Thermocouple No: FT-5

Calibrator: J. Neese Reference: ASTM-3F

Inlet

Reference point no.	Source*	Reference thermometer temperature °F	Thermocouple temperature °F	Difference °F**
1	1	68	69	1
2	2	32	34	2
3	3	158	159	1

Outlet

Reference point no.	Source*	Reference thermometer temperature °F	Thermocouple temperature °F	Difference °F**
1	1	68	70	2
2	2	32	34	2
3	3	162	164	2

* Source: 1) Ambient
2) Ice bath
3) Water bath

** Difference must be less than 5°F at both points.

Checked by JT Date 9/26/94

INTERNATIONAL TECHNOLOGY CORPORATION

DRY GAS THERMOCOUPLE CALIBRATION DATA SHEET

Date: 9-28-94 Thermocouple No: FT-9

Calibrator: J. Neese Reference: ASTM-3F

Inlet

Reference point no.	Source*	Reference thermometer temperature °F	Thermocouple temperature °F	Difference °F**
1	1	68	69	1
2	2	34	35	1
3	3	152	154	2

Outlet

Reference point no.	Source*	Reference thermometer temperature °F	Thermocouple temperature °F	Difference °F**
1	1	68	69	1
2	2	34	35	1
3	3	152	155	3

* Source: 1) Ambient
2) Ice bath
3) Water bath

** Difference must be less than 5°F at both points.

Checked by JJ Date 9/...

INTERNATIONAL TECHNOLOGY CORPORATION

IMPINGER THERMOCOUPLE CALIBRATION DATA SHEET

Date: 3-22-94 Thermocouple No: I-97

Calibrator: J Neese Reference: ASTM

Reference point no.	Source*	Reference thermometer temperature °F	Thermocouple temperature °F	Difference °F**
1	1	70	71	1
2	2	34	34	0

* Source: 1) Ambient
2) Ice bath

** Difference must be less than 2°F at both points.

Checked by [signature] Date 3-22-94

Trip Balance

The trip balance is calibrated by comparing it with Class-S standard weights, and it agreed within 0.5 g. Calibration data are shown in the following Trip Balance Calibration Data Sheet(s).

INTERNATIONAL TECHNOLOGY CORPORATION

TRIP BALANCE CALIBRATION DATA SHEET

Balance No.	Date	Calibrator	Mass determined for					
			5 g	Error	50 g	Error	100 g	Error
422	1/25/94	J. Neese	4.9	0.1	50.0	0.0	100.0	0.0
Mettler	1/25/94	J. Neese	5.0	0.0	50.0	0.0	100.0	0.0
199	1/25/94	J. Neese	5.0	0.0	50.0	0.0	99.9	0.1
421	1/25/94	J. Neese	5.2	0.2	50.3	0.3	100.3	0.3
419	1/25/94	J. Neese	5.0	0.0	49.9	0.1	99.9	0.1
198	1/25/94	J. Neese	5.0	0.0	50.0	0.0	100.0	0.0

Error must not exceed 0.5 grams at each point.

Checked by J. Neese Date 1-25-94

Barometer

The field barometer is calibrated to within 0.1 in.Hg of an NBS-traceable mercury-in-glass barometer before the test series. It is checked against the reference barometer after each test series to determine if it reads within 0.2 in.Hg. The barometer read within the allowable limits each time. Calibration data are included in the following Barometer Calibration Log(s).

BAROMETER CALIBRATION LOG

	BAROMETER NO.	401	415	431	408	431	447	401
	Client	Ford	GEORGIA PACIFIC	Phthalichem	Glacier Vanity	~~WEATHERFORD~~	PHTHALICHEM	PCI
	Project No.	332417	332432		332430			
PRETEST	BAROMETER READING	29.60	29.72	29.68	29.73	29.56	29.46	29.58
	REFERENCE BAROMETER READING	29.58	29.72	29.70	29.74	~~29.55~~	29.46 ~~29.55~~	29.60
	DIFFERENCE*	.02	0	.02	.01	0.01	0.0	.02
	DATE	10-3-94	10-4-94	10.4.94	10/12/94	10/21/94	10/19/94	10/25/94
	CALIBRATOR	[illegible]	DC	[illegible]	[illegible]	PT	PT	[illegible]

POST-TEST	BAROMETER READING	29.46	29.68	29.56	29.77	29.65	29.57	29.77
	REFERENCE BAROMETER READING	29.46	29.70	29.55	29.77	29.63	29.55	29.77
	DIFFERENCE**	0.00	0.02	0.01	.00	.02	0.02	.00
	DATE	10/10/94	10/17/94	10/21/94	11/7/94	10/27/94	10/21/94	11/7/94
	CALIBRATOR	[illegible]	[illegible]	PT	[illegible]	[illegible]	PT	[illegible]

*Barometer is adjusted so that difference does not exceed 0.05 in. Hg.
**Barometer is not adjusted. If difference exceed 0.10 in. Hg, inform project manager immediately.

Orsat Analyzer

The Orsat analyzer is calibrated before the test series by determining the percentages of carbon dioxide and oxygen in a calibration gas containing known percentages of each. The analyzer read within 0.5 percent of the known values. Calibration data are shown in the following Orsat Calibration Data Sheets.

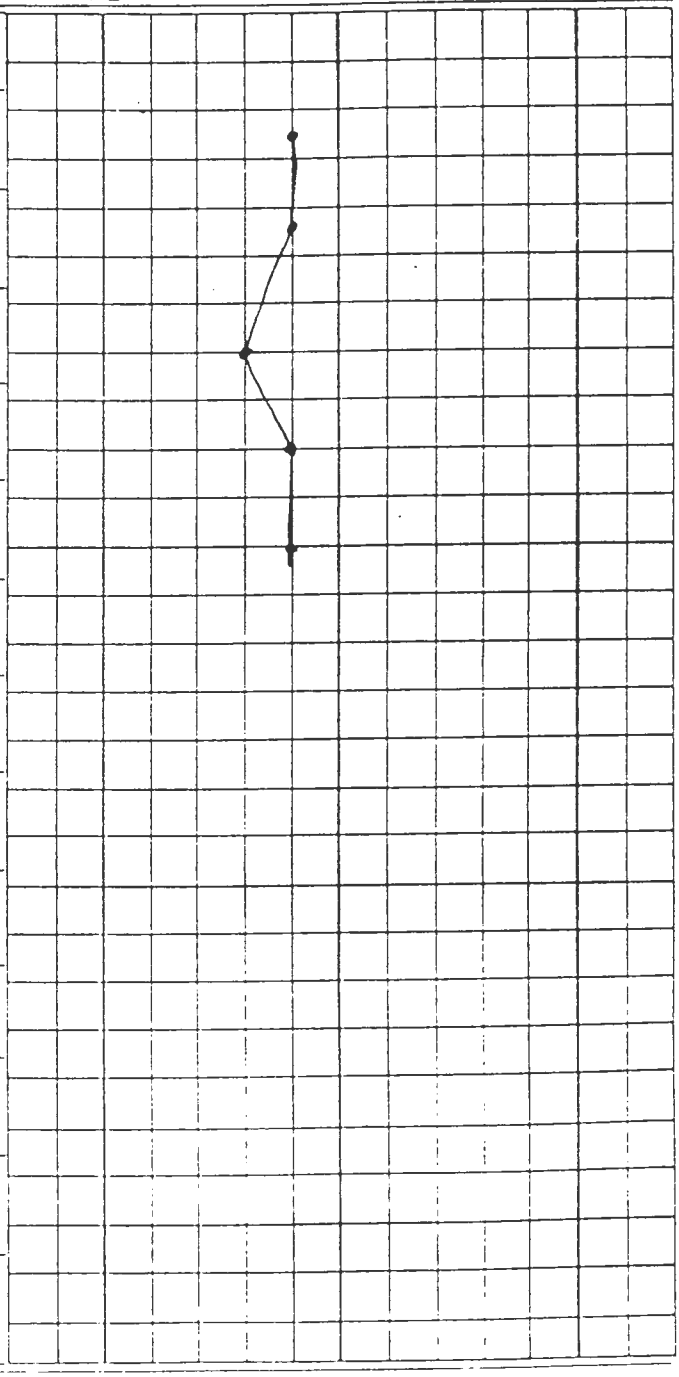
INTERNATIONAL TECHNOLOGY CORPORATION

Reference Gas: Scott ~~Matheson Gas Products, Inc.~~
Cylinder No. 4
Control No.
Analysis: CO_2- 4.96 %
O_2- 9.92 %
CO- 1.99 %

ORSAT CALIBRATION DATA SHEET

Orsat No.: 423 Gas: CO_2

Calibrator	Date	PN	Value determined
O2 Calib	3-7-94	332-369	4.9
D. Cahill	3-21-94	332-374	4.9
Jmeese	7/12/94	332-400	4.8
Jmeese	9/16/94	332-421	4.9
MS	10/14/94	335-	4.9



INTERNATIONAL TECHNOLOGY CORPORATION

Reference Gas: Scott ~~Matheson Gas Products, Inc.~~
Cylinder No. ~~4~~
Control No.
Analysis: CO_2 - 4.96 %
O_2 - 9.92 %
CO - 1.99 %

ORSAT CALIBRATION DATA SHEET

Orsat No.: 423 Gas: O_2

Calibrator	Date	PN	Value determined
D Cahill	3-7-94	332-369	9.9
D Cahill	3-21-94	332-374	9.9
Jfreese	7/12/94	332 400	10.0
Jfreese	9/16/94	332 421	10.0
[illegible]	10/14/94	~~332~~	10.0