1991 ANNUAL REPORT

SUMMARIZING THE RESULTS OF LANDFILL GAS MONITORING PROGRAMS AT THE OLD BETHPAGE SOLID WASTE DISPOSAL COMPLEX AND ADJACENT AREAS

SUBMITTED TO:

TOWN OF OYSTER BAY
DEPARTMENT OF PUBLIC WORKS

JUNE 1992

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OLD BETHPAGE
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AND ADJACENT AREAS

Submitted to:

TOWN OF OYSTER BAY

DEPARTMENT OF PUBLIC WORKS

SYOSSET, NEW YORK

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JUNE 1992

TABLE OF CONTENTS

		Page
Section 1	Background	
	1.1 General	1-1
	1.2 Presence of Combustible Gas	1-1
	1.3 Authority	1-2
	1.4 Background of Gas Detection and Control Programs	1-6
Section 2	Sampling	
	2.1 General	2-1
	2.2 Monitoring Equipment Operation	2-1
	2.3 Current Gas Monitoring	2-2
Section 3	Discussion of Results	
	3.1 General	3-1
	3.2 Landfill Gas Migration	3-1
	3.2.1 Site Survey	3-2
	3.2.2 Monthly Monitoring Survey	3-3
	3.3 Facility Surveys	3-5
	3.3.1 Nassau County Fireman's Training Center Survey	3-5
	3.3.2 Adjacent Building Structures & Incinerator Complex Survey	3-5
	3.3.3 Nassau County Campground Survey	3-6
	3.3.4 Senior Citizen Housing Survey	3-6
	3.4 Phase 1 Gas Control & Recovery System	3-7
	3.5 Phase 2 Gas Control System	3-7
	3.6 Phase 3 Gas Control System	3-8
	3.7 Relocation of the Phase 3 Gas Control System Header	3-9
Section 4	Conclusions	
	4.1 Landfill Gas Migration	4-1
	4.1.1 Site Survey	4-1
	4.1.2 Monthly Monitoring Survey	4-2

			Page
	4.2	Facilities Survey	4-3
		4.2.1 Nassau County Fireman's Training Center Survey	4-3
		4.2.2 Adjacent Building Structures & Incinerator Complex Survey	4-3
		4.2.3 Senior Citizen Housing Survey	4-4
		4.2.4 Nassau County Campground Survey	4-4
	4.3	Supplemental Gas Monitoring Program	4-4
		4.3.1 Ambient Volatile Organic Compound (VOC) Air Sampling	4-4
		4.3.2 Subsurface VOC Gas Sampling	4-4
		4.3.3 Thermal Oxidizer Emissions Sampling for VOC's	4-5
		4.3.4 Pressure Readings	4-5
	4.4	Monitoring Program Conclusions	4-6
Section 5	Recommendations		
	5.1	General	5-1
	5.2	Monitoring Programs	5-1
	5.3	Presence of Combustible Gas at the Nassau County Fireman's Training Center	5-2
	5.4	Gas Extraction System Condensate Discharge	5-3
	5.5	Inspection and Maintenance of Existing Extraction Wells	5-4
	5.6	Quarterly Supplemental Sampling	5-4
	5.7	Groundwater Treatment Facility	5-5
Appendix A	Recommended Monitoring Schedule for 1992		A-1
Appendix B	Identification of Monitored Buildings Adjacent to the OBSWDC		B-1
Appendix C	Ambient Air Quality Survey and Soil Gas Quality Survey (Third and Fourth Quarter Reports)		C-1
Appendix D	Landfill Gas Thermal Oxidizer Emissions Tests (Fourth Quarter Report)		D-1
Drawing No. 1	Old Bethpage Solid Waste Disposal Complex - Zero Percent Methane Gas Migration Contours 1991 Annual Site Survey		

LIST OF FIGURES

Figure Number	Title	Follows Page
1	1991 Perimeter Monitoring Points at OBSWDC	2-3
2	1991 Perimeter Monitoring Points at OBSWDC	2-3
3	1991 Monitoring Points at the Fireman's Training Center	2-3
4	Adjacent Building Structures and Incinerator Complex Survey	2-3
5	Adjacent Building Structures and Incinerator Complex Survey	2-3
6	Adjacent Building Structures and Incinerator Complex Survey	2-3
7	Town of Oyster Bay Senior Citizen Housing Combustible Gas Survey	2-4
8	Location of Phase 1, 2 and 3 Gas Control & Recovery Systems	3-1
9	Single Point Sampling Probe	3-3
10	Pressure Probe	3-3
11	Cluster Well	3-3
12	Varying Depth Cluster Well	3-3
13	Adjacent Building Structures and Incinerator Complex Survey (Updated for 1992)	5-5
14	Groundwater Treatment Facility	5-5

LIST OF TABLES

Table Number	Title	Follows Page
1	1991 Monthly Monitoring Survey Old Bethpage Solid Waste Disposal Complex	3-2
2	1991 Monthly Monitoring Survey Nassau County Fireman's Training Center	3-2
3	1991 Monthly Monitoring Survey Adjacent Building Structures & Incinerator Complex Survey	3-5
4	1991 Monthly Monitoring Survey Senior Citizen Housing Survey	3-5

SECTION 1

BACKGROUND

1.1 General

The Old Bethpage Solid Waste Disposal Complex (OBSWDC) is located between Winding and Claremont Roads, south of Bethpage-Sweet Hollow Road in the Town of Oyster Bay, Nassau County, New York. The OBSWDC consists of a total of 134 acres which contain a closed landfill (a majority of which is capped, the remaining to be completed by the end of 1992), inactive incinerators, an inactive baler, a municipal solid waste (MSW) Transfer Facility, a Groundwater Treatment Facility, a Leachate Treatment Facility, Landfill Gas Control and Recovery Systems, a Clean Fill Disposal Site, a Recycling Facility, scalehouse,recharge basins, stockpile areas and vehicle maintenance facilities.

1.2 Presence of Combustible Gas

On March 7, 1979, pursuant to inspections performed by the Nassau County Fire Commission, a violation was issued to the Nassau County Fireman's Training Center (NCFTC) and an order was given to remove all sources of ignition at the NCFTC because an explosive atmosphere was reported to exist in certain enclosed areas on-site (the NCFTC borders the OBSWDC on the southeast). In order to prevent landfill gas (LFG) from contributing to the creation of an explosive atmosphere at the NCFTC, the Town installed a landfill gas control and recovery system. Subsequent to this event, the Town has and continues to conduct regular combustible gas monitoring at the NCFTC, along the perimeter of the OBSWDC, in on-site buildings and at various off-site locations.

1.3 Authority

The presence of migrating gases in the vicinity of the OBSWDC was factored into the "SPECIAL CONDITIONS" category attached to the Permit to Operate No. 0013, Application 30-S-15, dated August 14, 1979. This permit was issued by the New York State Department of Environmental Conservation (NYSDEC) to the Town as per the requirements of 6 NYCRR Part 360. Special Conditions 2 and 4 of the permit required that the Town submit the following three (3) reports, respectively:

- Old Bethpage Landfill, Fireman's Training Center, % Combustible Gas, Sampling Data Summary , LKB, August 31, 1979;
- Old Bethpage Landfill, Fireman's Training Center, % Combustible Gas, Sampling Data Summary, LKB, January 29, 1981; and
- Old Bethpage Landfill Land Use Plan, LKB, December 1, 1979.

Both the August 31, 1979 and January 29, 1981 reports and The Land Use Plan included capital improvement programs for the collection and treatment of landfill gas (LFG) and ongoing LFG sampling programs. The Land Use Plan and monitoring programs received Town approval as per Town Board Resolution No. 136-80 (TBR 136-80) on February 9, 1980 and NYSDEC approval on January 31, 1981. Renewal of the 6 NYCRR Part 360 permit to operate was applied for by the Town on July 6, 1982. This renewal permit was issued by the NYSDEC to the Town on June 1, 1984 as per the requirements of 6 NYCRR Part 360.

As part of the renewal permit conditions, the Town was required to develop a monthly monitoring program acceptable to the NYSDEC and the Nassau County Department of Health (NCDH). The monitoring program was conducted along all boundaries of the OBSWDC and in all on-site facility structures. Monitoring results were required to be submitted in the form of a report to the NYSDEC and the NCDH. In April 1986, the landfill ceased operations and all MSW subsequently has been hauled off-site for disposal or recycling.

Additionally, the Town was required to submit an annual engineering report prepared by a licensed professional engineering firm for the purpose of summarizing the status of all landfill gas monitoring programs, including the zero percent gas migration limitations. Authorization for work summarized in this report was granted on January 8, 1991 and September 17, 1991 by passage of TBR No. 38-91 and 801-91, respectively, and is outlined as follows:

- annual site monitoring program exploring the radial migration of landfill gas;
- evaluation of the monthly monitoring data which are obtained by Town personnel;
- submission of an engineering report evaluating the results from both the site monitoring and monthly monitoring programs;
- transmission of all the evaluated combustible gas monitoring data to the Town, which are then sent to the regulatory authorities;
- coordination of all the Town landfill gas monitoring programs outlined in Section 6 of the Comprehensive Land Use and Operations Plan, (LKB, October 1983).

On June 30, 1988, the Town of Oyster Bay and the New York State Department of Law (NYSDOL) entered into a Final Consent Decree in the United States District Court for the remediation of the Old Bethpage Landfill (83 CIV. 5357). Incorporated into the Consent Decree was a Remedial Action Plan (RAP) which detailed the actions to be undertaken by the Town in compliance with the Final Consent Decree.

Appendix A, Section I(H) of the RAP obligates the Town to continue to operate and maintain the existing gas control system in compliance with the requirements of 6 NYCRR Part 360 and maintain a zero percent gas migration limitation at the OBSWDC property boundary. The RAP further states that in order to demonstrate such compliance, the Town will have to conduct the monitoring program described in the Lockwood, Kessler & Bartlett Report entitled 1986 Annual Report Summarizing the Status of Landfill Gas Monitoring Programs and the Establishment of the Zero Percent Gas Migration Limitation at the Old Bethpage Landfill (LKB, April 1987).

In addition, the same section of the RAP requires the Town to supplement this monitoring program with data obtained from the following:

- quarterly ambient volatile organic compound (VOC) air sampling to be taken at three (3) selected locations during the first year of remediation and if approved by the New York State Department of Law (NYSDOL), annually thereafter;

- quarterly subsurface VOC gas sampling to be collected at fourteen (14) selected sampling locations at a depth of 30" during the first year of remediation and if approved by the NYSDOL, on an annual basis thereafter;

- quarterly subsurface VOC gas sampling at locations M-9 (Figure 1) at depths of 10', 20', 30' and 40' during the initial year of remediation, and if approved by the NYSDOL, on an annual basis thereafter;

- quarterly thermal oxidizer emission sampling for VOC levels during the initial year of remediation. These results will be related to the thermal oxidizer temperatures during the initial year of sampling. Thereafter, the oxidizer temperatures will be monitored on a monthly basis to insure that temperatures needed to volatilize the organics are being maintained in the oxidizer.

The oxidizer emissions will continue to be sampled on an annual basis for VOC content;

- quarterly pressure readings at three (3) locations during the initial year of remediation and if approved by the NYSDOL, on an annual basis thereafter.

Two quarterly rounds of ambient air and subsurface soil gas sampling were completed in 1990. The third and fourth quarterly rounds were completed in 1991. Three quarterly rounds of emissions sampling of the thermal oxidizer were completed in 1990 and a fourth in 1991. Since sampling wells had not yet been installed, only one round of pressure monitoring was performed in 1991. All quarterly reports were submitted to the NYSDEC for review.

Upon receipt of the fourth and last quarterly report concerning the sampling of the ambient air, a review of all the quarterly analytical data indicated that in some respects ambient air data taken upwind of the landfill showed higher VOC's than downwind data.

These data were further analyzed to determine what, if any, impact the landfill has on the ambient air. That interpretive report entitled "Evaluation of Ambient Volatile Organic Compounds in Air and Soils" concluded that five organic compounds in both upwind and downwind samples were in excess of the current Ambient Guideline Concentrations (AGC's) (effective June 1991), although not in excess of the AGC's in effect at the beginning of the sampling program. The presence of VOC's in the upwind samples suggested that significant upwind emission sources exist, and that the data generated to date indicates that the landfill and/or the thermal oxidizer does not have a significant adverse impact on the ambient air.

Results of the fourth and last quarterly report concerning the sampling of soil gas and a review of all quarterly analytical data indicated that VOC concentrations were present in the subsurface soil surrounding the OBSWDC. The observed soil gas concentrations do not appear to pose a significant risk becaue coincident ambient air measurements did not show a strong correlation to the observed soil gas values.

Analytical test results presented in the Fourth Quarterly Report indicated that the thermal oxidizer emissions were all well below the acceptable ambient guideline concentration (AGC's) as stipulated by the NYSDEC.

Results of the quarterly pressure sampling indicated that all pressure probes were under zero or negative pressure at the time of the test. This supports data obtained as part of the annual zero migration line which shows that as a result of the effectiveness of the Town's landfill gas control system that no off-site landfill gas migration is occurring at the OBSWDC.

As per the conditions of the Final Consent Decree and the Remedial Action Plan (RAP Attachment 2-Old Bethpage Landfill Supplemental Gas Monitoring Program), appended herewith are the Ambient Air Quality and Soil Gas Quality Survey's - Third and Fourth Quarter Reports (Appendix C) and the Landfill Gas Thermal Oxidizer Emissions Test - Fourth Quarter Report (Appendix D) required as part of the Supplemental Gas Monitoring Program.

1.4 Background of Gas Detection and Control Programs

The Town of Oyster Bay has initiated several detection and control programs to monitor and prevent the off-site migration of landfill gas in the vicinity of the OBSWDC. Initially, the Town installed permanent sampling probes around the perimeter of the OBSWDC to detect potential off-site landfill gas migration. Next, field data were collected to help locate areas possibly troubled by off-site landfill gas migration.

Upon analysis of the data collected during the field measurements and based on the calculations presented in the Engineering Report entitled Preliminary Engineering Design Report: Phase 1 Gas Control and Recovery Program (LKB, June 1980), the Town prepared final Contract Documents for public bid (April 1981) to obviate the potential for off-site migration of landfill gas onto NCFTC property. The Phase 1 Gas Control and Recovery System became operational in June 1982. These actions were immediately undertaken by the Town thereby alleviating off-site landfill gas migration onto the NCFTC.

As part of the conclusions and recommendations presented in the Preliminary Engineering Design Report (LKB, June 1980) and based on additional monitoring data obtained by the Consultants, which revealed that gas migration was occurring across Winding Road, the Town prepared final Contract Documents for public bid (May 1983) and constructed the Phase 2 Gas Control System.

The Phase 2 System was constructed by the Town to control the off-site migration of landfill gas along Winding Road. To monitor the effectiveness of the Phase 2 System, the Town installed new permanent sampling probes adjacent to and across the road from the system along Winding Road. The Phase 2 System and the permanent sampling probe construction were completed in April 1984.

The Town also installed an additional vent well, approximately 300 feet south of LGV-5, to further guard against possible migration of landfill gas onto the NCFTC from the Phase I Landfill (western portion of

NCFTC). As discussed in detail in Section 3, the utilization of the Phase 2 System has effectively alleviated the off-site migration of landfill gas along Winding Road.

Based on the results of past site monitoring data obtained by the Consultants over a five year period (between 1982 and 1986), which revealed that gas migration was possibly occurring in the vicinity of the northwestern corner and western portions of the OBSWDC, the Town prepared final Contract Documents (October 1985) and constructed the Phase 3 Gas Control System. Construction of the Phase 3 Gas Control System was completed in early March 1987 and the system was placed in full operation in April 1987.

The Phase 3 system, which is similar in design to the Phase 1 and 2 Systems, was designed to obviate the migration of landfill gas in the northwestern and western portions of the OBSWDC. As discussed in detail in Section 3, the Phase 3 Gas Control System has effectively obviated the migration of landfill gas from this portion of the OBSWDC.

In addition to the previously mentioned detection and control programs, the Town has implemented several other detection and control programs to monitor and prevent the off-site migration of landfill gases. Following is a brief description of these programs as well as additional landfill gas/condensate related projects:

- As part of the Remedial Action Plan, which requires the Town to cap all existing uncapped portions of the landfill, a portion of the existing Phase 3 Gas Control System header had to be removed and a buried header installed. The buried header continues to operate as did the above-ground header to obviate the migration of landfill gas in this portion of the site. The Town is currently scheduling the work to be conducted to deactivate the buried header and reinstall the above-ground header system.

- In December 1985, the Town granted and leased all rights to landfill gas which is produced within the existing portions of the OBSWDC to Energy Tactics, Inc. (ET). As part of this lease, ET designed a system to convert high quality landfill gas into energy for sale to the Long Island Lighting Company (LILCO). Upon the sale of energy to LILCO, the Town receives a royalty payment from ET. This lease remains in force for twenty-five years and based on operations to date will continue to be beneficial to both the Town and ET. It should be noted that during the course of landfill capping, ET has had to remove/relocate portions of their system to accommodate these operations. ET submitted an application to operate a Solid Waste Management Facility to the NYSDEC in September 1989 and to date has not received a permit.

- In order to maintain a safe environment for training activities at the NCFTC, the County and the Town had previously agreed to jointly study the occurrence of subsurface combustible gas on the NCFTC and recommend appropriate remedial measures. That agreement was formalized in a document entitled, <u>Town of Oyster Bay Landfill/ Fireman's Training Center Subsurface Gas Sampling Program Work Scope,</u> Malcolm Pirnie, Inc., November, 1988, The Work Scope. After completion of the Phase I activities outlined in the Work Scope, the parties agreed that sufficient data resulting from the above was obtained to allow the remediation to proceed directly to the design phase of this project, thereby accelerating the remediation program.

In April, 1990, the County and Town agreed to jointly study the potential of a subsurface barrier in detering the movement of combustible gas in either direction along a portion of the common border of the NCFTC/OBSWDC. A consultant specialized in slurry wall design was retained to conduct soil borings and determine the preliminary design parameters for a barrier wall. This program was suspended, while the County conducted further testing on the NCFTC, involving the use of subsurface gas extraction wells. The County issued a draft report on its findings in 1991. This report indicated that one extraction well located near the western boundary of the NCFTC and operated at 50-100 CFM produced a large lateral area of vacuum (radius of influence) on the site, effectively exhausting subsurface soil gases. The report further demonstrated that when this well and the existing Town gas extraction wells operate simultaneously, all areas of concern were under vacuum. Therefore, both the County and Town have agreed that a barrier wall along the property boundary is not required at this time.

The County and Town also signed a betterment agreement wherein both parties will jointly share in upgrading the Town's facilities in the areas of joint concern. The projected design of the improvements will provide for the installation of a skid mounted blower, a water separator package and three (3) landfill gas vents in the vicinity of the common border of the NCFTC/OBSWDC.

In summary, the County and Town have concluded that the improvements to the Town's gas control facilities currently contemplated will control the potential for gas migration along the common border of the NCFTC/OBSWDC. With the completion of work currently under consideration by the County, all subsurface landfill gas along the common border of the NCFTC/OBSWDC should be effectively under control. It is anticipated that construction activities to improve the Town's gas control facilities will begin in late 1992 or early 1993.

SECTION 2

SAMPLING

2.1 General

Sampling was performed by the following organizations:

- Town of Oyster Bay (TOB); and
- Lockwood, Kessler & Bartlett, Inc. (LKB).
- RTP Environmental Associates, Inc. (RTP).
- Air Pollution Characterization and Control, Ltd. (APCC).

RTP and APCC were contracted by LKB to assist in the preparation of necessary reports to comply with all of the requirements stipulated in the Consent Decree - RAP Attachment 2. RTP personnel conducted the sampling and analysis of ambient air and soil gases as well as the pressure sampling in the areas at and surrounding the OBSWDC. APCC conducted the emission measurement programs to characterize the air emission of the LFG Thermal Oxidzier at the OBSWDC.

2.2 Monitoring Equipment Operation

Specific monitoring equipment used by the parties are as follows:

- TOB and LKB: MSA Model 60 Combustible Gas Indicator.
- RTP: Monitoring equipment and sampling protocols utilized by RTP for the Ambient Air Quality and Soil Gas Quality Surveys are presented in Appendix C, (attached herewith).
- APCC: Monitoring equipment and sampling protocols utilized by APCC, for the Landfill Gas Thermal Oxidizer Emissions Tests are presented in Appendix D (attached herewith).

Sampling protocols utilized by both the Town and LKB include the following:

Prior to sampling, certain monitoring equipment instructions are to be read and precautions undertaken to assure proper equipment (MSA Model 60 Combustible Gas Indicator) operation. First, the instrument is calibrated (prior to sampling) using a check gas cylinder with a known methane gas concentration. Second, the aspirator bulb is squeezed to purge the instrument with fresh air so that readings do not reflect contamination from prior readings. Lastly, excessive liquid quantities are prevented from entering the instrument during sampling since it contains a water trap which prevents liquids from being inadvertently drawn. In addition to the above, the Town and LKB regularly send their instruments to the manufacturer for calibration, maintenance and repairs to assure proper equipment operation.

Sampling data collected by TOB and LKB personnel, using the MSA Model 60 Combustible Gas Indicator, yield readings that are expressed on a scale that measures the concentration of combustible gas present by volume.

The sampling procedures, utilized by TOB and LKB personnel, were performed according to the monitoring schedule recommended in the <u>1990 Annual Report Summarizing the Results of Landfill Gas Monitoring Programs at the Old Bethpage Solid Waste Disposal Complex and Adjacent Areas</u> (LKB, April, 1991). This report developed sampling programs in potentially hazardous areas in buildings situated on the NCFTC grounds, and areas on-site and off-site of the OBSWDC.

2.3 Current Gas Monitoring

There are presently a number of ongoing gas monitoring programs at the OBSWDC implemented to locate and/or detect areas of off-site LFG migration.

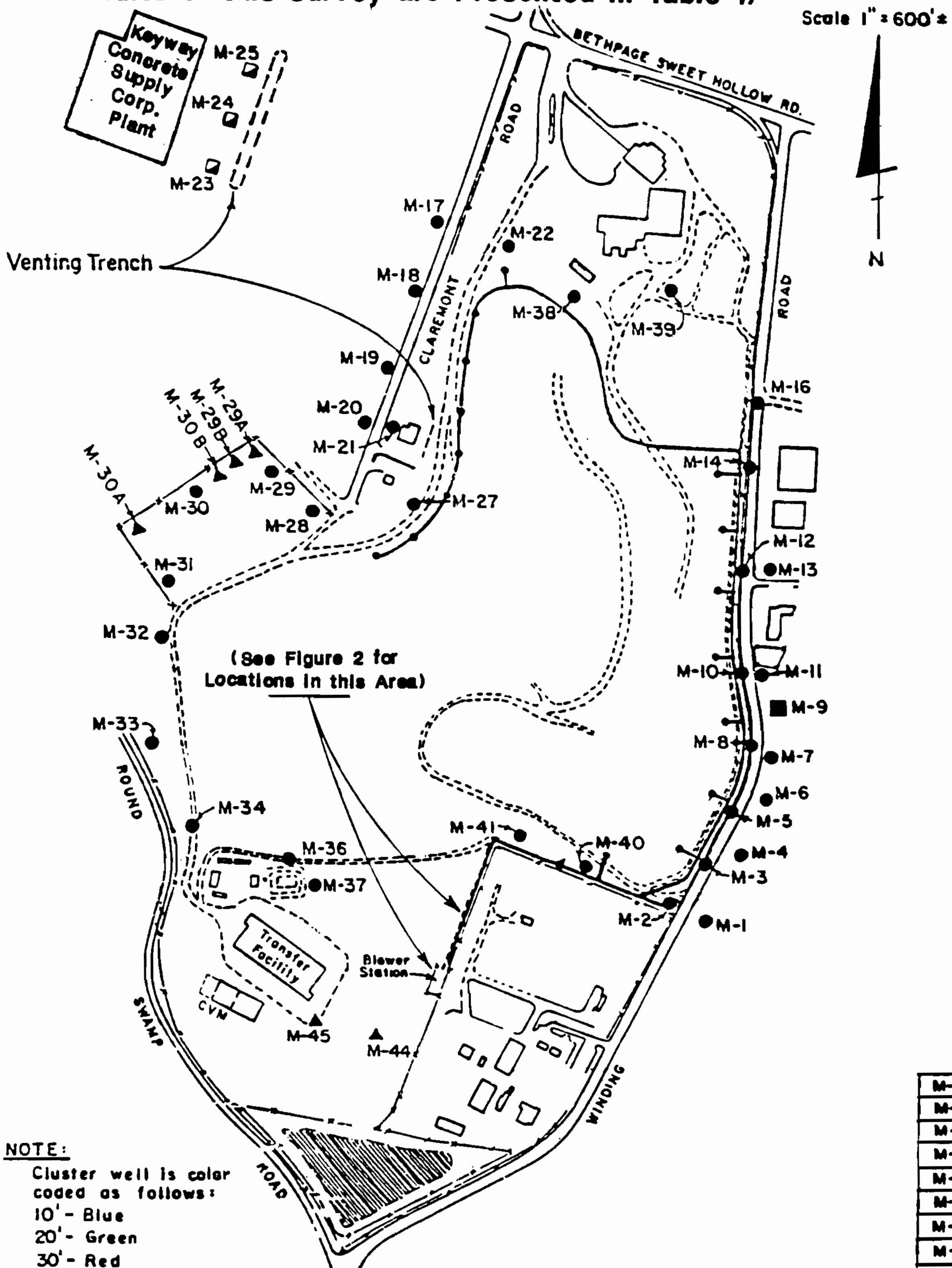
The annual facility and site survey, conducted by LKB personnel, presents data used to ascertain the extent of LFG migration along the OBSWDC boundary. The site survey also assesses the effectiveness of the Phase 1, 2 and 3 gas control and recovery systems in preventing off-site landfill gas migration onto NCFTC property and buildings adjacent to Winding, Round Swamp and Claremont Roads. Data obtained in the site survey are ultimately used to develop remedial programs for the modification and expansion of gas control and recovery systems, if necessary. Also, LKB personnel annually monitor the Nassau County Department of Parks and Recreation Battle Row Campground (The Campground) for the presence of off-site LFG migration.

Town of Oyster Bay personnel monitor the permanent sampling probes (Monthly Monitoring Survey) on a monthly basis to provide early warning in the event any off-site landfill gas migration occurs onto NCFTC property or beyond the OBSWDC property boundary (Figures 1, 2 and 3). The monthly monitoring survey is also used to determine subsurface landfill gas concentrations.

In addition to the previously mentioned TOB survey, Town of Oyster Bay personnel monitor (on a monthly basis) various locations at commercial properties immediately adjacent to the OBSWDC along Winding, Round Swamp and Claremont Roads, and in buildings located at the OBSWDC (Figures 4, 5 and 6). This survey (Adjacent Building Structures and Incinerator Complex Survey), was initiated as a result of the reported elevated levels of combustible gas on May 31, 1983, at the Key Way Concrete Supply Corp. Plant located at 100 Battle Row.

Lastly, Town of Oyster Bay personnel monitor (on a monthly basis) various points located in the interior and exterior of five (5) building structures immediately adjacent to the OBSWDC. This survey (Senior Citizen

1991 PERIMETER MONITORING POINTS AT OBSWDC
(Results of this Survey are Presented in Table 1)



SAMPLE LOCATION	COMBUSTIBLE GAS (%)
M-1	
M-2	
M-3	
M-4	
M-5	
M-6	
M-7	
M-8	
M-9	
-10'	
-20'	
-40'	
M-10	
M-11	
M-12	
M-13	
M-14	
M-16	
M-17	
M-18	
M-19	
M-20	
M-21	
M-22	
M-23	
M-24	
M-25	
M-27	
M-28	
M-29	
M-30	
M-31	
M-32	
M-33	
M-34	
M-36	
M-37	
M-38	
M-39	
M-40	
M-41	
M-44 Upper	
M-44 Lower	
M-45 Upper	
M-45 Lower	
M-29A Upper	
M-29A Lower	
M-29B Upper	
M-29B Lower	
M-30A Upper	
M-30A Lower	
M-30B Upper	
M-30B Lower	

NOTE:

Cluster well is color coded as follows:
10' - Blue
20' - Green
30' - Red
40' - Yellow

LEGEND:

- ● Denotes Single Point Sampling Probe, Depth 30".
- ■ Denotes Cluster Well. Depth 10', 20', 30' and 40'.
- ▲ Denotes Cluster Well, Varying Depth.
- ◪ Denotes Single Point Sampling Probe. Depth 8'.
- NS Denotes that No Sample was Obtained Due to Water in Sampling Location.

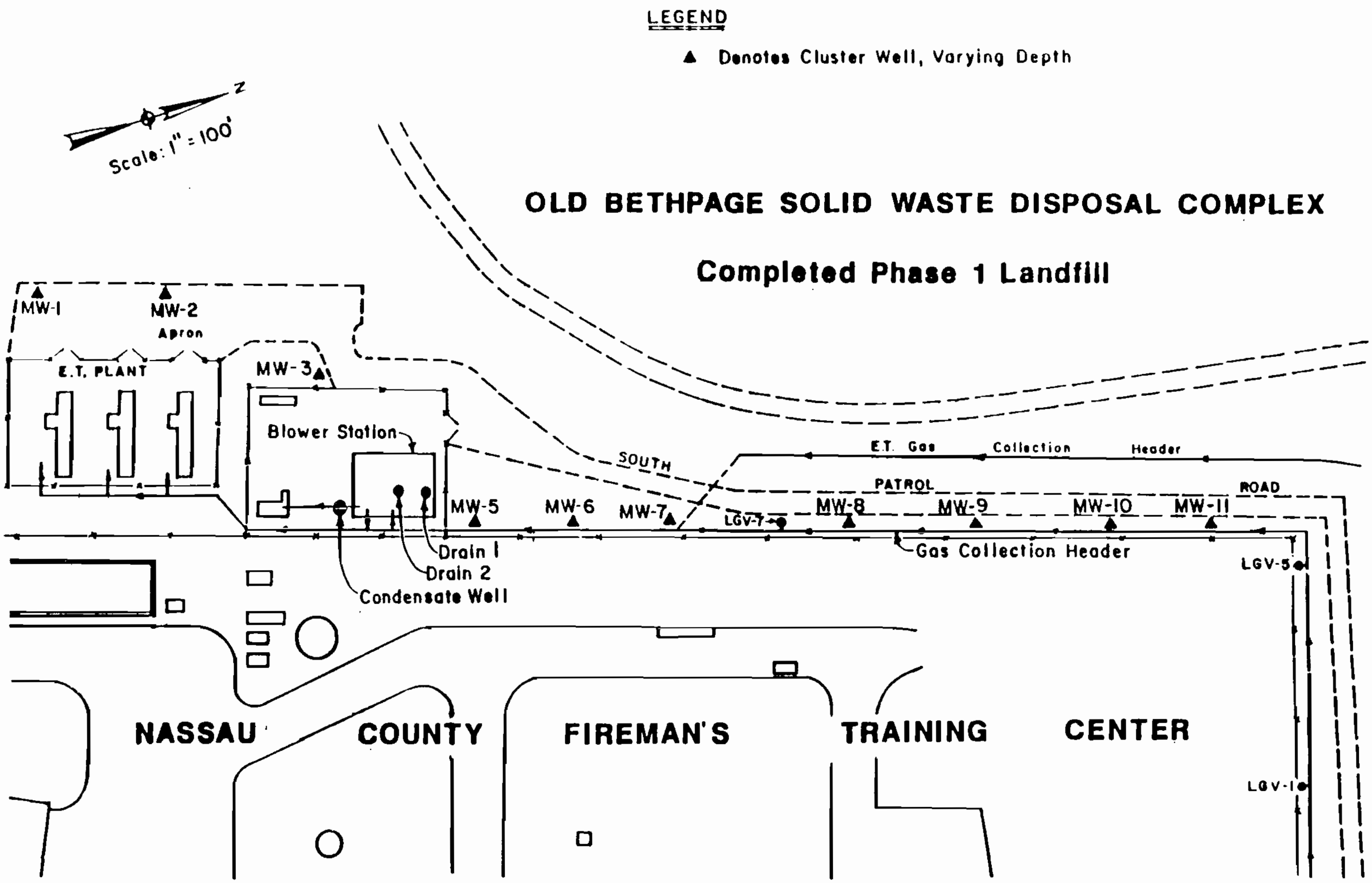
FIGURE 1

TOWN OF OYSTER BAY 1653 NEW YORK

LOCKWOOD, KESSLER & BARTLETT, INC.
ONE AERIAL WAY, SYOSSET, NEW YORK 11791

6014-13

JUNE 1992



SAMPLE LOCATION	% COMBUSTIBLE GAS
MW-1 Upper	
MW-1 Lower	
MW-2 Upper	
MW-2 Lower	
MW-3 Upper	
MW-3 Lower	
MW-5 Upper	
MW-5 Lower	
MW-6 Upper	
MW-6 Lower	
MW-7 Upper	
MW-7 Lower	
MW-8 Upper	
MW-8 Lower	
MW-9 Upper	
MW-9 Lower	
MW-10 Upper	
MW-10 Lower	
MW-11 Upper	
MW-11 Lower	
Drain 1	
Drain 2	
Condensate Well	

(Results of this Survey are Presented in Table 1)

FIGURE 2

1991 PERIMETER MONITORING POINTS AT OBSWDC

TOWN OF OYSTER BAY NEW YORK 1653

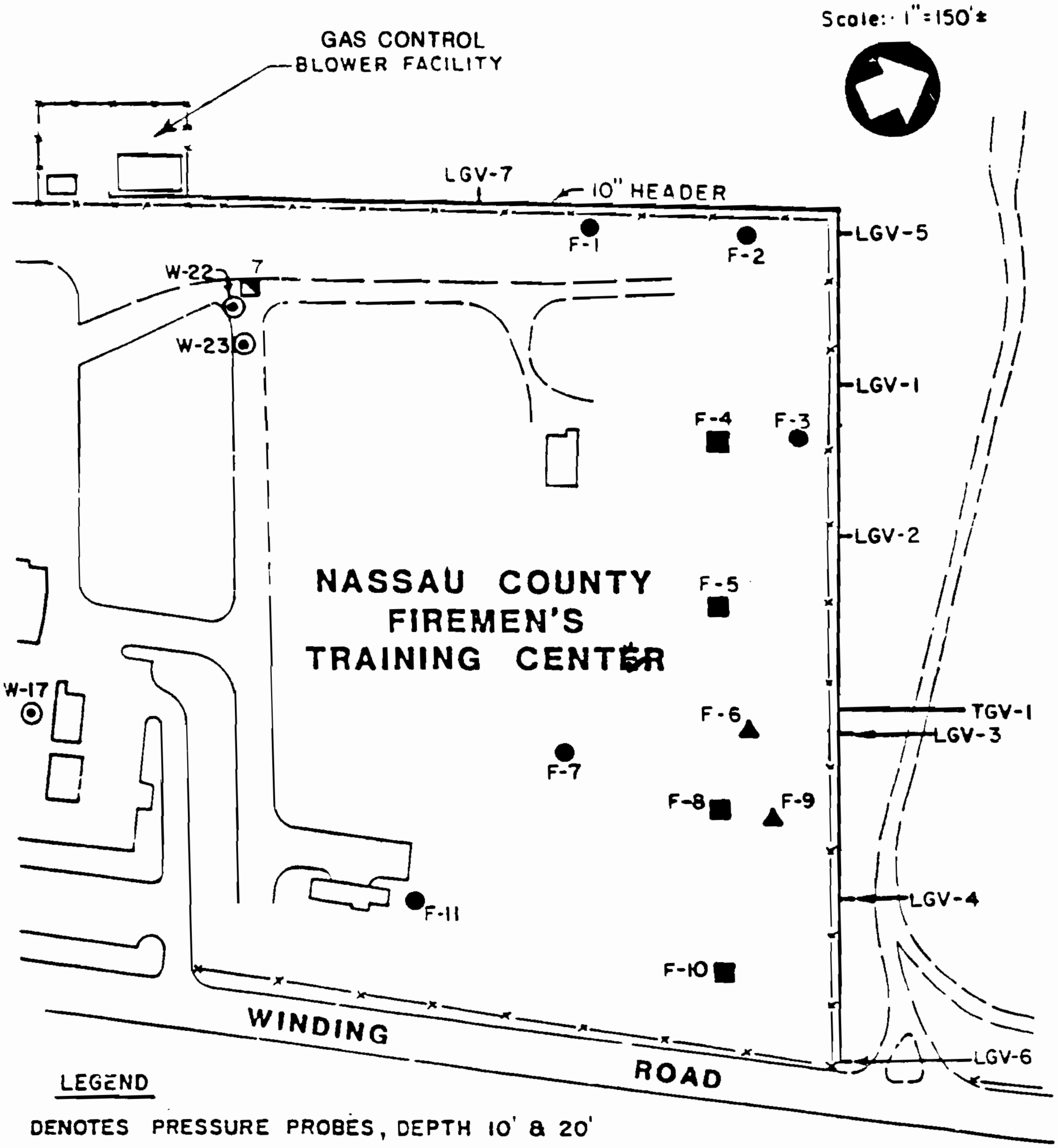
LOCKWOOD, KESSLER & BARTLETT, INC.
CONSULTING ENGINEERS SYOSSET, NEW YORK

6014-13

JUNE 1992

1991 MONITORING POINTS AT THE FIREMANS TRAINING CENTER

(Results of this Survey are Presented in Table 2)



SAMPLE LOCATION	% COMBUSTION GAS
F-1	
F-2	
F-3	
F-4	
AT 10'	
20'	
30'	
40'	
F-5	
10'	
20'	
30'	
40'	
F-6	
10'	
20'	
F-7	
F-8	
10'	
20'	
30'	
40'	
F-9	
10'	
20'	
F-10	
10'	
20'	
30'	
40'	
F-11	
W-17	
W-22	
W-23	
7	

LEGEND

▲ DENOTES PRESSURE PROBES, DEPTH 10' & 20'

■ DENOTES CLUSTER WELLS, DEPTH 10', 20', 30' & 40'

● DENOTES SINGLE POINT SAMPLING PROBES, DEPTH 30"

DENOTES PHASE I GAS SYSTEM

NS DENOTES THAT NO SAMPLE WAS OBTAINED DUE TO WATER IN SAMPLING LOCATION

⊙ DENOTES NASSAU COUNTY MONITORING WELL

DENOTES NASSAU COUNTY MONITORING DRYWELL

NOTES

1.) CLUSTER WELLS ARE COLOR CODED AS FOLLOWS
10'-BLUE, 20'-GREEN, 30'-RED, 40'-YELLOW

2.) PRESSURE PROBES ARE COLOR CODED AS FOLLOWS
10'-BLUE, 20'-GREEN

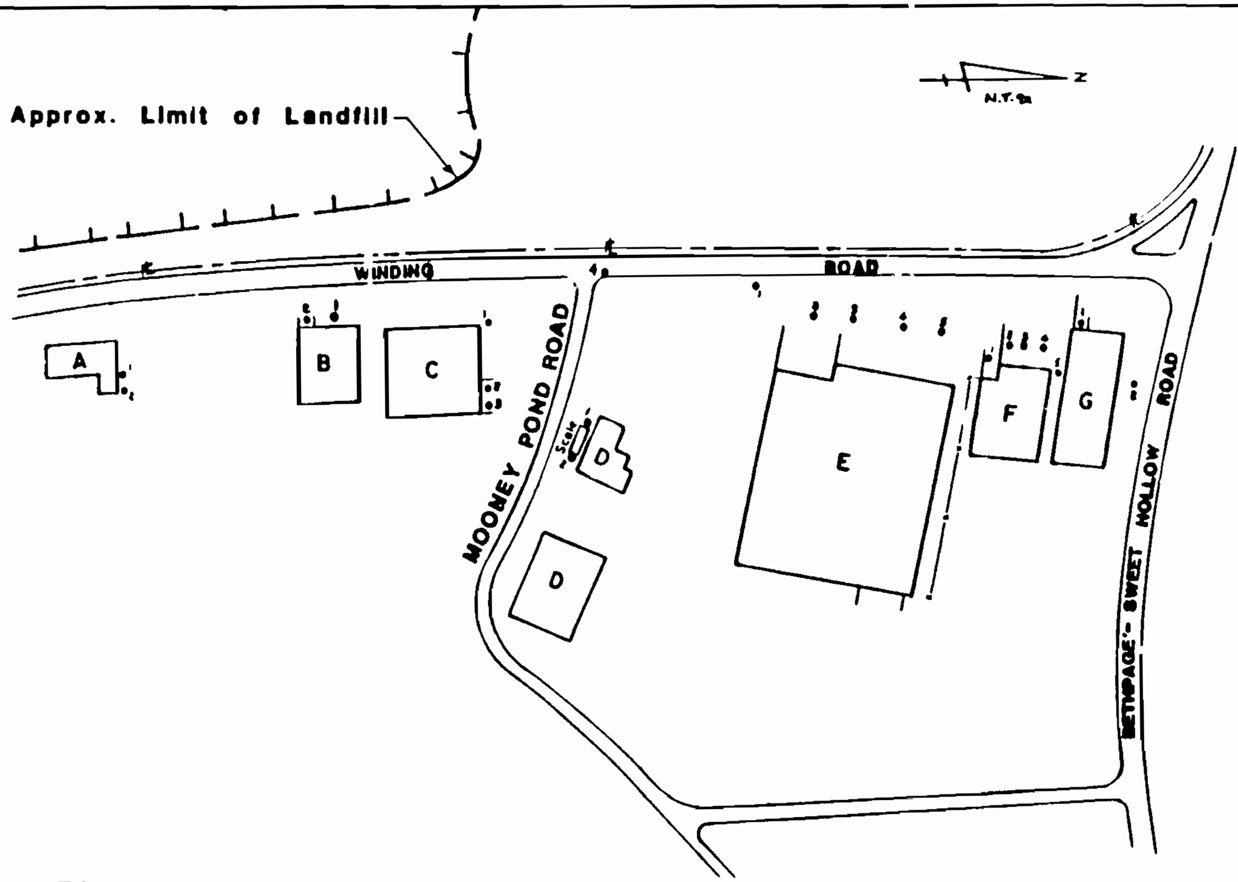
FIGURE 3

TOWN OF OYSTER BAY 1653 NEW YORK

LOCKWOOD, KESSLER & BARTLETT, INC.
ONE AERIAL WAY, SYOSSET, NEW YORK 11791

6014-13

JUNE 1992



SAMPLE LOCATION	SAMPLE DESCRIPTION	% COMBUSTIBLE GAS
(A) 499 WINDING RD.		
1	Hole	
2	Hole	
(B) 459 WINDING RD.		
1	Drain	
2	Dock	
(C) 445 WINDING RD.		
1	Drain	
2	Drain	
3	Drain	
4	Drain	
(D) 311 WINDING RD.		
1	Scale	
2	Scale	
(E) 303 WINDING RD.		
1	Drain	—
[illegible]	Drain	—
[illegible]	Drain	—
[illegible]	Drain	—
[illegible]	Drain	—

SAMPLE LOCATION	SAMPLE DESCRIPTION	% COMBUSTIBLE GAS
(F) 310 WINDING RD.		
1	Drain	—
[illegible]	Drain	—
[illegible]	Drain	—
[illegible]	Drain	—
[illegible]	Drain	—
(G) 161 BETHPAGE-SWEET HOLLOW RD.		
1	Drain	
2	Drain	

NOTE:

NS-Denotes that no sample was obtained due to water in sampling location.

(Results of this Survey are presented in Table 3)

FIGURE 4

ADJACENT BUILDING STRUCTURES AND INCINERATOR COMPLEX SURVEY

TOWN OF OYSTER BAY · NEW YORK · 1653

LOCKWOOD, KESSLER & BARTLETT, INC.
CONSULTING ENGINEERS
SYOSSET, NEW YORK

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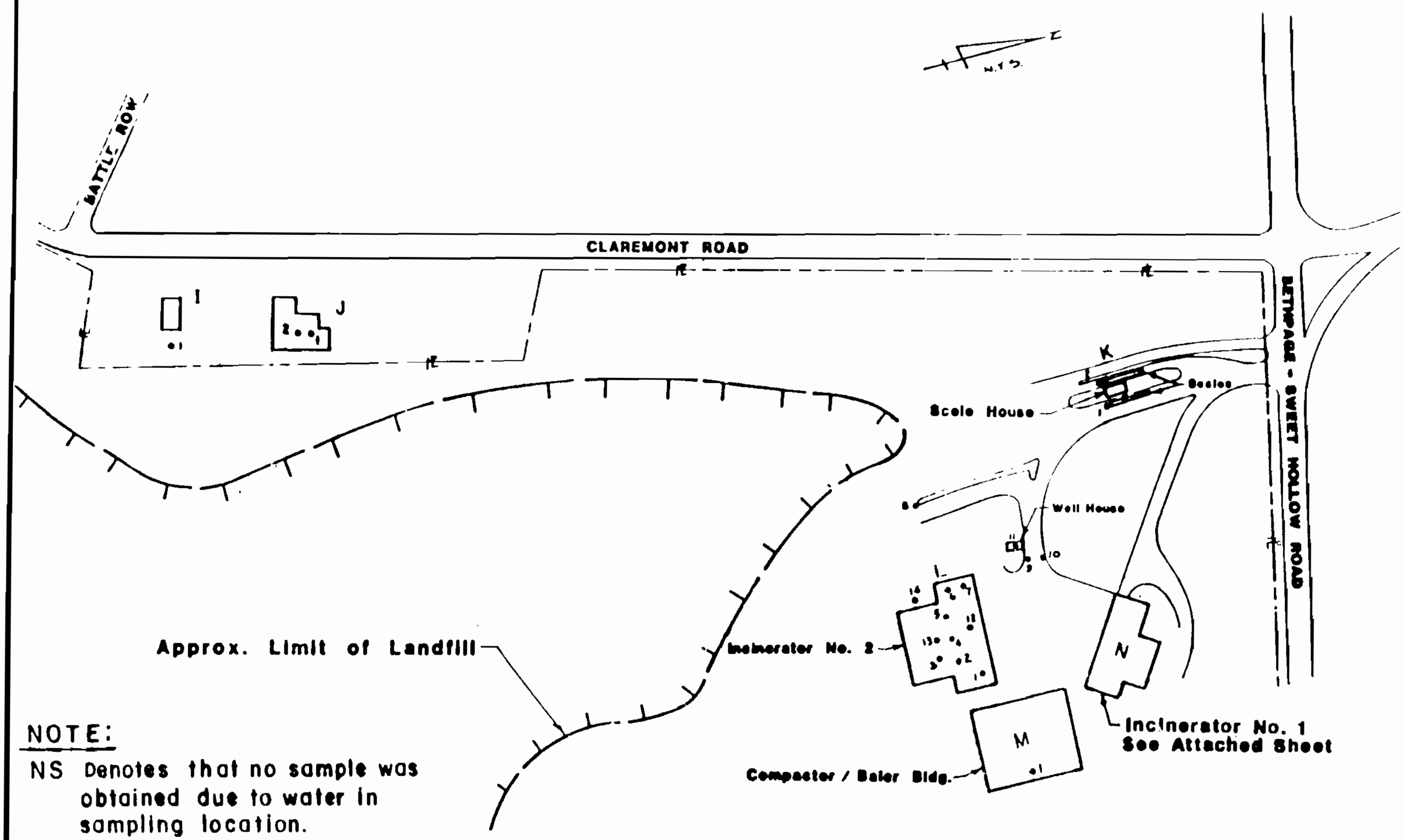
JUNE 1992



SAMPLE LOCATION	SAMPLE DESCRIPTION	% COMBUSTIBLE GAS
(I) 90 BATTLE ROW		
1	Drain	
(J) 100 BATTLE ROW		
1	Drain	
2	Hole	
(K) SCALE HOUSE		
1	Scale	
2	Scale	
(L) INCINERATOR PLANT NO. 2		
1	Drain	
2	Drain	
3	Drain	
4	Drain	
5	Hole	
6	Drain	
7	Drain	
8	Drain	
9	Drain	
10	Drain	
11	Pit	
12	Grate	
13	Drain	
14	Drain	
(M) COMPACTOR/BALER BUILDING		
1	Drain	

NOTE:

NS Denotes that no sample was obtained due to water in sampling location.

(Results of this Survey are Presented in Table 3)

FIGURE 5

ADJACENT BUILDING STRUCTURES & INCINERATOR COMPLEX SURVEY

TOWN OF OYSTER BAY · NEW YORK · 1653

LOCKWOOD, KESSLER & BARTLETT, INC.
CONSULTING ENGINEERS
SYOSSET, NEW YORK

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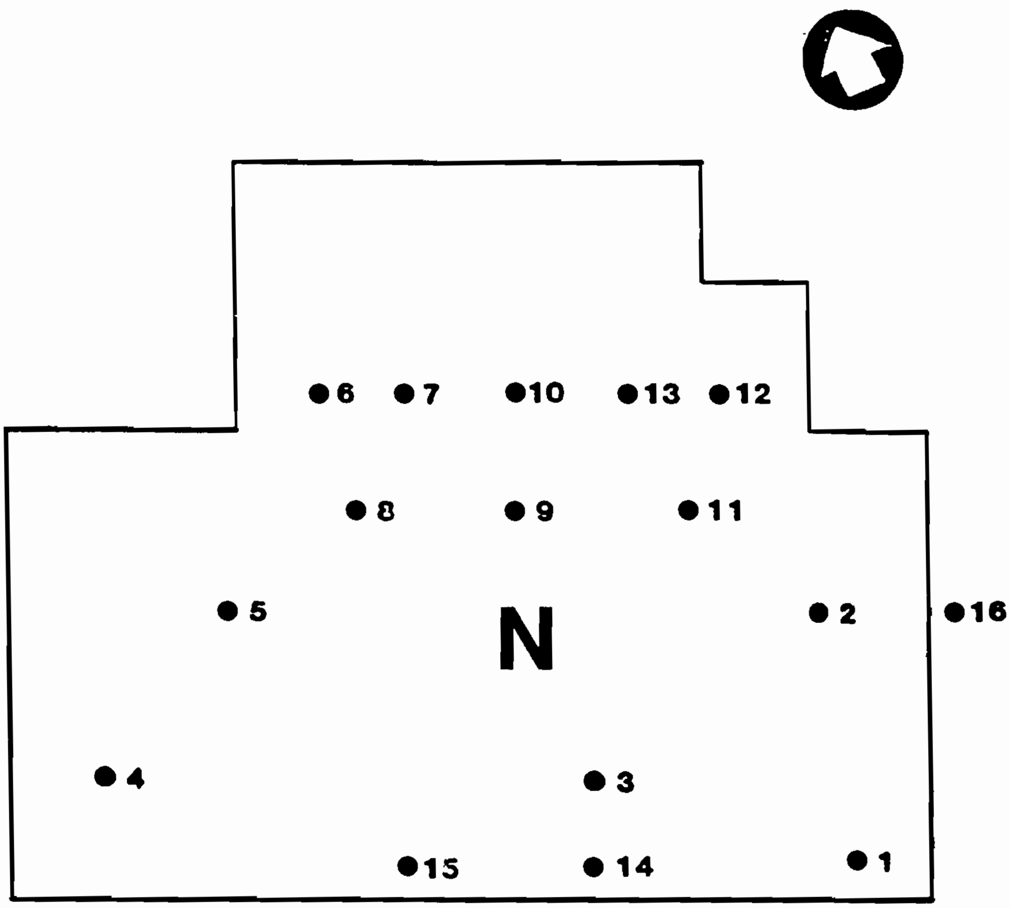
JUNE 1992

ADJACENT BUILDING STRUCTURES & INCINERATOR COMPLEX SURVEY

SAMPLE LOCATION	SAMPLE DESCRIPTION	% COMBUSTIBLE GAS
(N) INCINERATOR PLANT NO. 1		
1	Drain	
2	Drain	
3	Hole	
4	Drain	
5	Drain	
6	Drain	
7	Hole	
8	Drain	
9	Drain	
10	Drain	
11	Hole	
12	Drain	
13	Drain	
14	Hole	
15	Hole	
16	M.H.	



ASH FLOOR

INCINERATOR No. 1

(Results of this Survey are presented in Table 3)

NOTE:

NS Denotes that no sample was obtained due to water in sampling location.

FIGURE 6

TOWN OF OYSTER BAY NEW YORK 1653

LOCKWOOD, KESSLER & BARTLETT, INC.
CONSULTING ENGINEERS
SYOSSET, NEW YORK

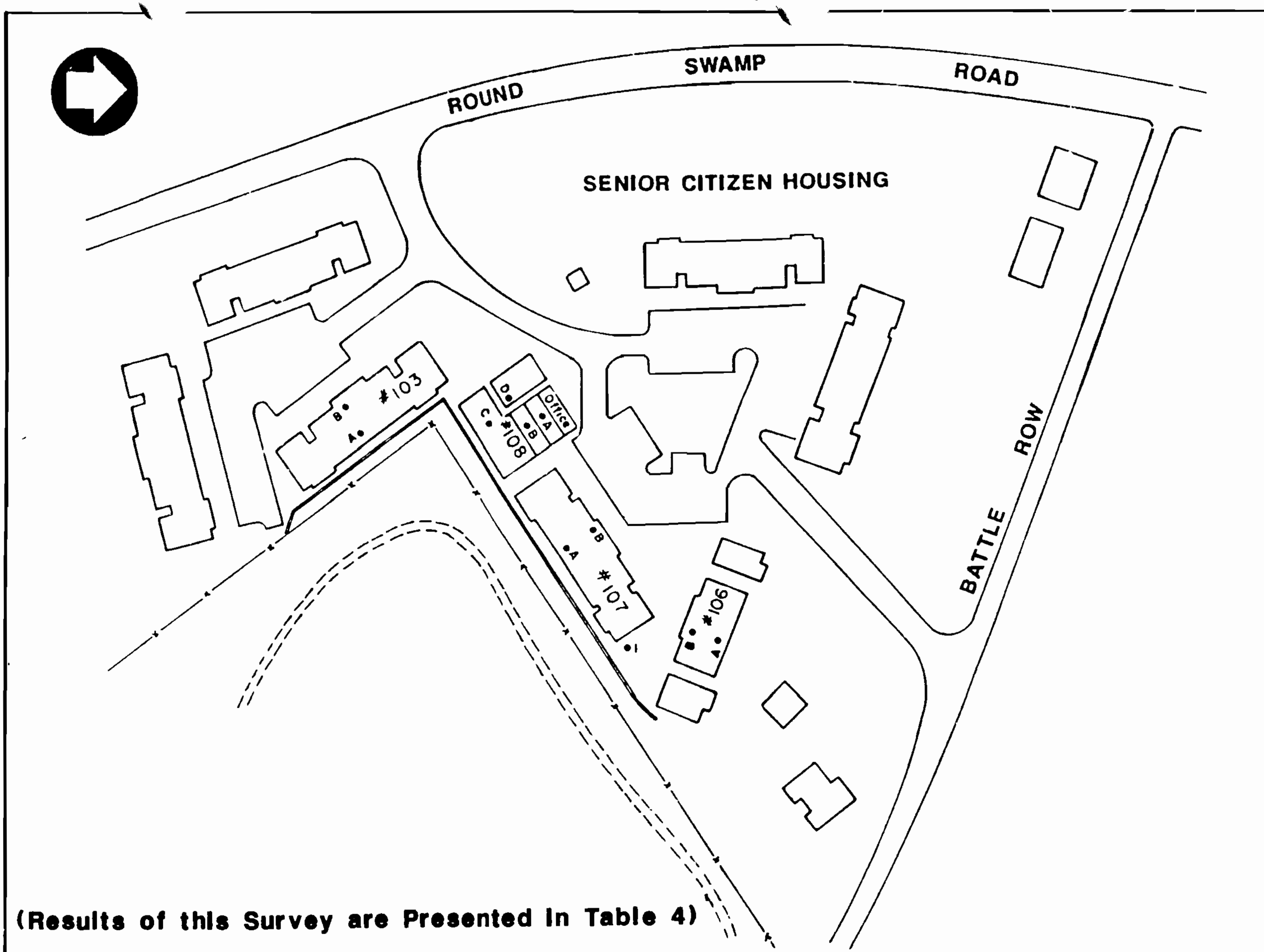
JUNE 1992

Housing Combustible Gas Survey) is conducted at the Senior Citizen Complex (Figure 7) which is located west of the OBSWDC. The Senior Citizen Complex is bounded by the property boundary of the OBSWDC, Round Swamp Road and Battle Row.

Data obtained by TOB personnel in the three (3) monthly surveys (OBSWDC, ABSIC and SCHCG Surveys) are then sent to LKB for analysis and evaluation. LKB then prepares an evaluation of data report based on the monthly combustible gas data.

In early November 1987, Nassau County personnel installed two (2) groundwater monitoring wells (to the groundwater table) at the NCFTC. The wells were constructed to determine the possible levels of groundwater contamination caused by the NCFTC's use of petroleum products over the years in their firefighting drills. During the course of this work, aside from the few inches of petroleum products found in the upper portion of the groundwater, the County also discovered the presence of significant levels of combustible gas in the two wells and notified the Town of this occurrence. After apparently finding steady combustible gas levels in the wells for 48 hours, a meeting was held to discuss the situation.

In an effort to better appraise the extent and cause of the problem, the Town on November 6, 1987, initiated a daily monitoring of the Town's sampling probes at the NCFTC as well as the two (2) groundwater wells and an on-site manhole. In April 1988, subsequent to the daily monitoring program, the Town as part of the subsurface soil boring program installed ten (10) new cluster wells (varying depths) along the western property boundary of the NCFTC to generate additional data. These locations were monitored daily by Town personnel until August 30, 1989. Subsequent sampling at these locations were conducted weekly by TOB personnel.



SAMPLE LOCATION	SAMPLE DESCRIPTION	% COMBUSTIBLE GAS
103A	Drain	
103B	Drain	
106A	Drain	
106B	Drain	
107A	Drain	
107B	Drain	
108A	Drain	
108B	Drain	
108C	Ambient	
108D	Drain	
1	Drain	

(Results of this Survey are Presented in Table 4)

FIGURE 7

TOWN OF OYSTER BAY
SENIOR CITIZEN HOUSING
COMBUSTIBLE GAS SURVEY

TOWN OF OYSTER BAY 1653 NEW YORK

LOCKWOOD, KESSLER & BARTLETT, INC.
CONSULTING ENGINEERS SYOSSET, NEW YORK

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Over the last three years, the Town has voluntarily conducted a considerable amount of landfill gas monitoring (at various times on a daily, semi-weekly and weekly basis), in and around the vicinity of the NCFTC. The sampling was conducted at locations within the NCFTC and at the cluster wells located along the western property boundary of the NCFTC. This monitoring was over and above that which was required for these locations, namely a monthly monitoring.

As of the week of November 12, 1990, the Town reverted to a monthly sampling of these locations since these areas and their respective gas concentrations were well defined and it was no longer necessary to continue to collect this data on a weekly basis. As with all other monitoring, the Town will continue to monitor these locations on a monthly basis unless conditions warrant a more frequent sampling schedule, in which case the Town will revert to a sampling schedule consistent with the warranted conditions (as has always been the Town's policy).

The above site and monitoring programs conducted by TOB and LKB personnel will continue during and after planned capping programs at the OBSWDC so that any changes in landfill gas migration will be detected and further remedial actions initiated, if necessary. The monitoring locations and their associated monitoring frequencies are listed in Appendix A.

SECTION 3

DISCUSSION OF RESULTS

3.1 General

Two types of sampling programs were developed in the Comprehensive Land Use and Operations Plan, (LKB, October 1983). These programs were conducted at:

- various site locations in the vicinity of the Old Bethpage Solid Waste Disposal Complex, and;
- areas where potential safety hazards exist (buildings, facilities, etc.).

A program of the first type, developed for the Old Bethpage Solid Waste Disposal Complex and vicinity, is described in Section 3.2. A program of the second type, developed for the NCFTC, adjacent building structures, incinerator complex, Nassau County Campground and the Senior Citizen Housing is described in Section 3.3.

Sampling data generated from these programs are used to detect potential problematic areas and develop design parameters for modification and expansion of LFG control and recovery systems, if necessary. At present, these LFG control systems extend along the northern and western sides of the NCFTC, along Winding Road and along the northwestern portion of the OBSWDC adjacent to Claremont Road (see Figure 8).

3.2 Landfill Gas Migration

The following LFG surveys were conducted to establish the extent of landfill gas migration both on and off-site of the Old Bethpage Solid Waste Disposal Complex:

- site survey; and,

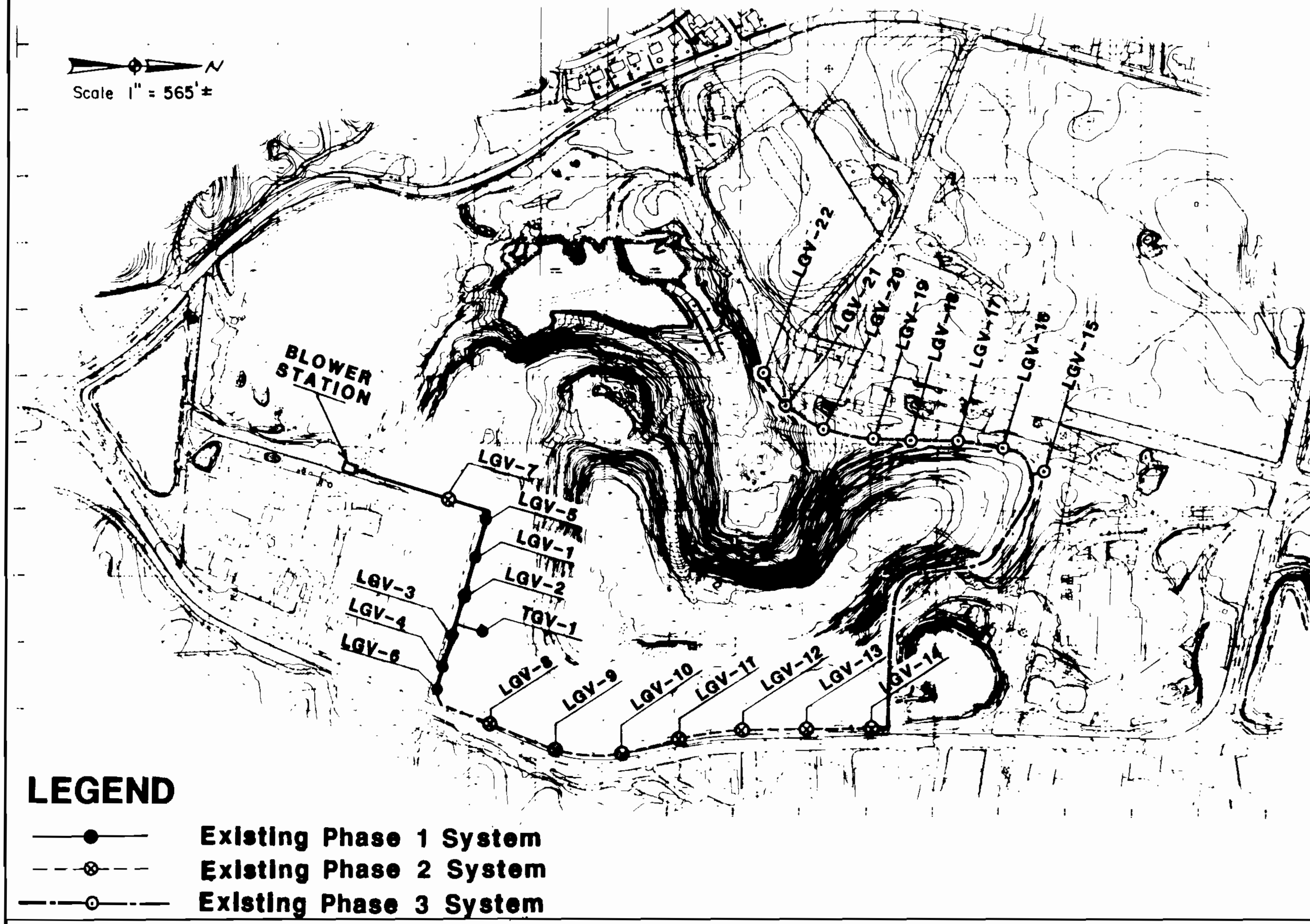

FIGURE 8: LOCATION OF PHASE 1, 2 & 3 GAS CONTROL & RECOVERY SYSTEMS

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6014-13

JUNE 1992

- monthly monitoring survey.

All data pertaining to these surveys is compiled on Drawing 1, Table 1 and Table 2.

3.2.1 <u>Site Survey</u>

A site monitoring program, consisting of sampling points exploring the lateral migration of LFG around the outer boundary of the OBSWDC site, was conducted by LKB personnel from May 22, 1991 to June 21, 1991. Three-quarter inch (3/4") bar holes were punched approximately 30 inches deep and spaced 50 feet apart along the outer boundary of the OBSWDC. The survey was continued radially inward or outward, depending upon whether a positive or zero percent combustible gas reading was obtained at the perimeter sampling points. The collected data was then used to plot the combustible gas migration contour (line of zero percent combustible gas readings) around the OBSWDC.

The data compiled in this current study is presented graphically on Drawing No. 1 (Old Bethpage Solid Waste Disposal Complex - Zero Percent Combustible Gas Migration Contours 1991 Annual Site Survey). This data compares the combustible gas migration contour compiled this year with the previously established August 1990 contour.

Drawing No. 1 illustrates the extent of off-site LFG migration at the OBSWDC site in this year's survey:

- As can be seen from the plotted results of this year's Annual Site Survey, off-site landfill gas migration has been contained around the entire OBSWDC boundary and is confined to areas located within the OBSWDC property boundaries.

TABLE 1
1991 MONTHLY MONITORING SURVEY
OLD BETHPAGE SOLID WASTE DISPOSAL COMPLEX
TOWN OF OYSTER BAY
PERCENT COMBUSTIBLE GAS

Weather	Sunny	Sunny	Rain	Rain	Sunny	Cloudy	Sunny	Cloudy	Rain	Sunny	Sunny	Sunny
Temp.	23°	34°	51°	52°	70°	61°	68°	67°	45°	44°	21°	18°
Bar. Pr.	30.20↑	30.02↓	29.50↓	29.98↑	29.74↓	30.14↑	30.10↑	30.39↑	29.91↑	30.31↑	30.52↑	30.43↑
Date / Location *	Jan 29	Feb 25	Mar 28	Apr 25	May 14	June 18	Jul 29	Aug 26	Sep 27	Oct 23	Nov 27	Dec 26
M-1	0	0	0	0	0	0	0	0	0	0	0	0
M-2	0	0	0	0	0	0	0	0	0	0	0	0
M-3	0	0	0	0	0	0	0	0	0	0	0	0
M-4	0	0	0	0	0	0	0	0	0	0	0	0
M-5	0	0	0	0	0	0	0	0	0	0	0	0
M-6	0	0	0	0	0	0	0	0	0	0	0	0
M-7	0	0	0	0	0	0	0	0	0	0	0	0
M-8	0	0	0	0	0	0	0	0	0	0	0	0
M-9												
@10'	0	0	0	0	0	0	0	0	0	0	0	0
@20'	0	0	0	0	0	0	0	0	0	0	0	0
@30'	0	0	0	0	0	0	0	0	0	0	0	0
@40'	0	0	0	0	0	0	0	0	0	0	0	0
M-10	0	0	0	0	0	0	0	0	0	0	0	0
M-11	0	0	0	0	0	0	0	0	0	0	0	0
M-12	0	0	0	0	0	0	0	0	0	0	0	0
M-13	0	0	0	0	0	0	0	0	0	0	0	0
M-14	0	0	0	0	0	0	0	0	0	0	0	0
M-16	0	0	0	0	0	0	0	0	0	0	0	0
M-17	0	0	0	0	0	0	0	0	0	0	0	0
M-18	0	0	0	0	0	0	0	0	0	0	0	0
M-19	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
-23	0	0	0	0	0	0	0	0	0	0	0	0
M-24	0	0	0	0	0	0	0	0	0	0	0	0
M-25	0	0	0	0	0	0	0	0	0	0	0	0
M-27	0	0	0	0	0	0	0	0	0	0	0	0
M-28	0	0	0	0	0	0	0	0	0	0	0	0
M-29	0	0	0	0	0	0	0	0	0	0	0	0
M-30	0	0	0	0	0	0	0	0	0	0	0	0
M-31	0	0	0	0	0	0	0	0	0	0	0	0
M-32	0	0	0	0	0	0	0	0	0	0	0	0
M-33	0	0	0	0	0	0	0	0	0	0	0	0
M-34	0	0	0	0	0	0	0	0	0	0	0	0
M-36	0	0	0	0	0	0	0	0	0	0	0	0
M-37	0	0	0	0	0	0	0	0	0	0	0	0
M-38	0	0	0	0	0	0	0	0	0	0	0	0
M-39	0	0	0	0	0	0	0	0	0	0	0	0
M-40	0	0	0	0	0	0	0	0	0	0	0	0
M-41	0	0	50	0	58	20	40	54	40	40	56	34

Notes:

*: All sampling locations presented in Table 1 are shown in Figure 1.

(Continued)

TABLE 1 (CONTINUED)
1991 MONTHLY MONITORING SURVEY
OLD BETHPAGE SOLID WASTE DISPOSAL COMPLEX
TOWN OF OYSTER BAY
PERCENT COMBUSTIBLE GAS

Weather	Sunny	Sunny	Rain	Rain	Sunny	Cloudy	Sunny	Cloudy	Rain	Sunny	Sunny	Sunny
Temp.	23°	34°	51°	52°	70°	61°	68°	67°	45°	44°	21°	18°
Bar. Pr.	30.20↑	30.02↓	29.50↓	29.98↑	29.74↓	30.14↑	30.10↑	30.39↑	29.91↑	30.31↑	30.52↑	30.43↑
Date Location *	Jan 29	Feb 25	Mar 28	Apr 25	May 14	June 18	Jul 29	Aug 26	Sep 27	Oct 23	Nov 27	Dec 26
M-44 Upper	0	0	0	0	0	0	0	0	0	0	0	0
M-44 Lower	0	0	0	0	0	0	0	0	0	0	0	0
M-45 Upper	0	0	0	0	0	0	0	0	0	0	0	0
M-45 Lower	0	0	0	0	0	0	0	0	0	0	0	0
M-29A Upper	0	0	0	0	0	0	0	0	0	0	0	0
M-29A Lower	0	0	0	0	0	0	0	0	0	0	0	0
M-30A Upper	0	0	0	0	0	0	0	0	0	0	0	0
M-30A Lower	0	0	0	0	0	0	0	0	0	0	0	0
M-29B Upper	0	0	0	0	0	0	0	0	0	0	0	0
M-29B Lower	0	0	0	0	0	0	0	0	0	0	0	0
M-30B Upper	0	0	0	0	0	0	0	0	0	0	0	0
M-30B Lower	0	0	0	0	0	0	0	0	0	0	0	0
MW-1 Upper	0	0	0	0	0	0	0	0	0	0	0	0
MW-1 Lower	0	0	0	0	0	0	0	0	0	0	0	0
MW-2 Upper	0	0	0	0	0	0	0	0	0	0	0	0
MW-2 Lower	0	0	0	0	0	0	0	0	0	0	0	0
MW-3 Upper	0	0	0	0	0	0	0	0	0	0	0	0
MW-3 Lower	0	0	0	0	0	0	0	0	0	0	0	0
MW-5 Upper	0	0	0	0	0	0	0	0	0	0	0	0
MW-5 Lower	1.0	0.4	0.5	0	3	0.9	0.2	0.3	0.4	1.0	0	0.5
MW-6 Upper	0	0	0	0	0	0	0	0	0	0	0.2	0
MW-6 Lower	7	0	8	8	0	0.4	2	0	1.0	0	0	0
MW-7 Upper	0	0	0	0	0	0	0	0	0	0	0	0
7 Lower	0	0	0	0	0	0	0	0	0	0	0	0
3 Upper	0	0	0	0	0	0	0	0	0	0	0	0
8 Lower	0	0	0	0	0	0	0	0	0	0	0	0
MW-9 Upper	0	0	0	0	0	0	0	0	0	0	0	0
MW-9 Lower	0	0	0	0	0	0	0	0	0	0	0	0
MW-10 Upper	0	0	0	0	0	0	0	0	0	0	0	0
MW-10 Lower	0	0	0	0	0	0	0	0	0	0	0	0
MW-11 Upper	1	14	0	0	0	0	0	0	0	0	0	0
MW-11 Lower	28	42	58	38	34	23	32	32	25	38	30	33
Drain 1	0	0	0	0	0	0	0	0	0	0	0	0
Drain 2	0	0	0	0	0	0	0	0	0	0	0	0
Conden. Well	0	0	0	0	0	0	0	0	0	0	0	0

Notes:

*: All sampling locations presented in Table 1 are shown in Figures 1 and 2.

TABLE 2
1991 MONTHLY MONITORING SURVEY
NASSAU COUNTY FIREMAN'S TRAINING CENTER
TOWN OF OYSTER BAY
PERCENT COMBUSTIBLE GAS

Weather Temp. Bar. Pr.	Sunny 23° 30.20↑	Sunny 34° 30.02↓	Rain 51° 29.50↓	Rain 52° 29.98↑	Sunny 70° 29.74↓	Cloudy 61° 30.14↑	Sunny 68° 30.10↑	Cloudy 67° 30.39↑	Rain 45° 29.91↑	Sunny 44° 30.31↑	Sunny 21° 30.52↑	Sunny 18° 30.43↑
Date Location *	Jan 29	Feb 25	Mar 28	Apr 25	May 14	June 18	Jul 29	Aug 26	Sep 27	Oct 23	Nov 27	Dec 26
F-1	0	0	0	0	0	0	0	0	0	0	0	0
F-2	0	0	0	0	0	0	0	0	0	0	0	0
F-3	0	0	0	0	0	0	0	0	0	0	0	0
F-4												
@10'	0	0	0	0	0	0	0	0	0	0	0	0
@20'	0	0	0	0	0	0	0	0	0	0	0	0
@30'	0	0	0	0	0	0	0	0	0	0	0	0
@40'	0	0	0	0	0	0	0	0	0	0	0	0
F-5												
@10'	0	0	0	0	0	0	0	0	0	0	0	0
@20'	0	0	0	0	0	0	0	0	0	0	0	0
@30'	0	0	0	0	0	0	0	0	0	0	0	0
@40'	0	0	0	0	0	0	0	0	0	0	0	0
F-6												
@10'	0	0	0	0	0	0	0	0	0	0	0	0
@20'	0	0	0	0	0	0	0	0	0	0	0	0
F-7	0	0	0	0	0	0	0	0	0	0	0	0
F-8												
@10'	0	0	0	0	0	0	0	0	0	0	0	0
@20'	0	0	0	0	0	0	0	0	0	0	0	0
@30'	0	0	0	0	0	0	0	0	0	0	0	0
@40'	0	0	0	0	0	0	0	0	0	0	0	0
F-9												
@10'	0	0	0	0	0	0	0	0	0	0	0	0
@20'	0	0	0	0	0	0	0	0	0	0	0	0
F-10												
@10'	0	0	0	0	0	0	0	0	0	0	0	0
@20'	0	0	0	0	0	0	0	0	0	0	0	0
@30'	0	0	0	0	0	0	0	0	0	0	0	0
@40'	0	0	0	0	0	0	0	0	0	0	0	0
F-11	0	0	0	0	0	0	0	0	0	0	0	0
W-17	0	0	7	0	0.3	0.5	0.9	2.3	0	0	0	0
W-22	14	15	18	11	28	41	20	12	10	0	0	0
W-23	0	0	0	0	0	0	0	0	0	0	0	0
7	0.2	0	0	2	2.7	0	0	1	0	0	0	0

NOTES :

*: All sampling locations presented in Table 2 are shown on Figure 3.

- All off-site areas, which in the past may have been experienced LFG migration, have been obviated of off-site landfill gas migration. The Town, however continues to monitor off-site areas at the NCFTC for the possibility of migration.

3.2.2 Monthly Monitoring Survey

As recommended in the 1990 Annual Report (LKB, April 1991), a monthly monitoring survey was conducted at the OBSWDC and the NCFTC to provide early detection in the event any off-site LFG migration occurred both onto NCFTC property or beyond the OBSWDC property boundary. Readings measured by TOB personnel were taken from one-inch diameter single point sampling probes most of which are installed 30 inches deep (except for four (4) which are set 8 feet deep (Figure 9)), pressure probes at depths of 10 and 20 feet (Figure 10), cluster wells ranging in depth from 10 to 40 feet (Figure 11) and varying depth cluster wells (Figure 12).

In this year's monthly monitoring survey (January to December 1991), 72 points located along the OBSWDC property boundary and at the NCFTC were monitored for the presence of combustible gas. Data obtained by Town personnel in this survey were then recorded on standard monthly monitoring forms (Figures 1, 2 and 3) and sent to LKB for analysis and evaluation.

Upon completion of LKB's data analysis and evaluation, a monthly letter report is transmitted by LKB to the Town. Comments include possible causes of LFG readings at specific locations as well as present and future remedial actions which may be required to obviate any off-site migration of LFG, if encountered.

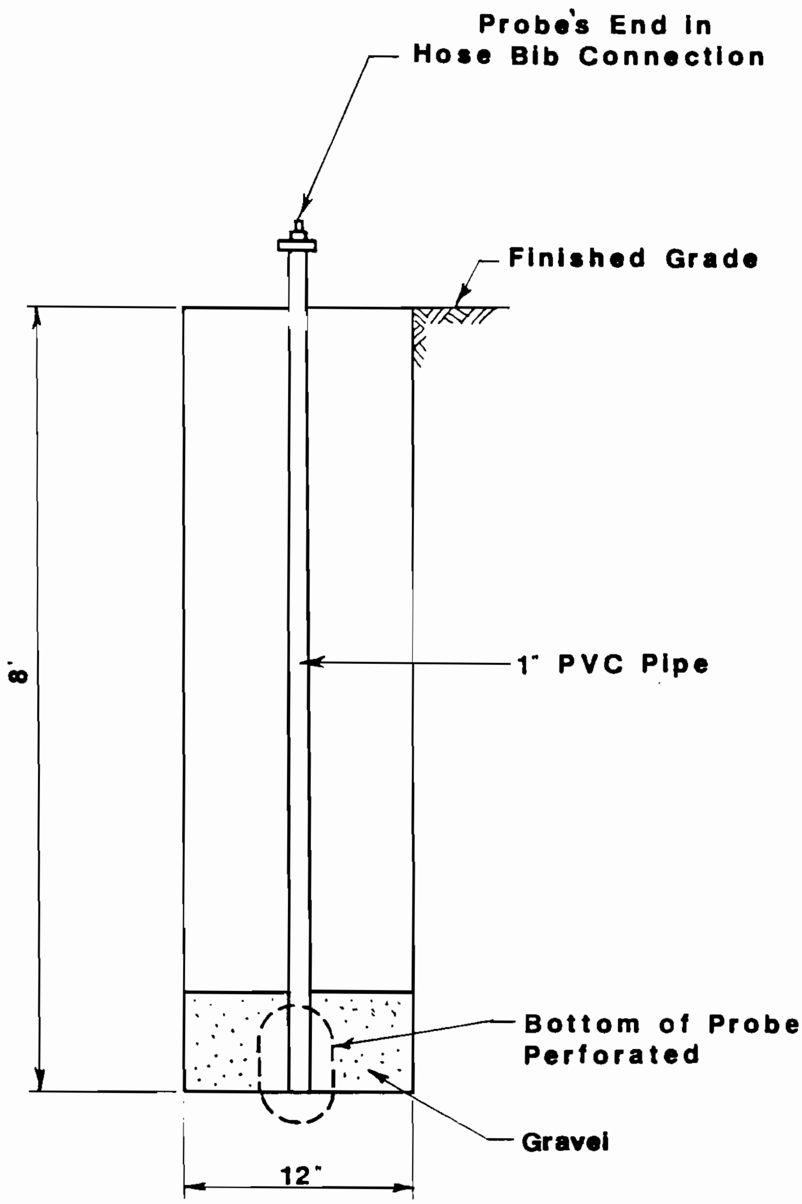

FIGURE 9: SINGLE POINT SAMPLING PROBE

NOT TO SCALE
ALL DIMENSIONS APPROXIMATE

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NOTE:

Each probe shall be color coded with waterproof tape as follows:

10' - Blue

20' - Green

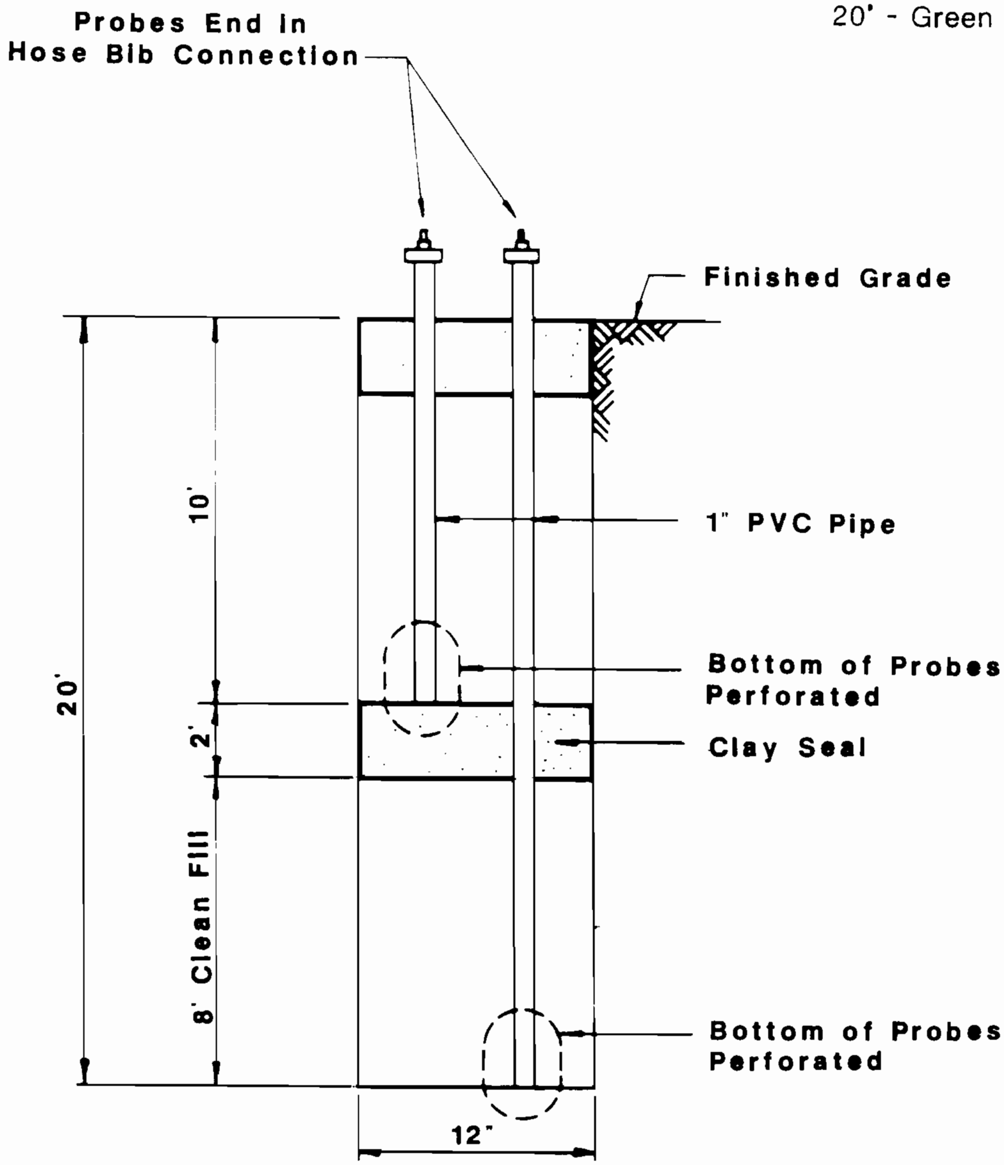

FIGURE 10: PRESSURE PROBE

NOT TO SCALE
ALL DIMENSIONS APPROXIMATE

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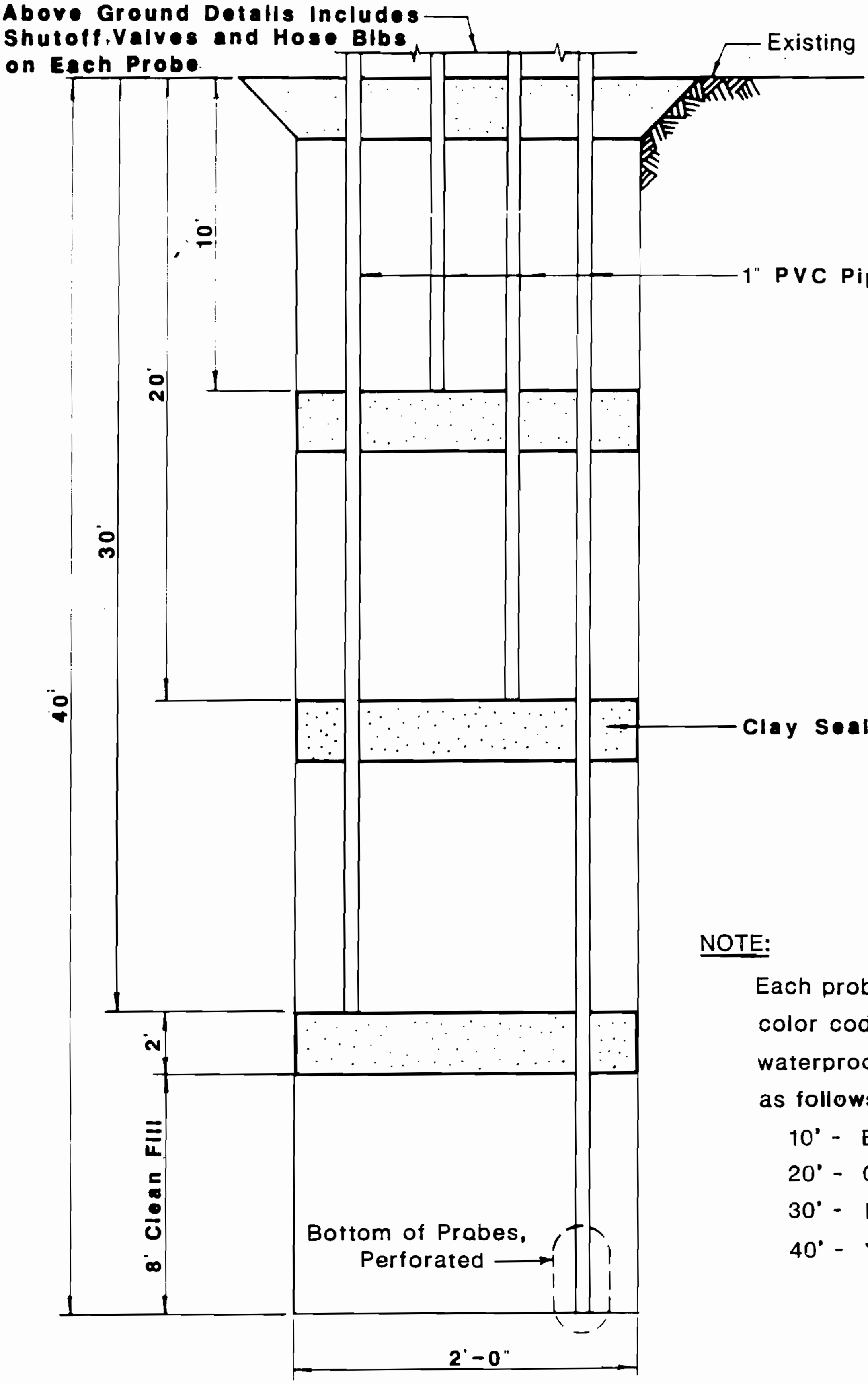

NOTE:

Each probe shall be color coded with waterproof tape as follows:

10' - Blue
20' - Green
30' - Red
40' - Yellow

FIGURE 11: CLUSTER WELL
Not to Scale
All Dimensions Approximate

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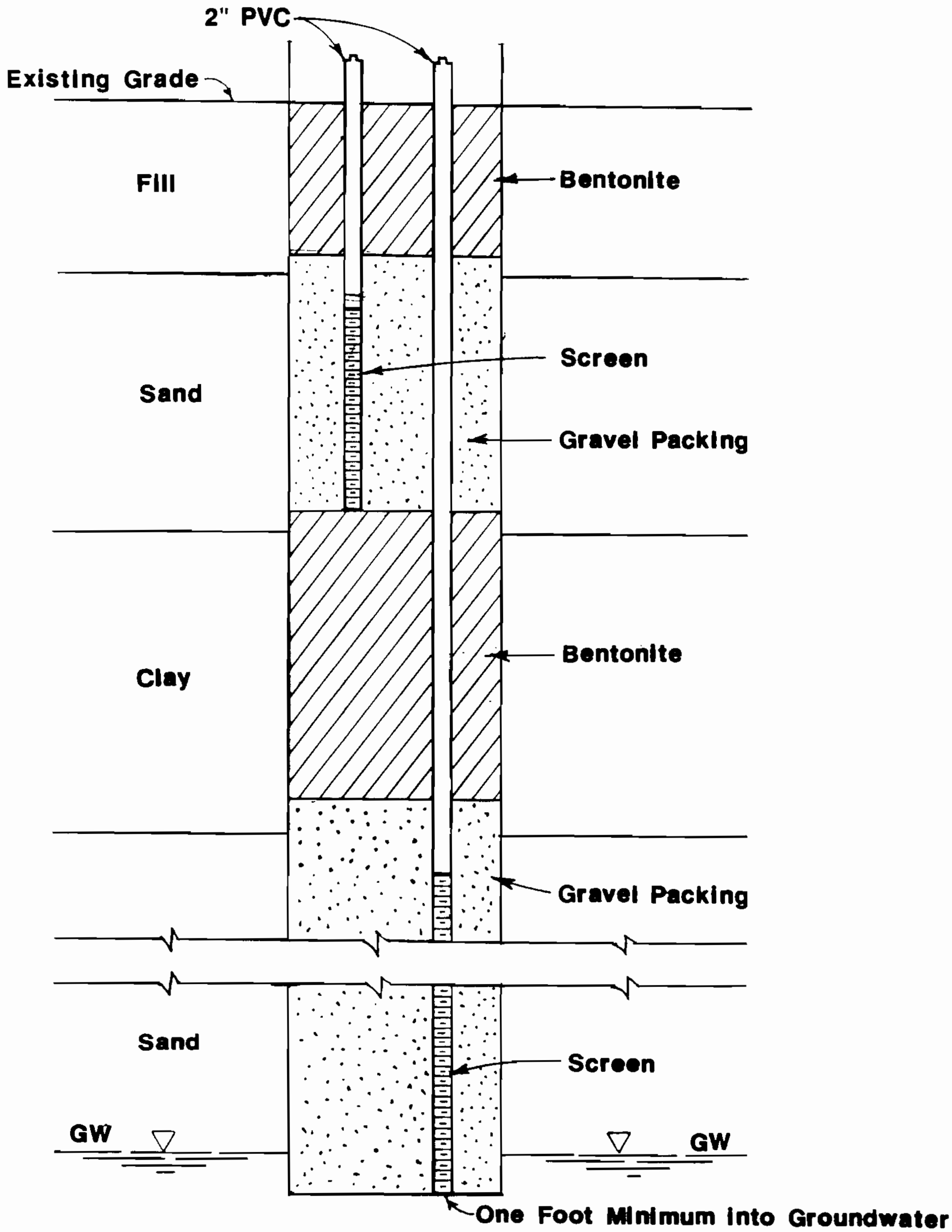

FIGURE 12 : VARYING DEPTH CLUSTER WELL

Not to Scale
All Dimensions Approximate

JUNE 1992

LOCKWOOD, KESSLER & BARTLETT, INC.

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The following is a discussion of results based on the data obtained by the Town in this year's survey. Sampling probes utilized are located at the NCFTC and along the OBSWDC property boundary (see Tables 1 and 2);

- At sampling locations M-40, M-41, MW-5 Lower, MW-6 Upper, MW-6 Lower and MW-11 Upper and Lower, the varying combustible gas concentrations (0.2 to 58% combustible gas) were anticipated since these sampling probes are located on-site and are therefore expected to yield some landfill gases.

- Combustible gas readings, ranging from 0.2 to 41% combustible gas, were measured by TOB personnel at Nassau County monitoring wells W-17, W-22 and Nassau County monitoring drywell Number 7. These sampling points are located at the Nassau County Fireman's Training Center. As noted in last year's report, the Town as of November 12, 1990 has reverted to a monthly sampling of these locations in lieu of a weekly sampling schedule. As with all other monitoring, should conditions warrant a more frequent sampling schedule, the Town would implement a modified schedule.

  It should be noted, that at this time it is undetermined whether readings on the NCFTC are the result of contamination caused by past operations at the NCFTC, the migration of LFG from the OBSWDC or both.

- Negligible and/or zero percent combustible gas concentrations were measured by Town personnel at all the remaining OBSWDC and NCFTC sampling locations.

3.3 Facility Surveys

Additional combustible gas readings were measured at the following facilities:

- the NCFTC;
- buildings adjacent to the OBSWDC;
- former incinerator complex;
- scalehouse;
- the Nassau County Campground; and
- Senior Citizen Housing.

All data pertaining to these facilities are compiled in Table 3, Table 4 and Drawing No. 1.

3.3.1 Nassau County Fireman's Training Center Survey

In past Annual Reports, this survey was conducted by NCFTC personnel on a weekly and monthly basis to provide early detection in the event any off-site LFG migration occurred at NCFTC facilities. The monitoring included the weekly sampling of the crawl space and sleeve located in the pump house and the monthly sampling of all other points located at the NCFTC. This survey has been discontinued by the County.

3.3.2 Adjacent Building Structures and Incinerator Complex Survey

As recommended in the 1990 Annual Report (LKB, April 1991), monthly monitoring was conducted by TOB personnel at building structures immediately adjacent to the OBSWDC and on-site building structures.

TABLE 3
1991 MONTHLY MONITORING SURVEY
ADJACENT BUILDING STRUCTURES AND INCINERATOR COMPLEX SURVEY
TOWN OF OYSTER BAY
PERCENT COMBUSTIBLE GAS

Weather	Sunny	Sunny	Rain	Rain	Sunny	Cloudy	Sunny	Cloudy	Rain	Sunny	Sunny	Sunny
Temp.	23°	34°	51°	52°	70°	61°	68°	67°	45°	44°	21°	18°
Bar. Pr.	30.20↑	30.02↓	29.50↓	29.98↑	29.74↓	30.14↑	30.10↑	30.39↑	29.91↑	30.31↑	30.52↑	30.43↑
Date / Location *	Jan 29	Feb 25	Mar 28	Apr 25	May 14	June 18	Jul 29	Aug 26	Sep 27	Oct 23	Nov 27	Dec 26
A-1	0	0	0	0	0	0	0	0	0	0	0	0
A-2	0	0	0	0	0	0	0	0	0	0	0	0
B-1	0	0	0	0	0	0	0	0	0	0	0	0
B-2	0	0	0	0	0	0	0	0	0	0	0	0
C-1	0	0	0	0	0	0	0	0	0	0	0	0
C-2	0	0	0	0	0	0	0	0	0	0	0	0
C-3	0	0	0	0	0	0	0	0	0	0	0	0
C-4	0	0	0	0	0	0	0	0	0	0	0	0
D-1	0	0	0	0	0	0	0	0	0	0	0	0
D-2	0	0	0	0	0	0	0	0	0	0	0	0
E-1	0	0	0	0	0	0	0	0	0	0	0	0
E-2	0	0	0	0	0	0	0	0	0	0	0	0
E-3	0	0	0	0	0	0	0	0	0	0	0	0
E-4	0	0	0	0	0	0	0	0	0	0	0	0
E-5	0	0	0	0	0	0	0	0	0	0	0	0
F-1	0	0	0	0	0	0	0	0	0	0	0	0
F-2	0	0	0	0	0	0	0	0	0	0	0	0
F-3	0	0	0	0	0	0	0	0	0	0	0	0
F-4	0	0	0	0	0	0	0	0	0	0	0	0
F-5	0	0	0	0	0	0	0	0	0	0	0	0
G-1	0	0	0	0	0	0	0	0	0	0	0	0
G-2	0	0	0	0	0	0	0	0	0	0	0	0
I-1	0	0	0	0	0	0	0	0	0	0	0	0
J-1	0	0	0	0	0	0	0	0	0	0	0	0
J-2	0	0	0	0	0	0	0	0	0	0	0	0
K-1	0	0	0	0	0	0	0	0	0	0	0	0
K-2	0	0	0	0	0	0	0	0	0	0	0	0
L-1	0	0	0	0	0	0	0	0	0	0	0	0
L-2	0	0	0	0	0	0	0	0	0	0	0	0
L-3	0	0	0	0	0	0	0	0	0	0	0	0
L-4	0	0	0	0	0	0	0	0	0	0	0	0
L-5	0	0	0	0	0	0	0	0	0	0	0	0
L-6	0	0	0	0	0	0	0	0	0	0	0	0
L-7	0	0	0	0	0	0	0	0	0	0	0	0
L-8	0	0	0	0	0	0	0	0	0	0	0	0
L-9	0	0	0	0	0	0	0	0	0	0	0	0
L-10	0	0	0	0	0	0	0	0	0	0	0	0
L-11	0	0	0	0	0	0	0	0	0	0	0	0
L-12	0	0	0	0	0	0	0	0	0	0	0	0
L-13	0	0	0	0	0	0	0	0	0	0	0	0
L-14	0	0	0	0	0	0	0	0	0	0	0	0
M-1	0	0	0	0	0	0	0	0	0	0	0	0
N-1	0	0	0	0	0	0	0	0	0	0	0	0
N-2	0	0	0	0	0	0	0	0	0	0	0	0
N-3	0	0	0	0	0	0	0	0	0	0	0	0
N-4	0	0	0	0	0	0	0	0	0	0	0	0
N-5	0	0	0	0	0	0	0	0	0	0	0	0
N-6	0	0	0	0	0	0	0	0	0	0	0	0
N-7	0	0	0	0	0	0	0	0	0	0	0	0
N-8	0	0	0	0	0	0	0	0	0	0	0	0
N-9	0	0	0	0	0	0	0	0	0	0	0	0
N-10	0	0	0	0	0	0	0	0	0	0	0	0
N-11	0	0	0	0	0	0	0	0	0	0	0	0
N-12	0	0	0	0	0	0	0	0	0	0	0	0
N-13	0	0	0	0	0	0	0	0	0	0	0	0
N-14	0	0	0	0	0	0	0	0	0	0	0	0
N-15	0	0	0	0	0	0	0	0	0	0	0	0
N-16	0	0	0	0	0	0	0	0	0	0	0	0

Notes:

: All sampling locations presented in Table 3 are shown in Figures 4, 5 and 6.

TABLE 4
1991 MONTHLY MONITORING SURVEY
SENIOR CITIZEN HOUSING SURVEY
TOWN OF OYSTER BAY
PERCENT COMBUSTIBLE GAS

Weather	Sunny	Sunny	Rain	Rain	Sunny	Cloudy	Sunny	Cloudy	Rain	Sunny	Sunny	Sunny
Temp.	23°	34°	51°	52°	70°	61°	68°	67°	45°	44°	21°	18°
Bar. Pr.	30.20↑	30.02↓	29.50↓	29.98↑	29.74↓	30.14↑	30.10↑	30.39↑	29.91↑	30.31↑	30.52↑	30.43
Date	Jan 29	Feb 25	Mar 28	Apr 25	May 14	June 18	Jul 29	Aug 26	Sep 27	Oct 23	Nov 27	Dec 2
Location *												
103A	0	0	0	0	0	0	0	0	0	0	0	0
103B	0	0	0	0	0	0	0	0	0	0	0	0
106A	0	0	0	0	0	0	0	0	0	0	0	0
106B	0	0	0	0	0	0	0	0	0	0	0	0
107A	0	0	0	0	0	0	0	0	0	0	0	0
107B	0	0	0	0	0	0	0	0	0	0	0	0
108A	0	0	0	0	0	0	0	0	0	0	0	0
108B	0	0	0	0	0	0	0	0	0	0	0	0
108C	0	0	0	0	0	0	0	0	0	0	0	0
108D	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0

Notes:

*: All sampling locations presented in Table 4 are shown in Figure 7.

Monitoring was initiated to provide early warning in the event any off-site LFG migration occurred at adjacent buildings and businesses or combustible gas concentrations were detected at the former incinerator complexes, the compacter-baler facility and scalehouse.

Combustible gas readings for the Adjacent Building Structures and Incinerator Complex Survey (See Table 3) were measured by TOB personnel at monthly intervals from points located in the interior and exterior of 14 building structures (see Figures 4, 5 and 6). The readings were taken from drains, well pits and loading docks located in and around these structures. Readings measured by TOB personnel in the survey were then sent to LKB for analysis and evaluation. In this year's survey, zero percent combustible gas concentrations were measured at all sampling locations.

3.3.3 Nassau County Campground Survey

The Nassau County Department of Parks and Recreation Battle Row Campground (The Campground), located on the western side of Claremont Road, was monitored for possible LFG migration on May 28, 1991 by LKB personnel. The survey consisted of sampling points (3/4" bar holes punched approximately 30 inches deep) parallel to the western boundary bordering Claremont Road. All sampling locations monitored indicated zero percent combustible gas.

3.3.4 Senior Citizen Housing Survey

The Senior Citizen Housing complex is located west of the OBSWDC bounded by the property boundary of the OBSWDC, Round Swamp Road and Battle Row. Monthly combustible gas readings were measured by TOB personnel from points located in the interior and exterior of five (5) building structures located immediately adjacent to the OBSWDC. The readings were taken from drains and the ambient air. All sampling locations monitored indicated zero percent combustible gas. All data pertaining to these facilities are compiled in Table 4.

3.4 Phase 1 Gas Control and Recovery System

The Phase 1 Gas Control and Recovery System was authorized by the Town in compliance with 6 NYCRR Part 360, as a result of the lateral migration of LFG at the southeastern portion of the OBSWDC (for additional background information, see Section 1.4).

The initial venting system design consisted of four basic components: vents, header, blower and a test flare burner. Seven vents are located along the southeast section of the OBSWDC contiguous to the NCFTC. Six of these vents (LGV-1 thru LGV-6) are located adjacent and parallel to the northern property boundary of the NCFTC. The seventh vent (TGV-1) is situated perpendicular to the line of the other vents and approximately 115 feet north of the NCFTC into the landfill. The general arrangement of this system is presented in Figure 8.

As indicated in the migration contour developed by LKB based on our monitoring results, the Phase 1 System appears to have prevented any major lateral migration of landfill gas onto NCFTC property, providing suitable protection for the NCFTC.

3.5 Phase 2 Gas Control System

As a result of off-site gas migration occurring across Winding Road along the eastern portion of the OBSWDC, the Town authorized the design and construction of the Phase 2 Gas Control System (for additional background information, see Section 1.4).

The Phase 2 System is an extension of the then existing Phase 1 System, located along the eastern edge of the OBSWDC, adjacent to Winding Road (Figure 8). Improvements were incorporated into the design of the Phase 2 System, based on the evaluation of the Phase 1 System operation, and included an improved condensate collection system, and a more rigid header support system.

The Phase 2 System consists of seven vents (LGV-8 thru LGV-14) installed approximately 250 feet apart extending north along Winding Road and terminating near Recharge Basin No. 2. As part of the overall Phase 2 design, an additional vent (LGV-7) was installed about 300 feet south of LGV-5 to guard against the possible off-site migration of landfill gas onto the NCFTC from the Phase I landfill.

As indicated in the the migration contour developed by LKB, the Phase 2 System has obviated the lateral migration of LFG at building structures along Winding Road, thereby providing suitable protection for businesses located in this area. As noted in last year's report, Energy Tactics continues to abandon one of their gas header lines due to the low quality of the gas and condensate problems. The abandoned line is still tied into the Town's existing Phase 1 and 2 Gas Control System at TGV-1 and LGV-12, respectively.

3.6 Phase 3 Gas Control System

Results of past site monitoring data obtained between 1982 and 1986 have indicated that off-site gas migration had extended beyond the OBSWDC property boundary at the northwestern portion of the site. As a result of this off-site LFG migration, the Town authorized the design and construction of the Phase 3 Gas Control System (for additional background information, see Section 1.4).

The Phase 3 System is a further extension of the then existing Phase 1 and Phase 2 Systems and consists of eight vents (LGV-15 thru LGV-22) located at the toe of slope of the landfill along the northwestern and western portion of the site. This system incorporated the basic design elements and improvements developed in the previous system designs.

As indicated in the migration contour developed by LKB (Drawing No. 1), the Phase 3 System has prevented lateral migration of LFG into building structures located on Claremont Road, thereby providing suitable protection for businesses located in this area.

3.7 Relocation of the Phase 3 Gas Control System Header

As part of the Remedial Action Plan, the Town is required to cap all existing uncapped portions of the Landfill. Final design plans for the landfill toe in the northwestern portion of the site necessitated the temporary removal of a portion of the existing Phase 3 Gas Control System header and the installation of a buried header. The header was buried and continues to function as the above-ground header did to obviate the migration of landfill gas in this portion of the site.

Capping operations in this area have been completed. The Town is currently scheduling the work to be conducted to deactivate the buried header and the reinstallation of the above-ground header system. It is expected that work for this project will be accomplished in the Summer of 1992.

SECTION 4

CONCLUSIONS

4.1 Landfill Gas Migration

4.1.1 Site Survey

This year's annual zero migration line site survey data, obtained by LKB personnel between May 22, 1991 and June 21, 1991, indicated that the zero percent combustible gas migration contour (Drawing No. 1) remained stable compared to that found in last year's survey.

The following conclusions are based on the site survey data obtained in this year's annual site survey:

- In the past several years of site monitoring, (between 1982 and 1986), maximum landfill gas migration was occurring in the northwestern portion of the OBSWDC, contiguous to the Key Way Concrete Supply Corp. Plant. As can be seen from the results of this year's and last year's Annual Site Surveys (Drawing No. 1), the zero percent combustible gas contours remain confined to areas located within the OBSWDC property boundary. These results are directly attributable to the successful operation of the Phase 3 Gas Control System and as such has thereby prevented the lateral migration of LFG.

- Both the southern (contiguous to the NCFTC) and eastern portions of the OBSWDC, which in the past experienced off-site migration of landfill gas, continue to show that the zero percent combustible gas contour is confined to areas located within the property boundaries of the OBSWDC.

Again, these results are due to the successful operation of the Phase 1 Gas Control System, which continues to protect the NCFTC facilities from the lateral migration of landfill gas and the Phase 2 System, which has obviated landfill gas migration along Winding Road.

- All other sampling locations monitored in this year's annual site survey (specifically the northern and southwestern portions of the OBSWDC), continue to show that the zero percent combustible gas migration contour has remained stable and within the OBSWDC property boundaries.

4.1.2 Monthly Monitoring Survey

Data obtained in this year's monthly monitoring survey (January to December 1991) have supported data provided in previous surveys, specifically the 1990 Annual Report (LKB, April 1991), with the exception of results obtained by Town personnel at sampling locations herein described.

The following conclusions for the results obtained in this year's monthly monitoring survey are presented below:

- Varying combustible gas concentrations were measured by TOB personnel at Nassau County monitoring wells W-17, W-22 and Nassau County monitoring drywell number 7 located at the Nassau County Fireman's Training Center (Table 2). As noted in Section 2.3, these areas and concentrations have been well defined over the course of four years of sampling and a joint betterment agreement has been signed between the County and Town wherein both parties will share in upgrading the Town's facilities. As with all other monitoring, should conditions warrant a more frequent sampling schedule, the Town would immediately implement a modified schedule.

- At sampling locations M-40, M-41, MW-5 Lower, MW-6 Upper and Lower, and MW-11 Upper and Lower, the varying high combustible gas readings were anticipated since these probes are located on-site and therefore are expected to yield some landfill gases.

- Negligible and/or zero percent combustible gas concentrations were measured by Town personnel at all the other sampling locations presented in this year's monthly monitoring program.

All sampling locations, percent combustible gas concentrations and relevant field data are summarized in Tables 1 and 2.

4.2 Facilities Survey

4.2.1 Nassau County Fireman's Training Center Survey

As previously described, this survey has been discontinued by the County.

4.2.2 Adjacent Building Structures and Incinerator Complex Survey

In this year's Adjacent Building Structures and Incinerator Complex Survey (January to December 1991), zero percent combustible gas concentrations were measured by TOB personnel at all sampling locations.

4.2.3 Senior Citizen Housing Survey

In this year's Senior Citizen Housing Survey (January to December 1991), zero percent combusible gas concentrations were measured by TOB personnel at all sampling locations.

4.2.4 Nassau County Campground Survey

Landfill gas monitoring results for the Nassau County Campground indicated zero percent combustible gas concentrations in this year's survey.

4.3 Supplemental Gas Monitoring Program

4.3.1 Ambient Volatile Organic Compound (VOC) Air Sampling

As noted in Section 1.3, analytical data obtained in the quarterly samplings indicated that in some respects ambient air data taken upwind of the landfill showed higher VOC's than downwind data. Although there is no firm evidence that the landfill is contributing significantly to ambient VOC concentrations, the relatively small number of data presented in the report is statistically not sufficient to fully confirm that the landfill is not significantly contributing to ambient air concentrations of VOC's.

4.3.2 Subsurface VOC Gas Sampling

Subsurface gas sampling at a variety of locations surrounding the landfill yielded anlaytical results which indicated that VOC's were present in the surrounding subsurface soil. These values in excess of respective AGC's are not technically in violation of the guidelines since the guidelines relate to ambient air concentrations and not soil gas. As noted earlier in this report, the observed soil gas concentrations do not appear to pose a significant risk because coincident ambient air measurements did not show a strong correlation to the observed soil gas values.

4.3.3 Thermal Oxidizer Emission Sampling for VOC's

As noted in Section 1.3, the results of this year's analytical testing of the thermal oxidizer emissions indicated that the emissions were all well below the acceptable AGL's as stipulated by the NYSDEC.

4.3.4 Pressure Readings

As noted in Section 1.3, the results of this year's pressure sampling indicated that all pressure probes sampled were zero or negative pressure. Again as previously noted, the occurrence of zero or negative pressure at the sampling probes indicates the effectiveness of the Town's landfill gas control system and further supports data presented herewith which shows the line of zero methane gas migration contained within the property boundaries of the OBSWDC.

Appended herewith are the Ambient Air Quality and Soil Gas Quality Survey's - Third and Fourth Quarter Reports (Appendix C) and the Landfill Gas Thermal Oxidizer Emissions Test - Fourth Quarter Report (Appendix D) which provide the sampling protocol and investigation methodology for air and soil gas as well as the sample collection, sample handling, analytical procedures applied for these programs and the sample results.

4.4 Monitoring Program Conclusions

In conclusion, this year's monitoring programs at the OBSWDC support efforts previously completed by the Town indicating the abatement of landfill gas migration by the Town's landfill gas control systems. These monitoring programs (Annual Site Survey, Monthly Monitoring Survey, Nassau County Campground Monitoring, Adjacent Building Structures Incinerator Complex Survey, Supplemental Gas Monitoring Program and Senior Citizen Housing Survey) were successfully conducted and completed, yielding valuable monitoring data used to aid in the early detection of LFG migration.

If, in the future, landfill gas migration is detected and located, remedial measures, design modifications and/or expansion of existing landfill gas control and recovery systems can be developed to assure that no hazards to health and safety are present in the vicinity of the OBSWDC.

SECTION 5

RECOMMENDATIONS

5.1 General

Based on the conclusions set forth in this report, the consultants recommend that the Town implement the additions and/or modifications outlined in Sections 5.2 through 5.6 inclusive. These programs represent a continuation of programs developed in previous reports, specifically the Comprehensive Land Use and Operations Plan, and the 1986 Annual Report Summarizing the Status of Landfill Gas Monitoring Programs and the Establishment of the Zero Percent Gas Migration Limitation at the Old Bethpage Landfill (LKB, April 1987), and are an integral part of the Final Consent Decree and the regulations governing the operation of the OBSWDC.

In addition to regulatory compliance, these programs provide the Town with essential LFG data and should be continued through 1992. The consultants further recommend that the Town submit this report and the programs outlined in the following sections to NYSDEC, NYSDOL, NCDH and NCFTC for their information and files.

5.2 Monitoring Programs

The monitoring programs outlined in this report consist of a modification of the monitoring schedule set forth in the 1990 Annual Report (LKB, April 1991) and we recommend that the Town implement this modified schedule for it's 1992 monitoring. Refer to Appendix A for details of these programs.

5.3 Presence of Combustible Gas at the Nassau County Fireman's Training Center

The presence of combustible gas at the NCFTC prompted the Town to initiate several investigative and monitoring programs at the NCFTC as well as areas adjacent to the NCFTC and OBSWDC grounds. The programs included the installation and sampling of twelve (12) cluster wells located along the western property boundary of the NCFTC, sampling of monitoring probes located within the NCFTC and an investigation of the operation and performance of the Town's Gas Control System.

Updating the current status of the remedial program, the County and Town agreed to jointly study the potential of a subsurface barrier in detering the movement of combustible gas in either direction along a portion of the common border of the NCFTC/OBSWDC. A consultant in slurry wall design was retained to conduct soil borings and determine the preliminary design parameters for a barrier wall. This program was suspended, while the County conducted further testing on the NCFTC, involving the use of subsurface gas extraction wells. The County issued a draft report on its findings in 1991. This report indicated that one extraction well located near the western boundary of the NCFTC and operated at 50-100 CFM produced a large lateral area of vacuum (radius of influence) on the site, effectively exhausting subsurface soil gases. The report further demonstrated that when this well and the existing Town gas extraction wells were operating, all areas of concern were under vacuum. Therefore, both the County and Town have agreed that barrier wall along the property boundary is not required at this time.

The County and Town also signed a betterment agreement wherein both parties will jointly share in upgrading the Town's facilities in the areas of joint concern. The projected design of the improvements will provide for the installation of a skid mounted blower, a water separator package and three (3) landfill gas vents in the vincinity of the common border of the NCFTC/OBSWDC.

As noted in Section 1.4 of this report, the County and Town have concluded that, the gas control facilities currently contemplated will control the potential for gas migration along the common border of the NCFTC/OBSWDC. With the completion of work currently under consideration by the County, all subsurface landfill gas along the common border of the NCFTC/OBSWEC should be effectively under control. It is anticipated that construction activities to upgrade the Town's gas control facilities will begin in late 1992 or early 1993.

5.4 Gas Extraction System Condensate Discharge

The Town has been granted permission by the Nassau County Department of Public Works to discharge condensate from the gas extraction system into the Nassau County Sewer System. Final Contract Documents for public bid were prepared by the Town to provide this connection and a bidder selected. Work for this project commenced in February 1989 and was successfully completed by March 15, 1989. This connection discharges condensate from the Phase 1 and 2 Gas Control Systems and some carry over of condensate mist from the Phase 3 Gas Control System through a bed of lime chips. The Town continues to abide by Nassau County permit requirements by discharging condensate from the gas extraction system into the Nassau County Sewer

System. Most condensate generated by the Phase 3 Gas Control System is discharged to leachate collection well 'A' and ultimately pumped to and treated at the Town's Leachate Treatment Plant, prior to discharge to the Nassau County Sewer System.

5.5 Inspection and Maintenance of Existing Extraction Wells

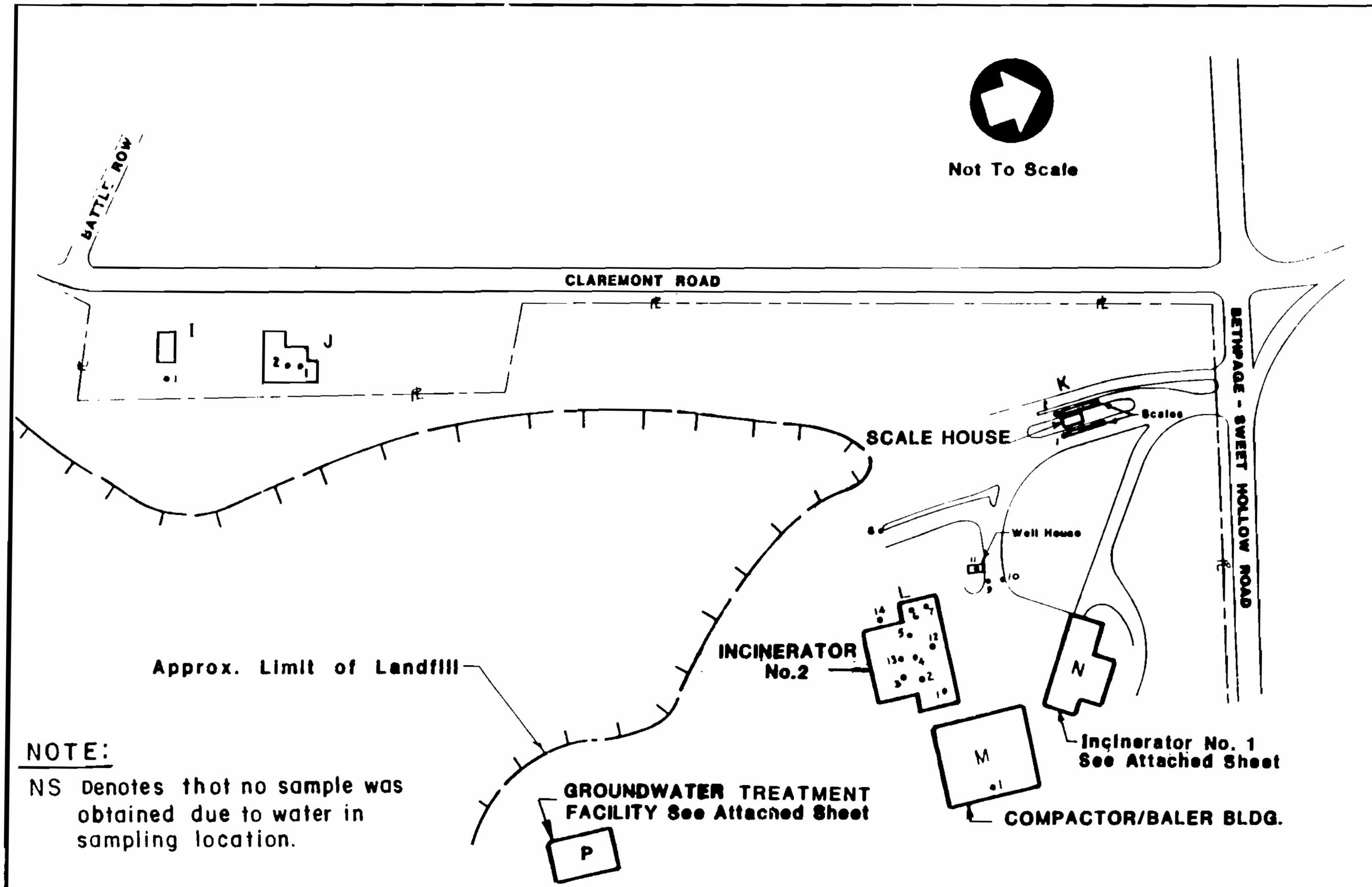
LKB has recommended that the Town periodically inspect all the existing extraction wells of the Town's Gas Control System for the presence of siltation and/or blockage. Siltation of the extraction wells or the presence of biological growth could lead to a loss of control efficiency around each well by blinding the well screens. If siltation of the wells or biological growth is observed, the Town will take all necessary steps (air/water scouring) to remediate and restore wells to their original operating conditions. The Town has previously cleaned the landfill gas wells along the NCFTC/OBSWDC property line.

5.6 Quarterly Supplemental Sampling

As part of the "RAP", which detailed the actions to be undertaken by the Town in compliance with the Final Consent Decree, the Town is required to supplement its current gas monitoring activities. During 1991, the final quarterly round of thermal oxidizer emissions sampling were completed and the results were submitted to the NYSDEC for review. Under the Consent Decree, annual sampling of thermal oxidizer emissions will begin in 1992. The third and fourth rounds of ambient air and subsurface gas sampling were completed in 1991, and those results were also submitted to the NYSDEC for review. After evaluating the data gathered during the four rounds of data collection, the Town will proceed with the second year of testing in 1992.

5.7 Groundwater Treatment Facility Sampling

In 1991, a Groundwater Remediation facility was constructed by the Town to pump and treat contaminated groundwater. The facility is located in the northeastern portion of the OBSWDC (See Figures 13 and 14). As per the consultant's recommendation, seven (7) sensors were installed inside the facility to continuously monitor the presence of explosive gases. It is recommended that Town TOB personnel monitor the facility as part of the Adjacent Building Structures and Incinerator Complex Survey.



NOTE:

NS Denotes that no sample was obtained due to water in sampling location.

SAMPLE LOCATION	SAMPLE DESCRIPTION	% COMBUSTIBLE GAS
(I) 90 BATTLE ROW		
1	Drain	
(J) 100 BATTLE ROW		
1	Drain	
2	Hole	
(K) SCALE HOUSE		
1	Scale	
2	Scale	
(L) INCINERATOR PLANT NO. 2		
1	Drain	
2	Drain	
3	Drain	
4	Drain	
5	Hole	
6	Drain	
7	Drain	
8	Drain	
9	Drain	
10	Drain	
11	Pit	
12	Grate	
13	Drain	
14	Drain	
(M) COMPACTOR/BALER BUILDING		
1	Drain	

FIGURE 13

ADJACENT BUILDING STRUCTURES & INCINERATOR COMPLEX SURVEY

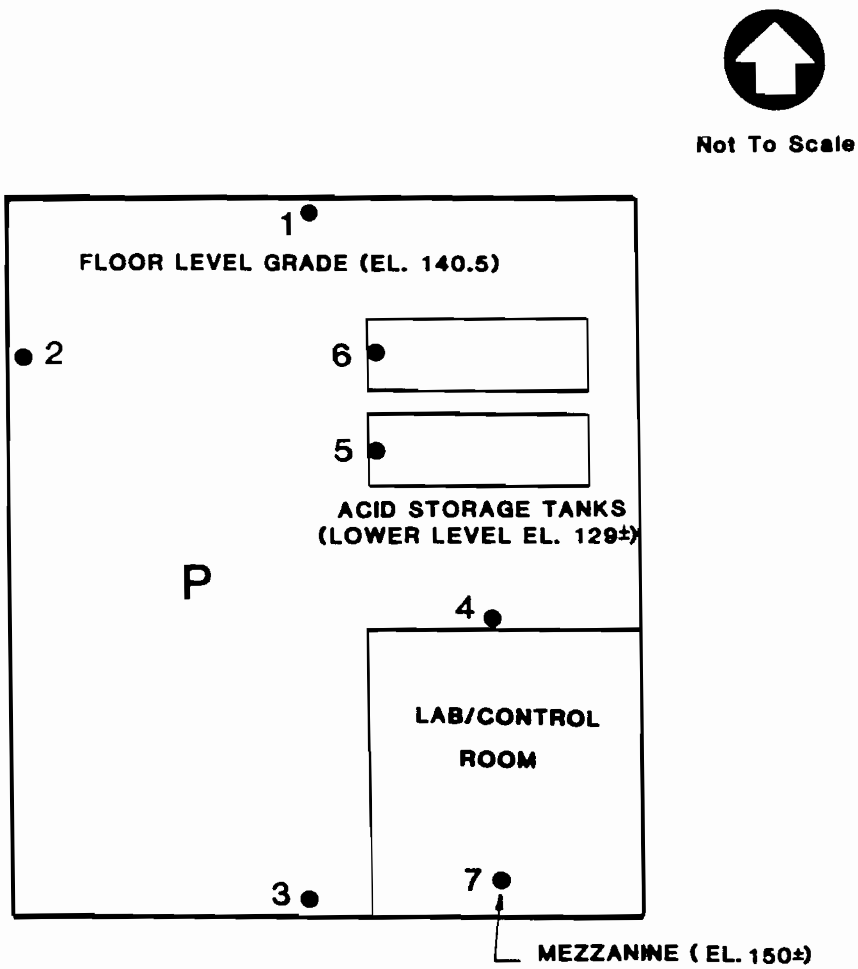
TOWN OF OYSTER BAY · NEW YORK · 1653

LOCKWOOD, KESSLER & BARTLETT, INC.
CONSULTING ENGINEERS
SYOSSET, NEW YORK

6014-13

JUNE 1992

ADJACENT BUILDING STRUCTURES & INCINERATOR COMPLEX SURVEY



SAMPLE LOCATION	SAMPLE DESCRIPTION	% LOWER EXPLOSIVE LIMIT (L.E.L.)
1	Sensor	
2	Sensor	
3	Sensor	
4	Sensor	
5	Sensor	
6	Sensor	
7	Sensor	

GROUNDWATER TREATMENT FACILITY

FIGURE 14

TOWN OF OYSTER BAY · NEW YORK · 1653

LKB
LOCKWOOD, KESSLER & BARTLETT, INC.
CONSULTING ENGINEERS SINCE 1889 SYOSSET, NEW YORK

6014-13

JUNE 1992

APPENDIX A

RECOMMENDED MONITORING SCHEDULE FOR 1992

Sample Points	Frequency of Monitoring	Monitoring Performed by
Monthly Monitoring Survey	Monthly	TOB personnel
Nassau County Fireman's Training Center Monitoring	Monthly	TOB personnel
Adjacent Building Structures and Incinerator Complex Survey	Monthly	TOB personnel
Senior Citizen Housing Survey	Monthly	TOB personnel
Supplemental Gas Monitoring Program	Quarterly	LKB personnel
Ambient VOC Air Sampling*	Quarterly	LKB personnel
Subsurface VOC Gas Sampling*	Quarterly	LKB personnel
Thermal Oxidizer Emissions Sampling for VOC's**	Annually	LKB personnel
Pressure Readings*	Quarterly	LKB personnel
Zero Migration Limits	Annually	LKB personnel
Nassau County Campground Survey	Annually	LKB personnel

NOTES:

* This sampling will be performed on a quarterly basis unless permission is received by the NYSDOL to perform this monitoring on an annual basis.

** Upon completion of the initial year of quarterly sampling (February 1991), thermal oxidizer emissions sampling for VOC's will be conducted annually. The oxidizer temperatures, however, will be monitored on a continuous basis. Note that the Consent Decree requires monthly temperature monitoring.

APPENDIX B

IDENTIFICATION OF MONITORED BUILDINGS ADJACENT TO OBSWDC

Identification Point	Identification Title	Building Location
A	Park Riding Stables	499 Winding Road
B	Associated Rigging and Hauling Action Crane Company	459 Winding Road
C	Mr. Bar-B-Q, Inc., Keromate	445 Winding Road
D	P & P Recycling	311 Winding Road
E	G & S Investors	303 Winding Road
F	Aluminum Louver Company	310 Winding Road
G	New Dimensions	161 Bethpage- Sweethollow Road
I	Briden Construction	90 Battle Row
J	Key Way Concrete Supply Corp.	100 Battle Row
K	Scalehouse	OBSWDC
L	Incinerator No. 2	OBSWDC
M	Compactor/Baler Building	OBSWDC
N	Incinerator No. 1	OBSWDC

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1991 ANNUAL REPORT

APPENDIX C
AMBIENT AIR QUALITY SURVEY AND SOIL GAS QUALITY SURVEY

(THIRD AND FOURTH QUARTER REPORTS)

JUNE 1992

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
AMBIENT AIR QUALITY SURVEY
AND
SOIL GAS QUALITY SURVEY

Fourth Quarter Report

RTP ENVIRONMENTAL ASSOCIATES INC.

AIR • WATER • SOLID WASTE CONSULTANTS

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
AMBIENT AIR QUALITY SURVEY
AND
SOIL GAS QUALITY SURVEY

Fourth Quarter Report

Prepared for:

Town of Oyster Bay
Department of Public Works
Syosset, New York

Prepared by:

RTP Environmental Associates, Inc.
400 Post Avenue
Westbury, New York

JUNE 1991

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

AMBIENT AIR QUALITY SURVEY AND SOIL GAS QUALITY SURVEY

FOURTH QUARTER REPORT

TABLE OF CONTENTS

		Page No.
1.0	INTRODUCTION	1
2.0	METHODOLOGY AND PROTOCOLS	1
2.1	Program Definition	1
2.2	Gas Sampling	2
2.2.1	General Scope	2
2.2.2	Modified VOST Gas Sampler	5
2.2.3	Sample Volume Selection	8
2.2.4	Other Sampling Equipment	11
2.3	Meteorological Data	12
3.0	SAMPLING AND ANALYSIS	12
3.1	Background	12
3.2	Ambient Air Sampling	13
3.3	Soil Gas Sampling	16
3.4	Analytical Laboratory Procedures	17
4.0	DISCUSSION OF RESULTS	18
4.1	Ambient Air Concentrations	18
4.2	Soil Gas Concentrations	18
5.0	SOIL GAS PRESSURE READINGS	18

APPENDICES:
- A - RAP, Attachment 2
- B - Monitoring Protocols and Sampling Equipment Descriptions
- C - Chronology - Ambient Air and Soil Gas Sampling Event
- D - Analytical Results

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

AMBIENT AIR QUALITY SURVEY AND SOIL GAS QUALITY SURVEY

FOURTH QUARTER REPORT

LIST OF TABLES

		Page No.
2.1	Summary of Analytical Parameters for Air and Soil Gas Samples	6
2.2	General Relationship Between Micro-Tip Readings and Sample Volume	10
3.1	Summary of Ambient Air and Subsurface Soil Gas Sampling	14
4.1	Oyster Bay VOST Ambient Air Sample Results	19
4.2	Oyster Bay VOST Soil Gas Sample Results	20
5.1	Summary of Soil Gas Pressure Tests	22

LIST OF FIGURES

2.1	Ambient Air and Soil Monitoring Sites at OBSWDC	3
2.2	Schematic of EPA Referenced Volatile Organic Sampling Train (VOST)	7
2.3	Modified VOST Sampler	9

1.0 INTRODUCTION

RTP Environmental Associates, Inc. (RTP) was contracted by the Town of Oyster Bay through their Consultant, Lockwood Kessler & Bartlett, Inc. (LKB), to perform the sampling and analysis of ambient air and soil gases in the areas at and surrounding the Old Bethpage Landfill at the Oyster Bay Solid Waste Disposal Complex. The general scope of the program was defined in the Order on Consent which is presented in Appendix A. Since the Consent Decree was not explicit as to the specific methodology and testing protocols to be followed, RTP, in conjunction with the Town, LKB and analytical laboratories, developed a complete protocol and analysis strategy for meeting the general requirements stipulated by the Decree. The air program was also designed to be consistent with the other components of the Consent Decree.

As stipulated in the Consent Decree, the ambient air quality and soil gas quality were monitored at several positions around the landfill. The samples were analyzed using USEPA protocols and the results tabulated. Four sampling events were to be conducted during the initial year of the program. Subsequent sampling events would be conducted on an annual basis or as directed by the State.

This report contains the results of the fourth quarter sampling efforts. The fourth sampling event was conducted on May 2nd and 3rd, 1991. Sections 2.0 to 4.0 of the report contain the sampling protocol and investigation methodology for air and soil gas. These include the sample collection, sample handling, analytical procedures applied for this program and the sample results. Section 5 of this report contains the soil gas pressure sampling protocols and test results for this quarter.

2.0 METHODOLOGY AND PROTOCOLS

2.1 PROGRAM DEFINITION

In conformance with the RAP Attachment 2 of the Consent Decree (83 CIV 5357), as shown in Appendix A, the Town of Oyster Bay initiated an investigation of the ambient air quality and soil gas quality in the vicinity of the Old Bethpage Landfill. This report addresses four of the components listed in the RAP, (1) ambient air sampling, (2) 30" deep subsurface gas sampling and, (3) subsurface gas sampling at various depths and (4) soil gas pressure readings.

The objective for air and soil gas portions of the program is to examine the ambient air concentration of trace volatile organic compounds in the vicinity of the Old Bethpage Landfill. During the fourth sampling event, four ambient air samples were collected over a 24-hour period at three locations. Short-term (ten minute) subsurface soil gas grab samples were collected at fifteen different locations as specified in the Consent Decree. Soil gas pressure readings were taken at three locations during the site investigation to assist in monitoring the effectiveness of the landfill gas collection system.

The air and soil gas sampling procedures follow those developed during the first round of sampling. The program also involved the collection of meteorological parameters from atop the landfill to specifically define the micrometeorological conditions existing during the ambient air and subsurface soil gas sampling events as well as during the soil gas pressure measurement period.

2.2 GAS SAMPLING

2.2.1 General Scope

As required by the RAP Attachment 2, ambient air samples are to be collected over a 24-hour period at three locations around the landfill, (1) along Winding Road to the east and southeast of the landfill, (2) to the west of the landfill along Round Swamp Road, and (3) to the north of the landfill. The RAP also states that samples at the above three locations should be collected quarterly during the initial year of the program and, if approved by the State, on an annual basis thereafter. Samples are to be analyzed for volatile organic compounds.

The sample collection program was modified from the ambient air sampling scope initially stated in RAP to account for site geometry. The selected ambient air sampling locations for this quarter are shown in Figure 2.1. The 24-hour ambient air samples were taken at locations A1 and A4 and two 24-hour samples were taken at location A2/A3 for a total of four ambient air samples. The reason for collecting two samples at a single site (A2/A3) was to provide two flow ranges. The first round of sampling identified a considerable range in ambient concentrations of various volatile organic compounds. Therefore, the two ranges of sample volumes were necessary to achieve acceptable analytical sensitivity for the target compound list.

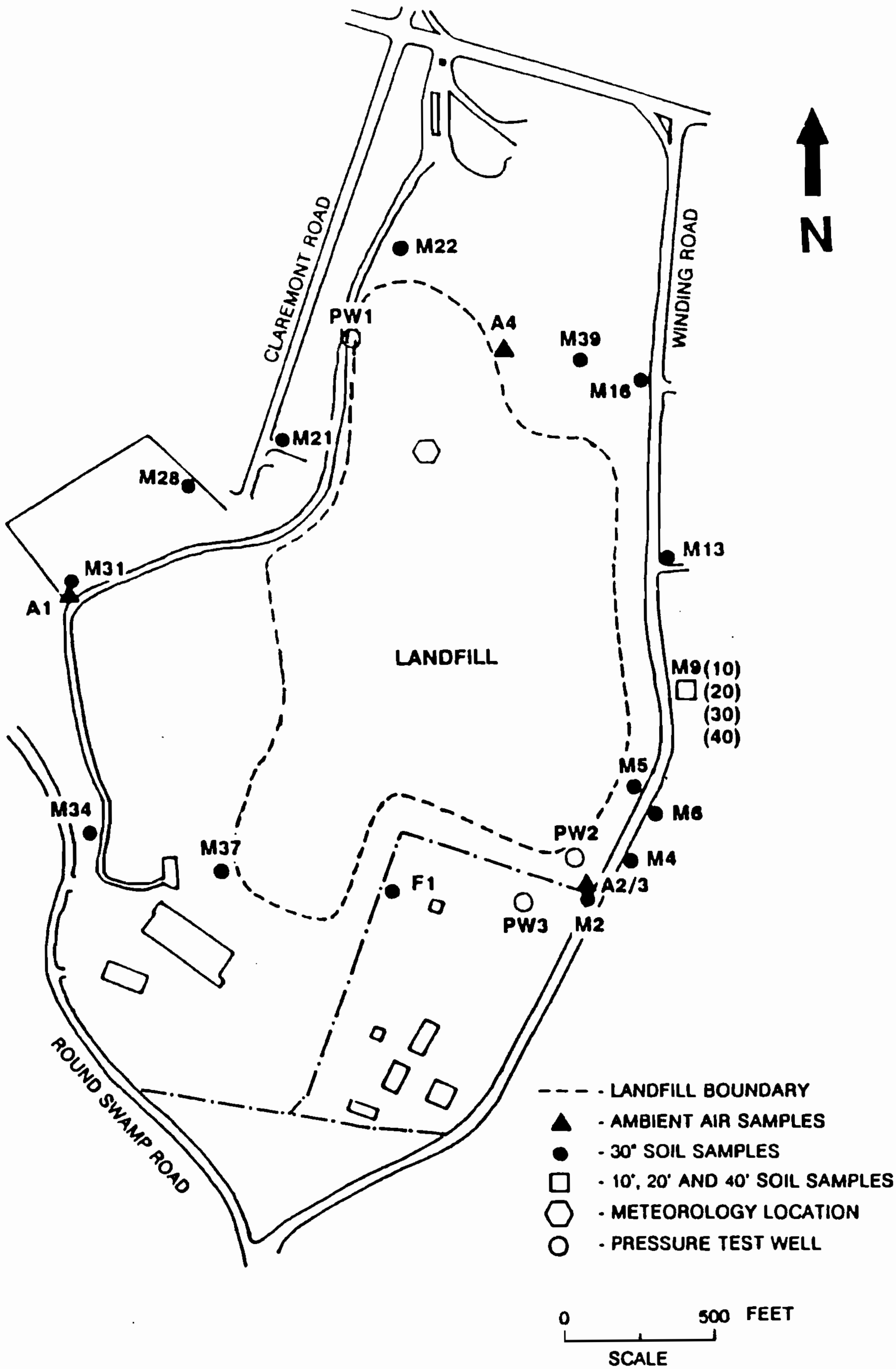


FIGURE 2.1: AMBIENT AIR AND SOIL MONITORING SITES AT OBSWDC

The RAP requires the collection and analysis of samples from fourteen (14) 30" deep wells at different locations surrounding the landfill on a quarterly basis during the initial year of the program and, if approved by the State, on an annual basis thereafter. In this fourth quarterly sampling event, all 30" wells listed in the Consent Decree were sampled. These included well locations M2, M4, M5, M6, M13, M16, M21, M22, M28, M31, M34, M37, M39 and F1 as identified in Figure 2.1. The sampling methodology used in the initial sampling event was also utilized in this case.

The third component of the RAP required subsurface soil gas samples to be collected from ten (10), twenty (20), thirty (30), and forty (40) foot depths at location M9 as shown in Figure 2.1. Again, sampling is required on a quarterly basis during the initial year of the program and, if approved by the State, on an annual basis thereafter. In this fourth quarterly sampling event, soil gas samples were taken from all four well depths.

As in the initial sampling event, the sampling procedure being applied was the modified VOST method. A modified VOST approach was decided upon for several reasons:

- o Standard absorbent traps for ambient air sampling may miss several compounds because of the volatility of many organics at ambient temperatures. By cooling the absorbent traps to near 32°F, the modified method would likely allow the traps to capture compounds that might normally go undetected.

- o Using a VOST trap series would provide data directly compatible with the thermal oxidizer tests being performed as part of the Consent Decree.

- o Since ambient air concentrations of VOC's are likely to be very low in the area surrounding the landfill, a method that would allow for the collection of large volumes of gas had to be developed.

- o Large volumes of ambient air were necessary because of the analytical limitations posed by standard gas chromatograph - mass spectrographic (GC/MS) methods.

- o Evacuated canister methods were reviewed and deemed unacceptable because of low total volume capacity and potential leaks.

- o The VOST series traps are applicable for both ambient air and soil gas monitoring.

- o The interference problems associated with sample bags and glass bulb methods were deemed unacceptable and had to be avoided.

A summary of the volatile organic compounds that could be evaluated by using the above methodology is presented in Table 2.1. This is the target compound list for the fourth round of the test and it is consistent with the VOC constituents being evaluated in the thermal oxidizer testing portion of the Consent Decree.

2.2.2 Modified VOST Gas Sampler

The Volatile Organic Sampling Train (VOST) is one of three EPA methods identified to collect VOC's from stacks (EPA, 1984). A schematic diagram of the principal components of the standard VOST is shown in Figure 2.2. The VOST consists of a quartz or glass lined probe with a glass wool particulate plug, an isolation valve, a water cooled gas condenser with a thermocouple placed at the outlet to monitor gas stream temperature, a sorbent cartridge containing Tenax, an empty impinger for condensate removal, a second water cooled glass condenser, a second sorbent cartridge containing Tenax and petroleum based charcoal (3:1 by volume; approximately 1 gram of each), a silica gel drying tube, a calibrated rotameter, a sampling pump, and a dry gas meter.

The standard VOST is not designed for portable ambient air monitoring work. It is designed to extract and concentrate volatile organic compounds with boiling points less than or equal to 100° centigrade from stack gas effluents. The major difficulties with using a standard VOST in the field for ambient air quality work are the power requirements, setup and assembly problems and the breakage of glassware.

EPA, 1984 — Compendium of Methods for Determination of Toxic Organic Compounds in Ambient Air. (Riggin & Purdue) EPA-600/4-84-041, Research Triangle Park, North Carolina.

TABLE 2.1

SUMMARY OF ANALYTICAL PARAMETERS FOR AIR AND SOIL GAS SAMPLES

VOLATILES*

Acetone
Benzene
Bromodichloromethane
Bromoform
Bromomethane
2-Butanone

Carbon Disulfide
Carbon Tetrachloride
Chlorobenzene
Chloroethane
2-Chloroethylvinylether
Chloroform
Chloromethane

Dibromochloromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,2-Dichloroethene
1,1-Dichloroethene
1,2-Dichloropropane
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene

Ethylbenzene
2-Hexanone
4-Methyl-2-Pentanone
Methylene Chloride
Styrene

1,1,2,2,-Tetrachloroethane
Tetrachloroethene
Toluene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Trichlorofluoromethane
Vinyl Acetate
Vinyl Chloride
Xylenes (total)

*The GC/MS Analysis also was used to detect the next 10 highest peaks not specifically identified above. (See lab analysis - Appendix D)

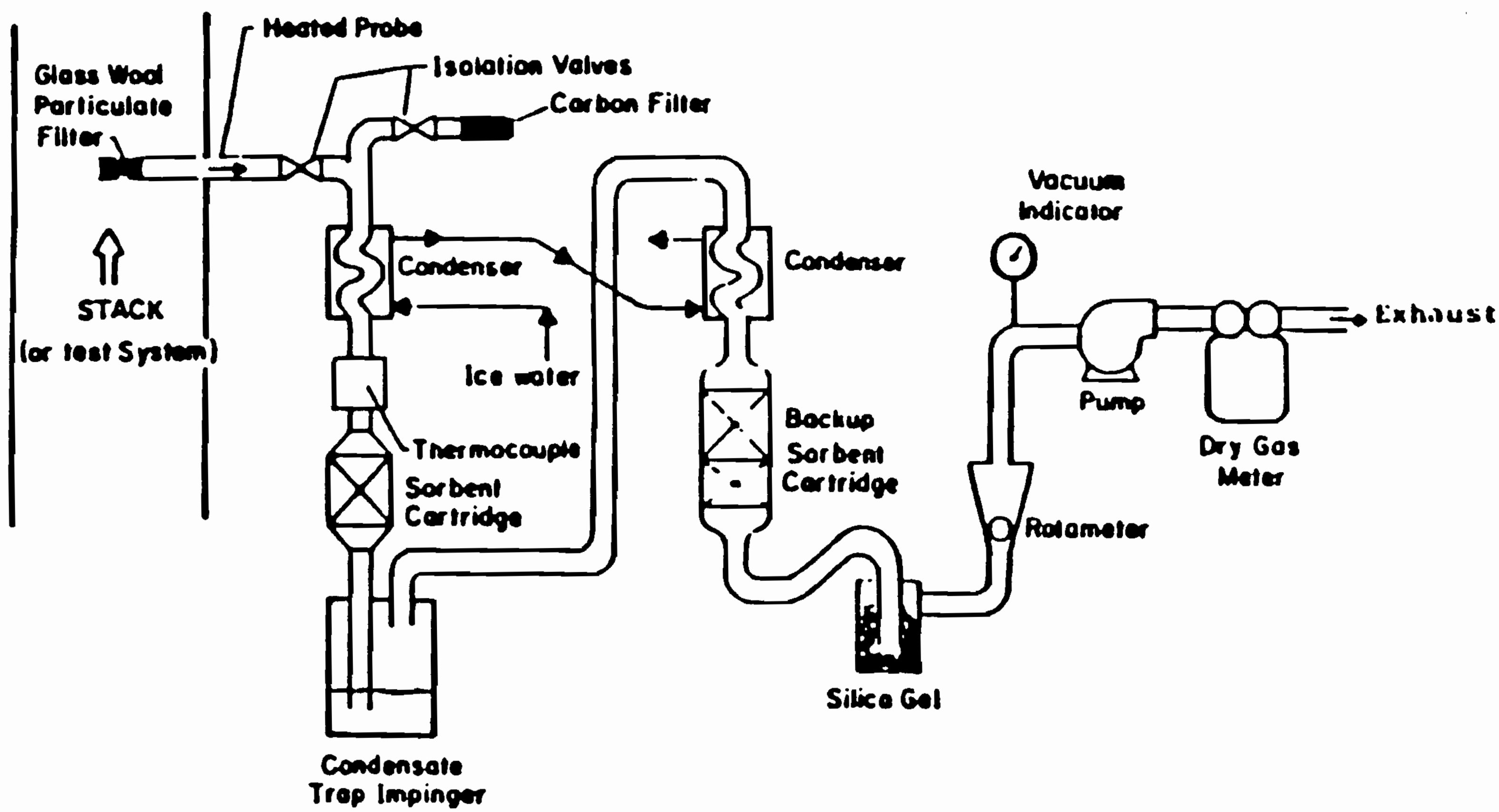


FIGURE 2.2: SCHEMATIC OF EPA REFERENCED VOLATILE ORGANIC SAMPLING TRAIN (VOST)

RTP modified the EPA standard VOST unit to make it portable and to account for air flow volumes necessary to achieve the analytical sensitivity required in both ambient air and subsurface soil gas sampling programs that are required by the Consent Decree. Figure 2.3 shows the RTP modified VOST. The key components of the modified VOST are: precalibrated portable sampling pump, rotameter, a rechargeable GEL CEL battery pack, particulate filter, pre-weighted VOST Tenax sorbent glass tube, pre-weighted VOST Tenax/charcoal sorbent glass tube, condensate impinger, aluminum tube holder, ice bath and ice pack, sampling cane, and cooler enclosure. The VOST sorbent tubes used in the modified sampling train are the same as those used in the VOST EPA referenced method. However, the SKC sampling pump and rotameter were used instead of the standard VOST flow controlled sampling pump and rotameter, and the ice bath, ice pack and condensate impinger were used instead of two condensers.

2.2.3 Sample Volume Selection

The selection of sample volume for both air and soil gas samples for this study was investigated. In general, the sample volume or sample size is limited by the analytical instrumentation being applied at the host laboratory and the period of sampling required in the Consent Decree. Since sample detection is based on nanogram concentrations of constituents, appropriate sample volumes were necessary to provide the analytical sensitivity desired.

In general, analytical instruments can normally detect between a few nanograms to thousands of nanograms of individual constituents in a sample. The analytical instrument's lower limit of detection for this case was set between 20 and 200 nanograms. The upper range of detection (calibration limit) was nominally set at approximately 100 times the lower detection limits. Therefore, in order to provide the correct mass loading of constituents on the sample substrate, sample volumes were approximated based on Photovac Micro-Tip values as presented in Table 2.2. Since the Micro-Tip has a lower limit of detection at 0.1 ppm, it was not always possible to specify the exact sample volume required to consistently achieve the proper mass loading on each sampling tube. Therefore, to avoid missing compounds because of insufficient sample volume for ambient air samples, high volume (1000 liters) and low volume (24 liters) sample sizes were selected.

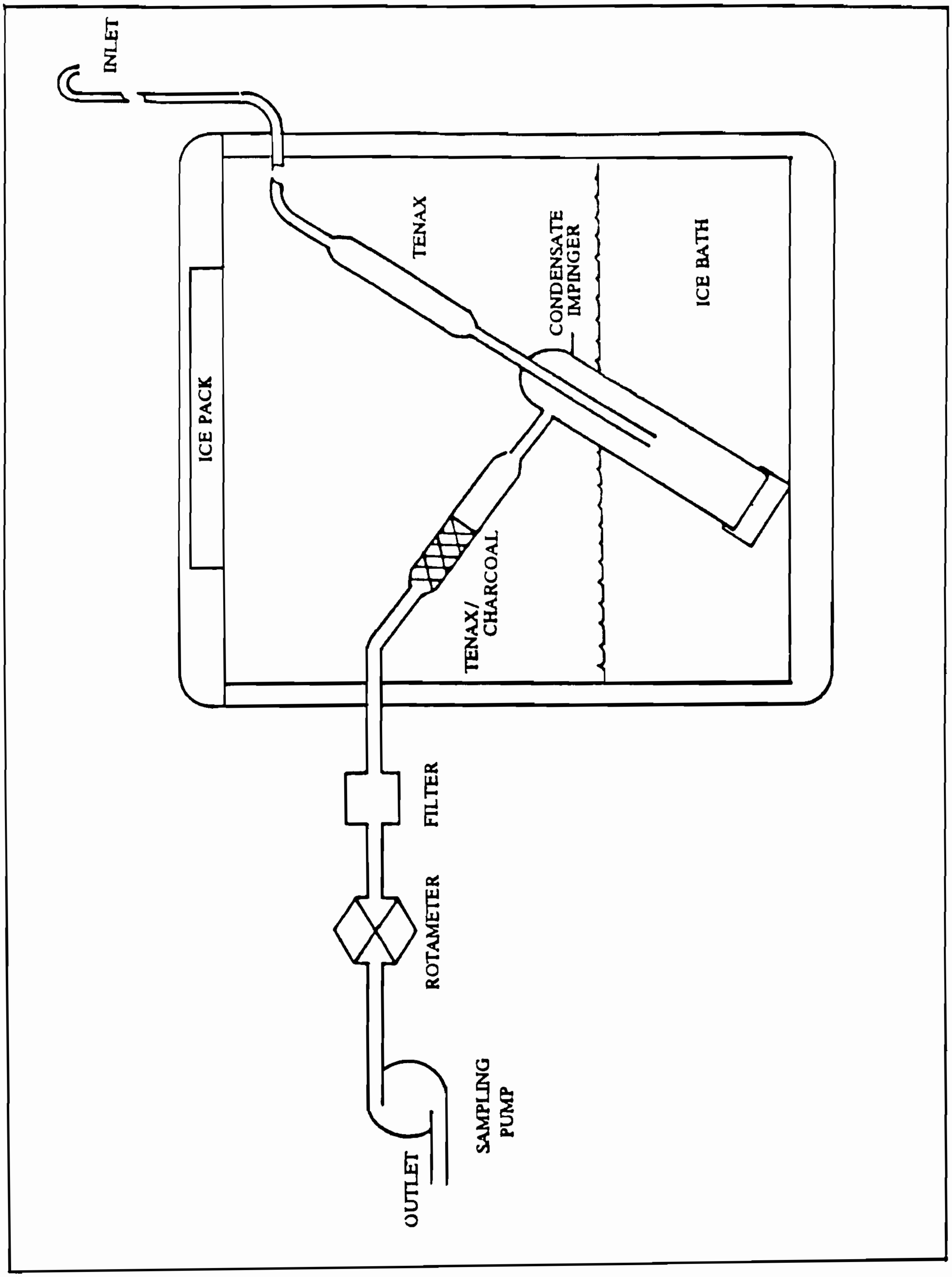


FIGURE 2.3: MODIFIED VOST SAMPLER

TABLE 2.2

GENERAL RELATIONSHIP BETWEEN MICRO-TIP READINGS AND SAMPLE VOLUME

MICRO-TIP READINGS* (ppm)	SAMPLE VOLUME (liters)
<0.1 to 0.5	1000 to 10
2 to 5	1
5 to 10	0.5
10 to 15	0.1
15 to 20	0.05
>20	0.01

*Micro-Tip photoionization detector with 11.7 ev lamp.

It was previously determined that a 10 liter sample volume would be appropriate for sampling shallow soil gas wells. Removing more than a 10 liter sample would have meant that ambient air from the surface would have been introduced into the well being sampled.

2.2.4 Other Sampling Equipment

The SKC sampling pump used in this study is a model MOD 224-PCXR7 universal exhaust pump. It automatically shuts down for low battery voltage and excess back pressure. The accuracy of the sampling pump is about +/- 5% of the set nominal flow rate.

The SKC sampling pump can be programmed to operate continuously and intermittently. Also, it can be used to collect different total sample volumes at different flow rates. The pump can be programmed to continuously draw samples at a desired flow rate over a pre-assigned time period. This capability is particularly important in the ambient air sampling event. It makes it possible to collect ambient air samples intermittently over a 24-hour total elapsed time period to give a 24-hour average VOC concentration as specified in the Consent Decree. The only factor that limits the overall sampling time would be the pump battery capacity which was expanded by using a larger capacity battery.

SKC electronic calibrator Model 712 is used prior to each sampling event to set the pump to a desired nominal flow rate. It is also used prior to testing to set up a relationship between actual pump volume flow rates and their corresponding rotameter readings. These calibration data together with the recorded pump rotameter readings, are then used after all sampling events to establish the exact sample volumes collected during each test. SKC calibrator is a digital film flow meter consisting of a microprocessor and a sensitive bubble meter with two photo-sensor lines. The flow rate shown on the digital film flow meter is calculated by the microprocessor. The flow is based upon the bubble meter inner diameter and the elapsed time taken by a bubble passing between the two photo-sensor lines. The accuracy of this calibrator is around +/- 2% of the reading.

The purpose of using a pump rotameter is to visually check and record the readings during sampling and not to determine the precise flow rate. The flow rate is determined by the digital film flow meter as discussed above.

A Photovac Micro-Tip meter was also used during the monitoring program. It is a hand held instantaneously reading analyzer that measures the total concentration of all ionizable compounds (in ppm). It is to be used before and after each sampling event to measure the total gross VOC concentration. The meter has a minimum detection limit (MDL) of 0.1 ppm. Micro-Tip is used to verify and adjust, if necessary, the appropriate nominal pump flow rate for each ambient air and subsurface soil gas sample.

2.3 METEOROLOGICAL DATA

Ambient onsite meteorological data was collected during the ambient air quality and soil gas tests. Meteorological data provide information on ambient conditions occurring during the tests. The specific equipment used to measure and record onsite meteorological data is identified and presented in Appendix B.

The meteorological parameters of interest in this program are: wind speed, wind direction, temperature, relative humidity, turbulence, barometric pressure and precipitation. The meteorological equipment used included a 10 foot meteorological tower, solid-state barometric pressure sensor, precipitation gauge, three-cup anemometer, counterbalanced wind vane coupled to a precision, low-torque potentiometer, temperature sensor and a fully programmable CR10 measurement data logger and control module. The pressure sensor and the CR10 data logger/controller was enclosed inside a portable instrument case. The remainder of the equipment was mounted on the meteorological tower. Appendix B provides a detailed description of the meteorological sampling and data processing protocols.

3.0 SAMPLING AND ANALYSIS

3.1 BACKGROUND

The program's scope of work for sampling and analysis of ambient air quality levels in the vicinity of the Old Bethpage Landfill was principally guided by the NYSDOL Consent Decree. As mentioned in Section 2.0, the EPA reference sampling mechanism was modified to account for site conditions and monitoring requirements. All locations specified in the Consent Order were sampled.

Analytical laboratory equipment provided concentration measurements based on mass loading of specific substrates within the sampling tubes. It was, therefore, important to determine how much pollutant mass was contained in each gaseous sample from each soil gas well and ambient air location. Historical data did not define what specific ambient levels were to be expected, therefore, a portable ambient air and soil gas monitor (Photovac Micro-Tip Total Hydrocarbon Analyzer) having detection ranges down to 0.1 ppm was used in this case to preliminarily define sample loadings.

3.2 AMBIENT AIR SAMPLING

The fourth quarterly 24-hour ambient air sampling event was conducted on May 2nd and 3rd, 1991. Three locations at the Old Bethpage Landfill were selected as illustrated on Figure 2.1. At locations A1 and A4, high volume, 24-hour ambient air samples were collected using the modified VOST sampler. At locations A2 and A3, low volume and high volume 24-hour modified VOST samples were collected. The critical parameters are summarized in Table 3.1.

The sampling trains were partially assembled according to the air sampling protocol presented in Appendix B prior to taking the four ambient air samplers to their respective field locations. The SKC sampling pumps were calibrated, battery packs were charged, both the pumps and battery packs were positioned and connected, aluminum tube holders were positioned, sampling canes were mounted onto the coolers and the inlets to the sampling ports were sealed. The VOST tubes were removed from their protective cases at the sampling sites and then the end caps and fittings were removed. The tubes were installed and the samplers were placed in their respective positions as shown in Figure 2.3. The sampler design for the tests has been described in Section 2.2.

The sampler for Location A1 was positioned first to the west of the landfill as shown in Figure 2.1. Sampler A4 was positioned last on the north side of the landfill to the southwest of soil gas well M39. Samplers at both A1 and A4 were set to collect 500 2-minute discrete samples at a 1.0 liter per minute (lpm) nominal flow rate over a 24-hour period. These settings would allow for the collection of two 1,000 liter samples at A1 and A4, respectively. During the intervening minute, the sampler was programmed to shut off. The reason the pump was set at 1.0 lpm was to place the pump at a sampling rate that was removed from the extreme ends of the pump's

TABLE 3.1

SUMMARY OF AMBIENT AIR SAMPLING

SITE ID	SAMPLE ID	TESTING DATE	DURATION (minutes)	SAMPLING HEIGHT	NOMINAL FLOWRATE (l/min)	DESIRED QUANTITY (liter)	ACTUAL QUANTITY (liter)
A1	A41	May 2-3	1440	36"	1.0	1,000	994
A2	A42	May 2-3	1440	36"	1.0	24	24
A3	A43	May 2-3	1440	36"	1.0	1,000	996
A4	A44	May 2-3	1440	36"	1.0	1,000	1072

SUMMARY OF SUBSURFACE SOIL GAS SAMPLING

WELL ID	SAMPLE ID	TESTING DATE	DURATION (minutes)	WELL DEPTH	NOMINAL FLOWRATE (l/min)	DESIRED QUANTITY (liter)	ACTUAL QUANTITY (liter)
M2	M42	May 3	10	30"	1.0	10.0	9.94
M4	M44	May 3	10	30"	1.0	10.0	10.16
M5	M45	May 3	10	30"	1.0	10.0	9.99
M6	M46	May 3	10	30"	1.0	10.0	9.14
M13	M413	May 3	10	30"	1.0	10.0	9.79
M16	M416	May 3	10	30"	1.0	10.0	9.99
M21	M421	May 3	10	30"	1.0	10.0	9.92
M22	M422	May 2	10	30"	1.0	10.0	9.99
M28	M428	May 3	10	30"	1.0	10.0	9.99
M31	M431	May 2	10	30"	1.0	10.0	9.99
M34	M434	May 2	10	30"	1.0	10.0	9.99
M37	M437	May 2	10	30"	1.0	10.0	9.99
M39	M439	May 2	10	30"	1.0	10.0	9.99
F1	M4F1	May 3	10	30"	1.0	10.0	8.96
M9	M491	May 3	10	10'	1.0	10.0	9.14
M9	M492	May 3	10	20'	1.0	10.0	9.99
M9	M493	May 3	10	30'	1.0	10.0	9.99
M9	M494	May 3	10	40'	1.0	10.0	9.99

operating range which is 0.1 lpm to 5.0 lpm while at the same time, collecting a total air volume of approximately 1,000 liters over the 24-hour period. Samplers A-1 and A-4 began sampling at 1339 EDT and 1444 EDT on May 2, 1991, respectively.

Samplers A-2 and A-3 were set up southeast of the landfill. Sampler A-3 was set to collect 500 2-minute samples at 1.0 lpm over the 24-hour period, the same set up as for Samplers A-1 and A-4. Sampler A-2 was set to collect a low volume sample. To achieve this, the pump was programmed to run for 1-minute out of every hour at 1 lpm. This would allow for the collection of 24 discrete 1-minute samples over the 24-hour sampling period with the total air volume being approximately 24 liters. Sampler A-2 began sampling at 1407 EDT and Sampler A-3 was started at 1413 EDT on May 2, 1991.

The ambient total VOC concentration was monitored at each site by a Photovac Micro-Tip. Ambient total VOC concentrations were measured to be 0.0 ppm at the initiation at all sampling sites except A4. The initial ambient total VOC concentration at A4 was 0.2 ppm. Based on the above ambient concentrations, flow rates were set at 1.0 lpm for all four pumps. These rates would achieve the desired range in sample volumes necessary for analytical sensitivity requirements.

Periodic checks were made at the ambient air sampling locations. Pump operations were monitored and VOST train integrity, station flow rates and ice levels in the samplers were checked. In all, each sampler was checked seven to eight times during the 24-hour sampling period. Rotameter readings were within established ranges. Sampling proceeded according to plan over the 24-hour sampling periods at all sites.

All air sampling units were programmed to end sampling at the conclusion of the 24-hour sampling event. The final VOC ambient concentrations at all sites were 0.0 ppm based on the Micro-Tip reading. Pump elapsed run time readings were recorded, VOST traps were removed, and the condensate was collected in clean septum vials. HPLC water was used to triple rinse the condensate impingers and the rinse water was collected in the corresponding clean septum vials. All traps and tubes were labeled and shipped to the analytical laboratory as per the established protocol.

The analytical laboratory for this test was Research Triangle Laboratories (RTL). The laboratory received all tubes in good condition. The laboratory analytical results along with the data observed during the sampling event will be discussed in Section 4.0. A more detailed chronology of the ambient air sampling event is presented in Appendix C.

3.3 SOIL GAS SAMPLING

The soil gas sampling elements of the Consent Decree require soil gas samples be extracted from several 30" deep subsurface gas wells and from 10', 20' 30' and 40' deep subsurface gas wells. The decree does not specify the volume of sample, constituents to be analyzed, time period for collection, conditions for collection, analytical instrumentation, minimum level of detection and other parameters necessary to specifically define the nature of the tests and the applicability of the test results. Based on the other elements of the work scope in the Consent Decree, RAP Attachment 2, it was decided to follow the protocols and procedures outlined in Section 2.3 and presented in Appendix B for all soil gas samples.

The first step in the soil gas test was to assemble the sampling trains. The sampler design is equivalent to that used for the ambient air samples except for the following modifications. The sample probe was modified to include a 36" long, 1/4" diameter, stainless steel tube that was attached to the sampler inlet line in place of the sampling cane. Prior to use, the sample probe tube was heated to purge any oils/VOC's attached to the stainless steel. After purging, the tubes were capped to prevent inadvertent exposure to trace VOC's. The sampler pump was calibrated and programmed for specific flow rates at each soil gas sampling point based on the total VOC concentrations observed in the well prior to removal of a soil gas sample. Total VOC well concentrations were monitored by the Photovac Micro-Tip.

Soil gas samples were collected at M2, M4, M5, M6, M13, M16, M21, M22, M28, M31, M34, M37, M39, F1 and M9 (10', 20', 30' and 40' depths) as shown on Figure 2.1 and as summarized in Table 3.1. All 30" soil gas wells were temporarily sealed with modeling clay prior to the collection of the soil gas samples. M9 wells have individual shut off valves which were all closed prior to the sampling event. The general procedure of collecting a sample was as follows. The modeling clay was removed from the well. The stainless steel sampling probe attached to the Micro-Tip was inserted into the well to a depth of 26" and sealed from the atmosphere using a teflon tape plug. The Micro-Tip (30" wells) were run for approximately 30 seconds to extract the stagnant well gases and total VOC well concentrations were monitored continuously. SKC pumps were used to extract stagnant gases from the deep wells. The duration of pump operation at the M9 cluster wells depended on the well depth of each soil gas probe. Since well gas concentrations were not exceptionally high, the sampling pumps during soil gas sample collection were set at a rate of 1.0 lpm and run for a total of 10 minutes at each well site. This procedure resulted in approximately 10.0 liters of soil gas being drawn through the VOST trap at each well. At the end of the sample, the Micro-Tip was used to record well concentrations. The VOST tubes were then removed from the train, labelled and packed for shipment to the laboratory. The lines and probe were purged by using sweep air cleaned by a Tenax/charcoal tube for several minutes prior to sampling the next soil gas well.

A detailed chronology of the soil gas sampling is presented in Appendix C.

3.4 ANALYTICAL LABORATORY PROCEDURES

Prepackaged clean VOST tubes were supplied by Research Triangle Laboratories (RTL) for use in this study. Upon arrival at RTP, the sampling tubes were refrigerated until their use in the field program.

RTL was forwarded a list of the VOC's that were initially identified as the target compound list for this monitoring program. RTL evaluated both Tenax and Tenax/charcoal traps from each sample set as a single laboratory run. There did not appear to be a need for separating front half from back half for this test sequence because of limited concentrations measured by the Micro-Tip. Each condensate sample was analyzed individually on the GC/MS analytical column. The RTL report is presented in Appendix D. RTL did experience a fairly high concentrations of various compounds, predominantly carbon disulfide in the low volume VOST ambient air sample A42. Upon consultation with RTP Environmental staff, it was decided that a 10:1 split of all ambient air VOST tubes should be performed to assure that analytical sensitivity would be within the calibrated range of the GC/MS. All of the soil gas samples were analyzed without a split and no problems were encountered for any of those samples. Although carbon disulfide levels were high in some samples, the GC/MS instrument didn't experience any malfunctions. The report provides a complete description of the analysis of samples.

4.0 DISCUSSION OF RESULTS

4.1 AMBIENT AIR CONCENTRATIONS

For the fourth quarter sampling event at the Old Bethpage Landfill, the ambient air concentrations at selected sites were monitored over a 24-hour period on May 2nd and 3rd, 1991. The sites have been identified and the monitoring and analysis methods discussed in preceding sections of this report. Laboratory analytical results are translated into ambient air concentrations in this section.

Table 4.1 contains a summary of the analytical results from the air samples collected at the Old Bethpage Landfill. These values are in nanograms per cubic meter and have been adjusted for flow volumes as calibrated from the digital flow meter. That is, Samples A41, A43 and A44 are adjusted to total sample volumes of 994, 996 and 1072 liters, respectively. Sample A42 was a low sample volume tube with flow volume equalling 24.12 liters. The table includes minimum detection limits for each sample. All ambient air sample concentrations have been adjusted for trip blank/field blank concentrations.

4.2 SOIL GAS CONCENTRATIONS

Soil gas concentrations were monitored on May 2nd and 3rd, 1991 at all selected soil gas well sites identified in the Consent Decree. Table 4.2 provides a summary of the soil gas concentrations at the wells identified above. These concentration values are reported in nanograms per cubic meter of soil gas. The table also includes minimum detection limits for each compound. All soil gas sample concentrations were adjusted for trip blank/field blank concentrations.

5.0 SOIL GAS PRESSURE READINGS

Soil gas pressure levels are to be monitored at three different locations around the perimeter of the gas collection system as specified by the Department of Law. This task is identified in the fifth component of the Consent Decree as shown in RAP Attachment 2 in Appendix A. The

TABLE 4.1

OYSTER BAY VOST AMBIENT AIR SAMPLE RESULTS

	24-HOUR AMBIENT AIR SAMPLES								BLANK SAMPLE	
	A41		A42		A43		A44		FIELD	TRIP
COMPOUND NAME	MDL	CONC.	MDL	CONC.	MDL	CONC.	MDL	CONC.	FB4	TB4
									---(ng)---	
Acetone	201		829		201		187		93	34
Benzene	201	765	829	871	201	803	187	1679		
Bromodichloromethane	201		829		201		187			
Bromoform	201		829		201		187			
Bromomethane	201		829		201		187			
2-Butanone	201		829		201		187	1399		
Carbon Disulfide	201	3195	829	102612	201		187		25	
Carbon Tetrachloride	201	312	829		201	382	187	364		
Chlorobenzene	201		829		201		187			
Chloroethane	201		829		201		187			
2-Chloroethyl Vinyl Ether	201		829		201		187			
Chloroform	201		829		201		187			
Chloromethane	201		829	1658	201		187			
Dibromochloromethane	201		829		201		187			
1,1-Dichloroethane	201		829		201		187			
1,2-Dichloroethane	201		829		201		187			
1,2-Dichloroethene	201		829		201		187			
1,1-Dichloroethene	201		829		201		187			
1,2-Dichloropropane	201		829		201		187			
cis-1,3-Dichloropropene	201		829		201		187			
trans-1,3-Dichloropropene	201		829		201		187			
Ethylbenzene	201	342	829		201	321	187	1772		
2-Hexanone	201		829		201		187			
4-Methyl-2-pentanone	201		829		201		187			
Methylene chloride	201	52	829		201	47	187			
Styrene	201		829		201		187			
1,1,2,2-Tetrachloroethane	201		829		201		187			
Tetrachloroethene	201	584	829		201	703	187	1212		
Toluene	201	2214	829	2239	201	2108	187	9326		
1,1,1-Trichloroethane	201	533	829	1741	201	653	187	933		
1,1,2-Trichloroethane	201		829		201		187			
Trichloroethene	201	72	829		201	161	187			
Trichlorofluoromethane	201	282	829	4146	201	562	187	616		
Vinyl acetate	201		829		201		187			
Vinyl chloride	201		829		201		187			
Total Xylenes	201	1811	829		201	1807	187	10259		

MDL = Minimum detection limit based on actual sample volume.

[1]. All concentrations are corrected for blank concentrations.
[2]. Air concentrations given are in nanograms per cubic meter. Samples were collected over a 24-hour period.
[3]. Reported concentrations below MDL are estimated by RTL.

TABLE 4.2

OYSTER BAY VOST SOIL GAS SAMPLE RESULTS

COMPOUND NAME	MDL	SOIL GAS SAMPLES																		BLANK SAMPLE	
																				FIELD	TRIP
		M42	M44	M45	M46	M413	M416	M421	M422	M428	M431	M434	M437	M439	M4F1	M491	M492	M493	M494	FB4	TB4
																				(ng)	
Acetone	2000		4626				4705		501			7708		3704			2703			93	34
Benzene	2000																				
Bromodichloromethane	2000																				
Bromoform	2000																				
Bromomethane	2000																				
2-Butanone	2000		6693				20020		3504			4605		14014			35035	450450			
Carbon Disulfide	2000	128270	223917		88074	70991	18519	30746	307808	137638	27528		127628	38539	153460	227024	337838	167668	127628	25	
Carbon Tetrachloride	2000																				
Chlorobenzene	2000																				
Chloroethane	2000																				
2-Chloroethyl Vinyl Ether	2000																				
Chloroform	2000																				
Chloromethane	2000																				
Dibromochloromethane	2000																				
1,1-Dichloroethane	2000																2402	6907	28028		
1,2-Dichloroethane	2000																				
1,2-Dichloroethene	2000																				
1,1-Dichloroethene	2000																				
1,2-Dichloropropane	2000																				
cis-1,3-Dichloropropene	2000																				
trans-1,3-Dichloropropene	2000																				
Ethylbenzene	2000																				
2-Hexanone	2000																				
4-Methyl-2-pentanone	2000																				
Methylene chloride	2000								9510												
Styrene	2000																				
1,1,2,2-Tetrachloroethane	2000																				
Tetrachloroethene	2000			6607	2516	4494	3504	2722			2603	2402		5606	3906	41575	87087	260260	560561		
Toluene	2000								4605					2703							
1,1,1-Trichloroethane	2000			4204			3303	2016	26026		4104	3203		3904	2567	7221	15015	34034	64064		
1,1,2-Trichloroethane	2000																				
Trichloroethene	2000																				
Trichlorofluoromethane	2000	2113	2559	3103			4605	3831	6907	3303	2503	5205	3203	2302	6362	108315	22022	43043	76076		
Vinyl acetate	2000																		5105		
Vinyl chloride	2000																				
Xylenes(total)	2000																				

MDL = Minimum Detection Limit based on the norminal sample volume of 10 Liters.

[1]. All concentrations are corrected for blank concentrations.
[2]. Soil gas concentrations given are in nanograms per cubic meter of soil gas.
[3]. Reported concentrations below MDL are estimated by RTL.

objective of monitoring soil gas pressure is to determine the effectiveness of the landfill gas collection system and whether the system needs adjustment or enhancement.

As required by the RAP, pressure readings are to be taken at the following three locations around the perimeter of the gas collection system: (1) northwest of landfill between LGV16 and LGV17 (a new probe), (2) southeast of the landfill between TGV-1 and LGV-9 (a new probe) and (3) south of the landfill at either F-6 or F-9 (existing probes). Figure 2.1 indicates the locations of these three soil gas pressure wells, PW1, PW2 and PW3, respectively. The RAP also states that pressure readings should be taken on a quarterly basis during the initial year of the program and, if approved, by the State, on an annual basis thereafter.

A quarterly soil gas pressure measurement was conducted on May 2, 1991. Two magnahelic pressure gauges, manufactured by Dwyer Instruments, Inc. were used to monitor soil gas pressures at each well. The ranges of the two pressure gauges were 0.0 to 0.25 inches of water for lower pressure readings and 0.0 to 1.0 inches of water for higher readings. There are two probes at different depths (10' and 20') at each location. Pressure readings were taken from each of the six (6) probes.

The readings were conducted between 1115 EDT and 1157 EDT on May 2, 1991. At two locations, PW1 and PW2 readings were measured with the lower range magnahelic pressure gauge. Due to the higher negative pressure at well location, PW3, the gauge with the range of 0.0 to 1.0 inches of water was used. The general meteorological conditions onsite during the pressure testing period was partly sunny with the north/northwest winds at about 10 miles per hour.

Table 5.1 provides a summary of the soil gas pressure tests. The readings indicate that all pressure probes were under zero or negative pressure at the time of the test. Only one probe had a zero reading, however, it is believed that the upper well at PW2 may have been flooded with water since a drainage area within 5 feet of the well contained standing water. The lower probe at PW2 had a substantial negative pressure.

TABLE 5.1

SUMMARY OF SOIL GAS PRESSURE TESTS

Sample ID	Date (m/d/yr)	Time (EDT)	Well ID	Well Location	Well depth (feet)	Wind Dir.	Wind Speed (mi/hr)	Readings (inches H_2O)	Special Notes
P1	5/2/91	1115	PW1	NW of landfill by haul road	10	N/NW	10	-0.03	
P2	5/2/91	1116	PW1	NW of landfill by haul road	20	N/NW	10	-0.035	
P3	5/2/91	1125	PW2	SE of landfill	10	N/NW	10	0.0	water in drainage ditch near upper well could have flooded the well.
P4	5/2/91	1127	PW2	SE of landfill	20	N/NW	10	-0.17	
P5	5/2/91	1155	PW3	S of landfill Inside of FTC	10	N/NW	10	-0.2	
P6	5/2/91	1157	PW3	S of landfill Inside of FTC	20	N/NW	10	-0.35	

APPENDIX A

RAP, ATTACHMENT 2

RAP Attachment 2

OLD BETHPAGE LANDFILL
SUPPLEMENTAL GAS MONITORING PROGRAM

The supplemental landfill gas monitoring program for the Old Bethpage Landfill Remediation Program contains five components. These are 1) the collection of ambient air samples; 2) the collection of subsurface gas samples at a depth of 30"; 3) the collection of subsurface gas samples at depths of 10', 20', 30' and 40'; 4) the collection of thermal oxidizer emission samples (stack testing); and 5) the measurement of gas pressure to ascertain negative pressure created by the gas collection system. These data requirements supplement the existing methane gas monitoring program and will be reported in the annual reports produced under that program.

The location of the proposed sampling points are shown on Drawing No. 1, entitled "Old Bethpage Landfill Zero Percent Methane Gas Migration Contours, 1986 Annual Site Survey". A description of the various components of this program follows.

Ambient Air Samples

Ambient air samples (24 hr. samples) will be collected at three locations around the landfill as shown on Drawing No. 1. One location will be along Winding Road to the east and southeast of the landfill (near M-3 shown on Drawing No. 1). One location will be to the west of the landfill along Round Swamp Road (near M-33). A third location will be north of the landfill (between M-17 and M-22). Samples at these locations will be collected quarterly during the initial year of the program and, if approved by the State, on an annual basis thereafter. Samples will be analyzed for volatile organic compounds.

30" Deep Subsurface Gas Samples

Fourteen subsurface gas samples will be collected at a depth of 30" at the following locations surrounding the landfill as shown on Drawing No. 1: F-1, M-2, M-4, M-5, M-6, M-13, M-16, M-21, M-22, M-28, M-31, M-34, M-37 and M-39. Samples will be collected on a quarterly basis during the initial year of the program and, if approved by the State, on an annual basis thereafter. Samples will be analyzed for volatile organic compounds.

Subsurface Gas Samples at Various Depths

Subsurface gas samples will be collected at depths of 10', 20', 30', and 40' at location M-9 (to be repaired or replaced) shown on Drawing No. 1. Samples will be collected on a quarterly basis during the initial year of the program and, if approved by the State, on an annual basis thereafter. Samples will analyzed for volatile organic compounds.

Thermal Oxidizer Emissions

Thermal oxidizer emissions will be sampled (in the incinerator stack) on a quarterly basis during the initial year of the program. The emissions will be related to oxidizer incinerator temperatures during this initial year of sampling. Thereafter, the oxidizer temperatures will be monitored on a monthly basis to insure that temperatures needed to volatilize the organics are being maintained in the oxidizer. The emissions will continue to be sampled on an annual basis. Samples will be analyzed for volatile organic compounds.

Pressure Readings

Pressure readings will be taken at three locations around the perimeter of the gas collection system to ascertain whether a vacuum is created around the system. This data will assist in monitoring the effectiveness of the system and in determining whether the system needs adjustment or enhancement. One reading will be taken to the south of the landfill at either F-6 or F-9 (existing probes) shown on Drawing No. 1. A new probe will be installed and a reading taken to the northwest of landfill between LGV 16 and LGV 17. The third probe will be installed and a reading taken to the southeast of the landfill between TGV-1 and LGV-9. Pressure readings will be taken on a quarterly basis during the initial year of the program and, if approved by the State, on an annual basis thereafter.

APPENDIX B

AMBIENT AIR SAMPLING PROTOCOL

1. Obtain pre-conditioned VOST tube pairs from analytical laboratory and refrigerate in resealed shipping container. Prior to testing, inspect condition of outer sample holding tube and inner sampling traps and note abnormalities (loose caps, fittings, cracks, Tenax discoloration, etc.).

2. Assemble sampling trains including:
   - o Clean and double rinse coolers with distilled water.
   - o Attach sampling cane.
   - o Calibrate and set desired sample pump rate according to manufacturer's specifications.
   - o Attach precalibrated SKC sampling pump and additional battery pack to exterior of sampling cooler.
   - o Install aluminum trap holder and partially fill cooler (1/4 full) with ice.
   - o Close cooler lid, cap sample inlet and transport sampling assembly to selected sampling site along with VOST traps.

3. Remove VOST trap pair from shipping container and follow USEPA VOST procedures augmented as follows. Label trap and shipping container with sample number/location. Using precleaned wrenches, install traps in modified VOST sampling train for ambient air.

4. Monitor gross VOC concentrations with portable OVA and determine acceptability of precalibrated flow rates. Adjust flow rate according to OVA reading. Reading of zero for VOC indicates 1000 liter volume on high flow samples is appropriate. Greater than zero, adjust high flow rate sampling interval to accumulate no more than 100 ug of total VOC on tube pair.

5. Leak check system by drawing a vacuum over sample train with cap on sample inlet. Turn on pump. Draw vacuum. Pump failure should occur within 40 seconds. If not, fix air leak and repeat.

6. Set sample pump for appropriate sampling interval. Remove cap from sample inlet, start sample event. Record the starting time.

7. Examine pump operation for proper cycling and record rotameter reading, sample time on, sample location, sample ID and other observations such as OVA reading, general site conditions, etc.

8. Repeat QA check approximately every four (4) hours. Examine sample lines, ice level, pump operation, note all changes and significant events.

9. At conclusion of 24-hour sampling period, record sample run time reading and check sample lines, ice level, OVA reading in the field log. Record total flow, time of pump stoppage. Do a leak check as per Item 5 above and note results. Then turn off sample pump.

10. Open sampler lid and remove VOST shipping tubes. Remove VOST traps, wrench tighten VOST caps and place in shipping tubes. Remove impinger trap, pour contents into clean septum vial and top off with HPLC water. Label and place in shipping container. Place VOST shipping tubes in air freight shipping container with manifest.

11. Disassemble sample trains, clean and return to storage.

12. Send sampling traps and vials to laboratory for analysis.

SOIL GAS SAMPLING PROTOCOL

Follow procedures defined in ambient air sampling protocol with the following exceptions.

1. Assemble soil gas sampling probe consisting of a precleaned stainless steel tube and teflon sampling line and substitute for ambient air probe.

2. Transport sampling tubes and sampling train to field observation points.

3. Record ambient VOC reading.

4. Remove cap from sampling well, insert sampling probe connected to OVA and draw sufficient volume of sample to clear lines and sampling probe and well. Record average and highest VOC reading during line clearing procedure by using Micro-Tip.

5. Using last recorded VOC value, determine sample volume that would effectively place 10 to 100 ug of total VOC's into VOST trap.

6. Remove VOST trap pair from shipping container, label trap and shipping container with sample number and location. Reconnect soil gas sample probe to modified VOST unit.

7. Turn on sampling pump with a 0.5 l/min to 1.0 l/min sample rate for 10 minutes if OVA reading is zero or for calculated sampling rate and interval if OVA provides non-zero result. Record the starting time and any abnormalities onsite.

8. Record sampling ending time/rotameter reading. Turn off pump. Takes ambient OVA reading at end of test.

9. Remove sample VOST traps as per ambient air sampling procedure.

10. Monitor soil gas concentration in well and record result at end of test. If greater than initial OVA value, submit supplemental data to laboratory regarding special handling instructions, be explicit on volumes and likely concentrations.

METEOROLOGICAL MONITORING PROTOCOL

1. Establish weather conditions appropriate for conducting ambient air and soil gas survey. (Falling atmospheric pressure, steady wind direction over 24-hour period, rainfall less than 30 percent chance).

2. Assemble precalibrated field meteorological equipment including counterbalanced wind vane, three-cup anemometer, temperature sensor, solid state barometric pressure sensor, precipitation gauge, and a fully programmable CR10 data logger and control module onsite. Select site to be representative of general area circulation patterns.

3. Perform proper alignment checks and begin operation.

4. Record data in 15 minute block averages and translate to hourly values for a period preceding test and during entire ambient air and soil gas survey.

5. Recheck alignments and reasonableness of values at end of test period and remove equipment. Note all problems/conditions that could influence data accuracy, quality or test results.

6. Prepare data base in format suitable for inclusion in ambient air/soil gas survey.

SAMPLE TRAIN

A volatile organics sampling train (VOST) similar to EPA Method 0030 was constructed for ambient and ground well measurements of volatile organic compounds (VOC's). The Tenax and Tenax/charcoal traps were supplied and analyzed by Research Triangle Laboratories.

The sample train was enclosed in a thermally insulated container with the inlet line and exhaust (vacuum) pump mounted externally.

A 1/4" O.D. teflon tube served as the inlet line. It was connected to the glass open end of the first Tenax trap through a segment of Tygon tubing (1.0"). The other end of the Tenax trap was attached to a condensate impinger, whose dry outlet was connected to a Tenax/Charcoal trap (the "Breakthrough" trap) via Tygon tubing (1.0"). The exhaust of this trap went through Tygon tubing to the sample pump.

The condensate impinger was immersed in an ice water bath during sampling.

MICRO-TIP HL200
CALIBRATION AND USE

The Micro-Tip is a hand held analyzer that measures the total concentration of all ionizable chemicals present in the sample. It does not differentiate between individual pollutants.

Prior to use for measuring ambient air and well VOC concentrations, the unit was calibrated. Procedures used are detailed in Chapter 6.3 of the Micro-Tip Users Manual, published by PhotoVac International, Incorporated, 741 Park Avenue, Huntington, New York 11743-9969.

Charcoal filtered ambient air was used as the zero gas. 99 PPM of Isobutylene was employed as the span gas. The HL200 has internal computing capacity to identify zero and span points and make necessary slope adjustments to correct observed values automatically.

SKC Model 224-PCXR7
UNIVERSAL SAMPLE PUMP

The pumps used for sampling were electronically flow-controlled to +/- 5% of the set point constant flow. They have automatic shutdown for low battery voltage, pinched hose, or excess back pressure. (See Operating Instructions Universal Sample Pump MOD 224-PCXR7 published by SKC, Inc. National Service Center, 334 Valley View Road, Eighty Four, PA. 15330).

For air samples, the high flow units were programmed to sample approximately 1,000 minutes of each 1,440 minute period. A GEL CEL battery was connected in parallel to the OEM battery to provide sufficient power for the 24-hour period. The planned sample was 1,000 liters. Low flow samplers were scheduled to run 24 minutes out of the 1440 minute total test period. The sample total volume was 24 liters.

The pump rotameters were used for visual checks during sampling, not as precise flow indicators, which was determined by the electronic flow calibrator.

For soil gas samples, the pumps were programmed to sample at approximately 1.0 lpm for 10 minutes.

The pump setting for both ambient air and soil samples are well within the dynamic range of the unit when using VOST traps.

PUMP CALIBRATOR

An SKC Model 712 Electronic Calibrator (Digital Film Flowmeter) was used to preset the nominal flow rate for all pumps and to determine precise sample volumes.

This digital film flow meter is provided with a micro-processor that calculates the flow rate based on bubble meter diameter and elapsed time of passage between two photo-sensor lines. Accuracy is stated at +/- 2% of the reading.

The operator calibrated the ambient air sampling pumps prior to the test. A pre-start calibration and a comparison check on the low flow measurements was completed.

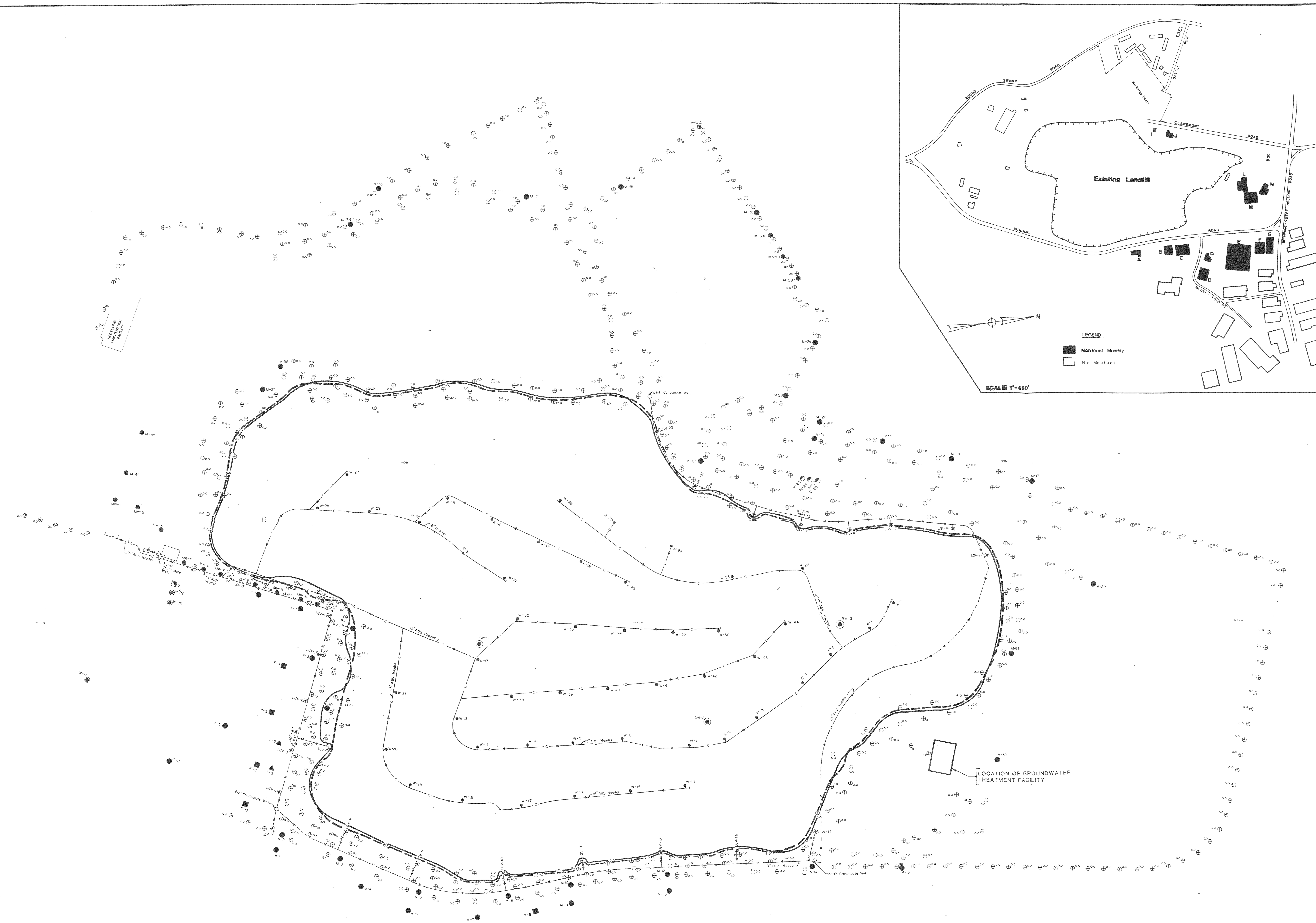
APPENDIX C

100 0 100 200 300 FEET

SCALE 1" = 100'
CONTOUR INTERVAL 2'

GENERAL NOTES:

1) Map prepared by Lockwood, Kessler & Bartlett, Inc. by photogrammetric methods. Date of photography, November 26, 1988
2) Grid shown hereon is based on the New York State plane coordinate system (Long Island Zone)
3) Vertical datum is the National Geodetic vertical datum of 1929 (mean sea level)



SUMMARY OF EXTERIOR AND INTERIOR GAS SURVEY OF BUILDINGS ADJACENT TO THE LANDFILL

IDENT. NO.	LOCATION IDENTIFICATION	FINDINGS AND REMARKS
A	499 Winding Road	All Samples Negative
B	469 Winding Road	All Samples Negative
C	445 Winding Road	All Samples Negative
D	311 Winding Road	All Samples Negative
E	383 Winding Road	All Samples Negative
F	310 Winding Road	All Samples Negative
G	161 Bethpage Sweethollow Road	All Samples Negative
I	90 Battle Row	All Samples Negative
J	100 Battle Row	All Samples Negative
K	Scale House	All Samples Negative
L	Incinerator No. 2	All Samples Negative
M	Compactor/Baler Building	All Samples Negative
N	Incinerator No. 1	All Samples Negative

LEGEND

- 0% Combustible Gas Contour, Recorded August, 1991
- 0% Combustible Gas Contour, Recorded August, 1990
- T.O.B. Gas Collection System
- E.T. Gas Collection System
- Nassau County Monitoring Well
- Nassau County Monitoring Drywell
- GW Combustible Gas Monitoring Well
- 0.0 Site Survey, 0% Combustible Gas, August, 1991
- Single Point Sampling Probe, Depth 30"
- Single Point Sampling Probe, Depth 8'
- Pressure Probes, Depth 10' and 20'
- Cluster Well, Depth 10', 20', 30' and 40'
- MW Gas Monitoring Well, Varying Depth
- TGV Telescoping Gas Vent
- LGV Landfill Gas Vent

OLD BETHPAGE SOLID WASTE DISPOSAL COMPLEX
TOWN OF OYSTER BAY
NASSAU COUNTY, NEW YORK

LKB LOCKWOOD, KESSLER & BARTLETT, INC.
CONSULTING ENGINEERS SYOSSET, NEW YORK

REV. NO.	DESCRIPTION	DATE	BY

DRAWING TITLE
OLD BETHPAGE SOLID WASTE DISPOSAL COMPLEX
ZERO PERCENT COMBUSTIBLE GAS MIGRATION CONTOURS
1991 ANNUAL SITE SURVEY

SCALE: 1" = 100'
DATE APRIL 1991
DRAWN BY: R.G.
CHECKED BY: J.M.

PROJECT NO. 6014-13
DRAWING NO. 1

CHRONOLOGY - AMBIENT AIR SAMPLING

SAMPLER A-1

- May 2, 1991

Start sampler A-1 using pump #2 and sampling unit #1 at 1339 EDT. The nominal flow rate was 1 liter per minute (lpm). The sampler was programmed to run 1000 minutes out of next 24 hours. The sampling location was A1 as shown in Figure 2.1. This location is west of the landfill near soil gas well M31.

The initial ambient VOC concentration reading was 0.0 ppm and the initial rotameter reading was 1.25.

Checked rotameter readings at 1530 EDT and 2018 EDT. Both readings were 1.25 lpm.

- May 3, 1991

The operator checked the sampler five times (0035 EDT, 0451 EDT, 0745 EDT, 1016 EDT, and 1315 EDT) and the rotameter readings were all at 1.25 lpm. The pump operation was normal during the whole sampling period. No unusual events were noted. The sampler was removed from service at 1610 EDT according to the protocol. The ambient OVA reading was 0.0 ppm.

SAMPLER A-2

- May 2, 1991

Sampler A-2 began sampling at 1407 EDT. Pump #2A was used along with sampling unit #2. The sampling location was A2 which is southeast of the landfill. The nominal flow rate was 1 lpm and the initial rotameter reading was 1.25 lpm. The pump was programmed to run 24 minutes over 24 hours to collect a 24 liter sample. The ambient VOC concentration was 0.0 ppm prior to sampling. A maximum and minimum thermometer was set inside the sampler to measure the maximum and minimum temperatures during the sampling period.

Rotameter readings were checked again at 1614 EDT, 1633 EDT, 1707 EDT and 2007 EDT. The readings were 1.25 lpm.

- May 3, 1991

Inspected A-2 at 0107 EDT. No problems were noted. Rotameter reading was 1.25 lpm.

At 0507 EDT, the rotameter reading went up to 1.50 lpm.

The last inspection of the sampler was at 1207 EDT. No problems were identified and rotameter readings were back to 1.25 lpm. The sampler was removed from service according to the established protocol. The ambient OVA reading was 0.0 ppm. The recorded maximum and minimum temperatures within the A-2 sampling unit were 42°F and 32°F.

SAMPLER A-3

- May 2, 1991

The sampler was started at 1413 EDT with pump #3 and sampling unit #3. Again, the normal flow rate was 1 lpm. The sample location is southeast of the landfill approximately three feet from sampler A-2. The initial ambient VOC concentration was 0.0 ppm. The initial rotameter reading was 1.50 at the center of ball. The reading had dropped to 1.25 by 1430 EDT.

Sampler A-3 was rechecked again at 1616 EDT, 1703 EDT and 1957 EDT. No problems were noticed. The rotameter ball was resting on 1.25 lpm.

- May 3, 1991

Checked sampler A-3 at 0050 EDT, 0458 EDT, 0755 EDT, 1041 EDT and 1310 EDT. Rotameter indicated readings of 1.25 lpm. At the end of sampling, all connections were in order. The sampler was removed from service according to the established protocol. The ambient OVA reading was 0.0 ppm.

SAMPLER A-4

- May 2, 1991

Sampler A-4 was positioned north of the landfill location at A4 as shown on Figure 2.1. It was started at 1444 EDT. Pump #4 was programmed for this sampler to run at a nominal flow rate of 1 lpm for 1,000 minutes over the next 24 hours to collect 1000 liters of sample. Sampling unit #4 was utilized.

The rotameter reading was 1.25 lpm at the beginning of the test. Micro-Tip meter indicated an initial ambient VOC concentration of 0.2 ppm. Operators observed blowing dust when setting up the unit. Sampler A-4 was inspected again before midnight at 1623 EDT and 2012 EDT. All tubes were still connected properly. No condensation was noticed in the impinger and the rotameter readings were 1.25.

- May 3, 1991

The operator checked sampler A-4 at 0511 EDT, 0750 EDT, 1025 EDT, and 1315 EDT. The rotameter reading remained constant at 1.25 lpm.

The unit was taken out of service at 1605 EDT according to established protocols. The pump stopped at total elapse time of 1440 minutes. The final ambient OVA reading was 0.0 ppm.

CHRONOLOGY - SOIL GAS SAMPLING

MAY 2, 1991

- SAMPLE M434

Soil gas testing commenced at 1530 EDT for 30" well located at M34 near haul road and the waste management building. The nominal sampling rate was 1 lpm and the test was 10 minutes in duration. The initial rotameter reading was 1.25 lpm and maintained that level during the testing. The Micro-Tip analyzer was used to measure ambient and well VOC concentrations before and after the sampling. The initial ambient air and well VOC concentrations were both 0.8 ppm. The final ambient air VOC concentration was 1.1 ppm and and the final well VOC concentration was 1.6 ppm.

- SAMPLE M437

The second soil gas sample was collected between 1552 EDT and 1602 EDT. The well location was M37 just east of the leachate treatment plant and pond. The nominal sampling rate was 1 lpm. The initial and final rotameter reading were 1.25 lpm.

The initial and final ambient air VOC concentrations were 0.9 ppm. The well VOC concentration was measured two times prior to sampling, and the readings were 3.2 ppm and 1.0 ppm, respectively. No adjustments were made to sample volumes. The final well VOC concentration was 9.0 ppm.

- SAMPLE M431

Soil sample M431 was taken between 1616 and 1626 EDT. This site was southwest of the landfill along haul road. Again, the nominal flow rate was 1 lpm and both initial and final rotameter readings were 1.25 lpm.

The Micro-Tip ambient VOC readings before and after the testing were 1.4 ppm and 0.4 ppm, respectively. The initial and final well VOC readings were 1 ppm and 0.3 ppm. No adjustments were made to sample volumes.

- SAMPLE M422

The sampling at M22 began at 1642 EDT and ended at 1652 EDT with the nominal flow rate of 1 lpm. The site was northwest of the landfill on the east side of haul road. The rotameter reading was 1.25 lpm during the entire test. The nominal flow rate was 1.0 lpm. The initial and final well VOC concentrations were 0.5 ppm and 1.6 ppm. The ambient VOC concentrations were 0.0 ppm and 0.4 ppm at the beginning and the end of sampling. During the test, operators smelled odors from transfer trailers parked across the street on the other side of haul road.

- SAMPLE M439

Well location M39 was north of the landfill. The sample was taken between 1704 EDT and 1714 EDT with a nominal flow rate of 1 lpm. The rotameter reading was 1.25 lpm throughout the run. The Micro-Tip meter was utilized to take ambient and well VOC concentrations. The ambient VOC concentration was 0.8 ppm. The initial and final well VOC concentrations were 2.3 ppm and 2.6 ppm. Operator observed bubbles in the impinger at the end of sampling. The impinger was rinsed and then filled with ultra distilled water for 12 hours before it was used again. Operators noted the well was only one foot away from a telephone pole. Also, aged garbage such as bike tires, soda cans, etc. were around the well site.

MAY 3, 1991

- SAMPLE M428

Soil gas sample M428 was collected from well M28. This well is located west of the landfill near the future discharge basin No. 1. A newly cleaned stainless steel probe and new teflon inlet line and connectors were used at this sampling point. The sample was collected from 1009 and 1019 EDT. The nominal sampling rate was 1 lpm. The rotameter read 1.25 lpm at the start and at the end of the 10 minute test.

Micro-Tip measurements of the initial ambient and well VOC concentrations were 1.6 ppm and 3.4 ppm. The final readings of those were 1.9 ppm and 3.8 ppm. The following cleaning procedure was applied at the end of this sampling. The pump was reconnected to draw air through a Tenax/charcoal trap and then through the inlet line. This cleaning procedure last about 10 minutes until the next sampling started. The purpose of this cleaning procedure was to remove any VOC that might be inside the inlet line.

- SAMPLE M421

M21 was the site for soil sample M421. The site is along Claremont Road to the west of the landfill near the concrete plant. The sampling was started at 1041 EDT with a nominal flow rate of 1 lpm. The rotameter read 1.25 lpm at the start and dropped to 1.10 at the end of the test. The ambient and well VOC concentrations at the initiation were 1.6 ppm and 5.2 ppm. The final concentration of those were 1.4 and 5.5 ppm. The sampling line VOC concentration was measured using the Micro-Tip meter. The concentration was the same as the initial ambient VOC concentration. The cleaning procedure used after sampling M28 was applied again at the end of this test and for the rest of the soil gas well tests.

- SAMPLE M416

Sample M416 was taken from a newly installed well. The old M16 was inadvertently destroyed and a new well was installed about one hour before the sampling and was located about 2 feet away from the old well site. This new well is located on the west side of Winding Road northeast of the landfill. The sample was taken between 1104 and 1114 EDT. The rotameter reading was 1.25 lpm throughout the testing. The initial readings for both well and ambient VOC's were 3.4 and 1.6 ppm, respectively. These readings decreased to 3.3 and 1.5 ppm, respectively, at the end of sampling. The well is three feet away from a telephone pole that has a creosote coating.

- SAMPLE M413

The sample was collected at well M13. This well is near the intersection of a driveway and Winding Road. It was noticed that a telephone pole was about five feet away from the well.

The pump flow rate was l lpm and the rotameter reading was 1.0 lpm during the sampling period (from 1129 to 1139 EDT). The inlet sampling line VOC concentration was 1.3 ppm prior to sampling. The initial and final ambient VOC readings were 1.5 and 0.6 ppm, respectively. The final well VOC concentration was 1.8 ppm.

- SAMPLE M45

Sample M45 was collected at M5, west of Winding Road between 1152 and 1202 EDT. The rotameter readings were 1.25 lpm at all times. Operator replaced inlet sampling lines, connections and probe for this sample. Prior to sampling, the inlet line VOC concentration was 0.1 ppm which was the same as initial ambient VOC concentration.

Micro-Tip meter was also utilized to read well VOC concentrations. The readings was 1.1 ppm at the beginning and 0.3 ppm at the end. The final ambient VOC reading was around 0.1 ppm.

- SAMPLE M46

This sample was taken from soil gas well M6 located east of Winding Road, across the street from well M5. The condensate impinger was rinsed with distilled water before sampling. The testing started at 1215 EDT and ran for 10 minutes at the nominal flow rate of 1 lpm. The inlet line VOC concentration was 0.4 ppm. The initial and final rotameter readings were 1.25 lpm and 1.0 lpm, respectively. Initial and final ambient air VOC readings indicated a 0.3 ppm and 0.1 ppm via the Micro-Tip meter. Well VOC concentrations were also taken before and after the testing. The readings were 1.1 ppm and 0.7 ppm. No adjustments were made to sample volumes.

- SAMPLE M42

The sampling was started at 1328 EDT at M2, east of Winding Road, and lasted for 10 minutes as scheduled. The batteries for Micro-Tip and the pump were changed before sampling. All inlet sampling lines, connections and probe were replaced. The nominal pump flow rate was 1 lpm and rotameter reading was 1.20 during the test.

Micro-Tip ambient VOC readings were 0.0 ppm before and after the testing. The initial well OVA reading was 1.0 ppm, and the final reading was around 3.5 ppm. No adjustments were made to sample volume.

- SAMPLE M4F1

Sample M4F1 was collected from well F1 located at Fireman's Training Center. About eight feet away from the well was a fence enclosing a subsurface vault.

The initial inlet line VOC concentration was taken, the reading was 0.0 ppm. The testing started at 1401 EDT and ended at 1411 EDT as scheduled. The rotameter reading during the testing period was 1.1 lpm.

Micro-Tip readings indicated both ambient VOC concentration of 0.0 ppm at the beginning and at the end of testing. Well VOC was 0.1 ppm initially and dropped to 0.0 ppm at the end of sampling.

Landfill grading operations had exposed garbage to the atmosphere and the odors from this activity were observed at the time of sampling.

- <u>SAMPLE M44</u>

Started sampling at 1421 EDT. The nominal sampling rate was 1 lpm, and the initial and final rotameter reading was 1.1 lpm. The sampling well was M4 on the west side of Winding Road. The initial Micro-Tip readings for ambient and well VOC concentrations were 0.0 ppm and 0.4, respectively. The final readings for both ambient air and the well were 0.0 ppm.

- <u>SAMPLE M491</u>

This sample was collected from the 10 foot well at M9. There are four deep wells at M9. The ten foot wall is marked with a blue tape at the end.

The well was evacuated at 1 lpm for 1.5 minutes prior to sampling to remove a full well volume of stagnant gas. The amount of time required to evacuate the deep well was calculated from the well depth, the diameter of the well pipe and the pump flow rate. The impinger was rinsed with ultra distilled water before sampling.

The rotameter reading was 1.0 lpm at the start and 1.25 lpm at the end of the 10 minute test.

Ambient and well VOC concentrations were 0.0 ppm before and after sampling.

- SAMPLE M492

The sample was collected from the 20 foot well also located at M9. The well is marked with green tape. Since this well was two times deeper than the 10 foot well, the pump was run for three minutes to evacuate the well prior to sampling. With the nominal sampling rate of 1 lpm, sample collection occurred between 1513 and 1523 EDT.

The initial and final ambient VOC concentrations were 0.0 ppm, respectively. The initial well VOC reading was 0.0 ppm, the final reading was 2.6 ppm.

- SAMPLE M493

This sample was taken from the 30 foot deep well also at M9. The end of the well was marked with red tape. The well was evacuated for 6 minutes at 1 lpm prior to sampling. Sample collection started at 1530 EDT.

The rotameter reading was 1.25 lpm at the start and at the end of the 10 minute testing. Before sampling, the well VOC concentration was 7.9 ppm. The well concentration was 0.6 ppm at the end of sampling. The initial and final ambient air VOC concentrations were 0.0 ppm.

- SAMPLE M494

The sample was collected from the 40 foot deep well located at M9. This well is marked with yellow tape. The pump was set to run 6 minutes at 1 lpm to evacuate the well prior to sampling. The sampling was started at 1550 EDT and lasted for 10 minutes.

The rotameter reading was 1.25 lpm during the 10 minute sampling period. The ambient air and well VOC concentrations were 0.0 ppm before and after sampling.

- SAMPLE M495

The sample was collected as a field blank sample at 1548 EDT and lasted for 10 minutes. Tenax and Tenax/charcoal tubes were connected to two teflon lines separately. They were set inside the sampler which was located next to M9. The pump was not used for this sample. The ambient VOC reading was 0.0 ppm during sample collection.

- SAMPLE M496

This was a trip blank sample. The tubes were carried along with the other VOST tubes but were returned unopened to the laboratory for analysis.

APPENDIX D
ANALYTICAL RESULTS

RESEARCH TRIANGLE LABORATORIES

VOST GC/MS REPORT

prepared for

RTP ENVIRONMENTAL ASSOCIATES

by

RESEARCH TRIANGLE LABORATORIES, INC.

Barry A. Ruvio
Chemist

Thomas G. Conally
Laboratory Manager

RTL ID # 10507A

May 17, 1991

1612 Carpenter Fletcher Road • Durham, North Carolina 27713 • (919) 544-5775 • FAX: (919) 544-3770
A Member of the Andersen Technology Group

INTRODUCTION

Scope:

To analyze (VOST) Tenax and Tenax/Charcoal cartridge pairs, and (VOST) condensate samples for the target compound list (TCL) and tentatively identify the 10 greatest Non-TCL peaks by Desorb-Purge-Trap-Desorb Gas Chromatography Mass Spectrometry (DPTD GC/MS).

Method Summary:

Sample cartridges are analyzed by desorb-purge-trap-desorb gas chromatography/mass spectrometry (DPTD GC/MS). Daily analytical checks are performed on cartridge blanks and reagent water. The daily GC/MS performance test required for this method is described in SW 846, Method 8240. The key Abundance Criteria for 4-Bromofluorobenzene (BFB) must be met before any samples are analyzed. All standards, blanks and samples are spiked with a known amount of BFB to maintain a constant check of system performance.

Sample Desorption:

The DPTD GC/MS procedures are those described in SW 846 Method 5040. The spiked sample cartridge is placed in the thermal desorption apparatus (Nutech 8533) and desorbed in the VOST system by heat to 200 °C for 10 minutes. Consideration is given for individual analysis of cartridges. The desorbed components then pass into the bottom of the water column, are purged from the water and collected on the internal analytical sorbent trap. After the 10-minute desorption period, the analytical trap is dry purged for 2 minutes. The compounds are desorbed from the analytical trap into the GC/MS system.

A 5.0 milliliter aliquot of the condensate sample is placed into the bottom of a water column and purged for 10 minutes. The volatile components are then collected and analyzed as stated above.

Calculations:

All compounds detected that coincide with those of the Target Compound List (TCL) are calculated using equation #1 and response factors derived from in-house standards. All tentatively identified compounds are calculated, using equation #2 and a standard TIC response factor of one (1.0). Compounds quantified by equation #2 are qualified as being estimates.

Eqn #1: $$[X] = \frac{A_X \cdot [IS]}{A_{IS} \cdot RF}$$

Eqn #2: $$[X] = \frac{A_X \cdot [IS]}{A_{IS} \cdot 1.0}$$

Where:
$[X]$ = amount of compound, ng
$[IS]$ = amount of internal standard, ng
A_X = response of compound
A_{IS} = response of internal standard
RF = response factor

RESEARCH TRIANGLE LABORATORIES

May 17, 1991

Mr. Ken Skipka
RTP Environmental Associates
400 Post Avenue
Westburg, NY 11590

RE: 10507A

Dear Mr. Skipka:

Enclosed please find the results of analysis for the samples submitted to our laboratory 05/07/91.

If you have any questions concerning these reports, please contact me at the number listed below.

Sincerely,

RESEARCH TRIANGLE LABORATORIES, INC.

Barry A. Ruvio
Chemist

BAR/rch

Enclosures

Narrative:

Sample A42 was run first and it had high enough concentration to necessitate using a (1:10) split on the remaining (A) samples, A-41, A-43, and A-44.

All of the S samples were run without a split and no problems were encountered for any of these samples. Although Carbon Disulfide levels were high (1000 - 3000 ng) in some samples we did not experience any instrument malfunctions because to the high sample load.

Please call the laboratory if you have further questions or problems concerning this data.

Footnotes:

[a]: The value listed is greater than the established calibration range (20 to 1000 ng). However, experience has shown that extrapolated results are usually a very good estimate of the actual amounts.

When splits are installed, the ratio of the split extends the calibration range. The values calculated and reported are for the original cartridge amount.

- 10:1 Split
- Calibration Range = 200 to 10,000 ng
- Maximum column load per compound = 100,000 ng

[b]: A correction factor was used for this unknown because the area for its internal standard was distorted by a coeluting compound.

REFERENCES

Federal Register, 44, 69464, December 3, 1979

Protocol for the Collection and Analysis of Volatile POHCs Using VOST, EPA-600/8-84-007 available from ORD Publications, Center for Environmental Research Information, Cincinnati, Ohio 45268

NIOSH Manual of Analytical Methods, HEW Publication No. (NIOSH) 75-121, available from Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402

Supelco Bulletin 769, "Determination of Organic Vapors in the Industrial Atmosphere", 1977: Supelco, Inc., Bellefonte, PA 16823

Test Methods for Evaluation of Solid Waste, SW 846 Methods 0030, 8240, 5040, 5030

Compendium of Methods for the Determination of Toxic Organic Compounds in Air, PB87-168688, Battelle Columbus Laboratories, Columbus, Ohio

ANALYTICAL CONDITIONS

Equipment:

HP 5970 GC/MS/DS tuned to BFB criteria

GC Conditions:

Temp 1	:	0 °C
Time 1	:	4.0 minutes
Ramp Rate	:	6.0 °C/minute
Temp 2	:	160 °C
Time 2	:	5.0 minutes

Column:

VOCOL (Supelco),
Length 60 m,
Film thickness 1.5 μm,
Internal diameter 0.75 mm,
Construction of Borosilicate glass
with fused silica ends

s Spectrometer Conditions:

Run Time	:	25 minutes
Scan Range	:	35 - 260 AMU
Scan Delay	:	1.25 minutes
Ion Source Temp	:	200 °C
Electron Multiplier	:	2000 ± 200 EV
Separator Temp	:	225 °C

Sample Chronicle:

Client	RTP Environmental Associates
RTL Project ID	10507A
Analysis Type	VOST / Condensate
Date of Collection	05/02/91 - 05/03/91
Date Received	05/07/91
Date Authorized	05/08/91
Date Analyzed	05/08/91 - 05/13/91
Date Reported	05/17/91

SAMPLE RESULTS

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-2	Analyzed:	05/08/91
File ID:	T7959	Reported:	05/17/91
Sample ID:	A41L	Description:	Condensate

Tentatively Identified Compounds

Compound	Results (ng/5 mL)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	140	1.88	44

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-2	Analyzed:	05/08/91
File ID:	T7959	Reported:	05/17/91
Sample ID:	A41L	Description:	Condensate

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	85
Toluene-d_8	102
4-Bromofluorobenzene	80

CAS Number	Target Compound	Results (ng/5 mL)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-4	Analyzed:	05/08/91
File ID:	T7960	Reported:	05/17/91
Sample ID:	A42L	Description:	Condens..e

Tentatively Identified Compounds

Compound	Results (ng/5 mL)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	150	1.84	44
3-Methylpentane	25	6.11	86

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-4	Analyzed:	05/08/91
File ID:	T7960	Reported:	05/17/91
Sample ID:	A42L	Description:	Condensate

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	86
Toluene-d_8	99
4-Bromofluorobenzene	78

CAS Number	Target Compound	Results (ng/5 mL)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-6	Analyzed:	05/08/91
File ID:	T7961	Reported:	05/17/91
Sample ID:	A43L	Description:	Condensate

Tentatively Identified Compounds

Compound	Results (ng/5 mL)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	160	1.85	44

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-6	Analyzed:	05/08/91
File ID:	T7961	Reported:	05/17/91
Sample ID:	A43L	Description:	Condensate

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	76
Toluene-d_8	92
4-Bromofluorobenzene	73

CAS Number	Target Compound	Results (ng/5 mL)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	20	
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-8	Analyzed:	05/08/91
File ID:	T7962	Reported:	05/17/91
Sample ID:	A44L	Description:	Condensate

Tentatively Identified Compounds

Compound	Results (ng/5 mL)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	130	1.84	44

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-8	Analyzed:	05/08/91
File ID:	T7962	Reported:	05/17/91
Sample ID:	A44L	Description:	Condensate

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	85
Toluene-d_8	100
4-Bromofluorobenzene	80

CAS Number	Target Compound	Results (ng/5 mL)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-9	Analyzed:	05/08/91
File ID:	T7963	Reported:	05/17/91
Sample ID:	A45L	Description:	Condensate

Tentatively Identified Compounds

Compound	Results (ng/5 mL)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	140	1.84	44
Unknown	16	24.21	-

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-9	Analyzed:	05/08/91
File ID:	T7963	Reported:	05/17/91
Sample ID:	A45L	Description:	Condensate

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	85
Toluene-d_8	98
4-Bromofluorobenzene	77

CAS Number	Target Compound	Results (ng/5 mL)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-1	Analyzed:	05/13/91
File ID:	T8000	Reported:	05/17/91
Sample ID:	A41	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	9500	2.09	44
3-Methylpentane	310	6.02	86
Unknown AR	320	8.70	-
Unknown AH	320	12.56	-
3-Methylheptane	190	12.90	114
Unknown PNA	240	19.44	-
Ethylmethylbenzene isomer	950	20.61	120
Unknown AH	430	21.23	-
Trimethylbenzene isomer	400	21.58	120
Unknown AH	380	21.85	-

Comments:

1:10 Split

AH = Aliphatic Hydrocarbon

AR = Aromatic Hydrocarbon

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-1	Analyzed:	05/13/91
File ID:	T8000	Reported:	05/17/91
Sample ID:	A41	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	85
Toluene-d_8	96
4-Bromofluorobenzene	86

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	280	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	3200	
75-09-2	Methylene Chloride	52	
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	530	
56-23-5	Carbon Tetrachloride	310	
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene	760	
79-01-6	Trichloroethene	72	
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene	2200	
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	580	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene	340	
1330-20-7	Xylene (total)	1800	
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 200 **1:10 Split** **BQL: Below Quantitation Limit**

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-3	Analyzed:	05/08/91
File ID:	T7964	Reported:	05/17/91
Sample ID:	A42	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	430	2.38	44
1,1,2-Trichloro-1,2,2-trifluoroethane	910	4.03	186
Unknown	[b] 270	6.65	-
Unknown	30	11.95	-
Unknown AH	93	18.91	-
Unknown AH	100	20.70	-
Unknown AH	230	21.18	-
Unknown AH	320	21.73	-
Unknown AH	100	22.35	-

Comments:

AH = Aliphatic Hydrocarbon

[b]: See Footnotes

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-3	Analyzed:	05/08/91
File ID:	T7964	Reported:	05/17/91
Sample ID:	A42	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	77
Toluene-d_8	98
4-Bromofluorobenzene	69

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane	40	
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	100	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	2500 [a]	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	42	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene	21	
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene	54	
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

[a]: See Footnotes

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-5	Analyzed:	05/13/91
File ID:	T7998	Reported:	05/17/91
Sample ID:	A43	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	11000	2.13	44
1,1,2-Trichloro-1,2,2-trifluoroethane	1000	3.86	186
Unknown AH	860	19.42	-
Ethylmethylbenzene isomer	630	20.59	120
Unknown AH	760	20.79	-
Unknown AH	890	21.27	-
Ethylmethylbenzene isomer	630	21.55	120
Unknown AH	780	21.83	-
Unknown AH	600	22.45	-
Unknown AH	840	23.13	-

Comments:

1:10 Split

AH = Aliphatic Hydrocarbon

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-5	Analyzed:	05/13/91
File ID:	T7998	Reported:	05/17/91
Sample ID:	A43	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	84
Toluene-d_8	94
4-Bromofluorobenzene	76

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	560	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride	47	
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	650	
56-23-5	Carbon Tetrachloride	380	
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene	800	
79-01-6	Trichloroethene	160	
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene	2100	
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	700	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene	320	
1330-20-7	Xylene (total)	1800	BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 200 **1:10 Split** **BQL: Below Quantitation Limit**

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-7	Analyzed:	05/13/91
File ID:	T7999	Reported:	05/17/91
Sample ID:	A44	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	8700	2.10	44
2-Methylpentane	880	4.78	86
Unknown AH	1300	6.02	-
Unknown AH	1000	12.56	-
3-Methylheptane	880	12.90	114
Unknown	1300	17.72	-
Unknown AH	710	19.45	-
Ethylmethylbenzene isomer	3300	20.62	120
1,2,3-Trimethylbenzene	2000	21.51	120
Methylpropylbenzene isomer	2200	23.17	134

Comments:

1:10 Split

AH = Aliphatic Hydrocarbon

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-7	Analyzed:	05/13/91
File ID:	T7999	Reported:	05/17/91
Sample ID:	A44	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	90
Toluene-d_8	91
4-Bromofluorobenzene	90

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	660	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone	1500	
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	1000	
56-23-5	Carbon Tetrachloride	390	
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene	1800	
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene	10000	
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	1300	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene	1900	
1330-20-7	Xylene (total)	11000	
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 200 **1:10 Split** **BQL: Below Quantitation Limit**

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-10	Analyzed:	05/10/91
File ID:	T7985	Reported:	05/17/91
Sample ID:	S42	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	290	2.14	44
1,1,2-Trichloro-1,2,2-trifluoroethane	32	4.00	186
Unknown	31	12.88	-
Unknown AH	19	21.21	-
Unknown AH	45	21.97	-
Unknown	18	24.73	-

Comments:

AH = Aliphatic Hydrocarbon

RESEARCH TRIANGLE LABORATORIES, INC.

[redacted]:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-10	Analyzed:	05/10/91
File ID:	T7985	Reported:	05/17/91
Sample ID:	S42	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	77
Toluene-d_8	94
4-Bromofluorobenzene	74

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	21	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	1300 [a]	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

a: See Footnotes

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-11	Analyzed:	05/09/91
File ID:	T7976	Reported:	05/17/91
Sample ID:	S44	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	550	2.09	44
Unknown AH	27	15.72	-
Unknown AH	41	21.92	-
Nonanal	36	24.67	142

Comments:

AH = Aliphatic Hydrocarbon

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-11	Analyzed:	05/09/91
File ID:	T7976	Reported:	05/17/91
Sample ID:	S44	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	76
Toluene-d_8	97
4-Bromofluorobenzene	68

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	26	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	140	
75-15-0	Carbon Disulfide	2300 *	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone	68	
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 **BQL: Below Quantitation Limit**

***: See Footnotes**

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-12	Analyzed:	05/09/91
File ID:	T7978	Reported:	05/17/91
Sample ID:	S45	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	480	2.16	44
1,1,2-Trichloro-1,2,2-trifluoroethane	55	4.02	186
Unknown	[b] 67	10.77	-
Unknown AH	17	21.17	-
Unknown AH	52	21.93	-
Nonanal	39	24.68	142

Comments:

AH = Aliphatic Hydrocarbon

[b]: **See Footnotes**

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-12	Analyzed:	05/09/91
File ID:	T7978	Reported:	05/17/91
Sample ID:	S45	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	79
Toluene-d_8	98
4-Bromofluorobenzene	72

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	31	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	64	
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	42	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	66	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-13	Analyzed:	05/09/91
File ID:	T7979	Reported:	05/17/91
Sample ID:	S46	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	390	2.16	44
1,1,2-Trichloro-1,2,2-trifluoroethane	29	4.02	186
Unknown PNA	16	14.62	-
Unknown AH	19	21.92	-

Comments:

AH = Aliphatic Hydrocarbon

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-13	Analyzed:	05/09/91
File ID:	T7979	Reported:	05/17/91
Sample ID:	S46	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	82
Toluene-d_8	98
4-Bromofluorobenzene	77

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	830	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	23	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 **BQL: Below Quantitation Limit**

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-14	Analyzed:	05/09/91
File ID:	T7980	Reported:	05/17/91
Sample ID:	S413	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	2600	1.78	44
1,1,2-Trichloro-1,2,2-trifluoroethane	29	4.02	186

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-14	Analyzed:	05/09/91
File ID:	T7980	Reported:	05/17/91
Sample ID:	S413	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	88
Toluene-d_8	107
4-Bromofluorobenzene	78

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	720	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	44	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 **BQL: Below Quantitation Limit**

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-15	Analyzed:	05/10/91
File ID:	T7988	Reported:	05/17/91
Sample ID:	S416	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	2800	1.79	44
3,6,6-Trimethyl-bicyclo[3.1.1]hept-2-ene	83	18.96	136
beta-Pinene	46	20.55	136
1,7,7-Trimethyl-bicyclo[2.2.1]hept-2-ene	23	22.06	136
Undecane	41	23.09	156
3,7,7-Trimethyl-bicyclo[4.1.0]hept-2-ene	160	23.92	136

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-15	Analyzed:	05/10/91
File ID:	T7988	Reported:	05/17/91
Sample ID:	S416	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	83
Toluene-d_8	100
4-Bromofluorobenzene	80

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	46	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	140	
75-15-0	Carbon Disulfide	210	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone	200	
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	33	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	35	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-16	Analyzed:	05/10/91
File ID:	T7989	Reported:	05/17/91
Sample ID:	S421	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	3200	1.79	44
Trimethylhexane isomer	21	21.86	128

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-16	Analyzed:	05/10/91
File ID:	T7989	Reported:	05/17/91
Sample ID:	S421	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	73
Toluene-d_8	93
4-Bromofluorobenzene	67

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	38	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	62	
75-15-0	Carbon Disulfide	330	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	20	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	27	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-17	Analyzed:	05/09/91
File ID:	T7977	Reported:	05/17/91
Sample ID:	S422	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	800	2.03	44
3-Methyl-pentane	40	6.09	86
3,6,6-Trimethyl-bicyclo-hept-2-ene	29	18.90	136
1,1,3,3,5,5-Hexamethyltrisiloxane	40	19.52	208
Unknown	49	23.51	-

Comments:

Data drop out seen during Carbon Dioxide elution.
Area for this peak is probably much higher.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-17	Analyzed:	05/09/91
File ID:	T7977	Reported:	05/17/91
Sample ID:	S422	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	78
Toluene-d_8	99
4-Bromofluorobenzene	74

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	69	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	98	
75-15-0	Carbon Disulfide	3100 [a]	
75-09-2	Methylene Chloride	95	
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone	35	
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	260	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene	46	
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 **BQL: Below Quantitation Limit**

[a]: See Footnotes

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-18	Analyzed:	05/10/91
File ID:	T7990	Reported:	05/17/91
Sample ID:	S428	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	630	2.09	44
Unknown	14	10.83	-
Unknown	86	12.42	-
Unknown AH	22	20.75	-
Unknown AH	26	21.23	-
Unknown AH	31	21.85	-
Unknown AH	19	21.99	-
Unknown AH	17	22.40	-

Comments:

AH = Aliphatic Hydrocarbon

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-18	Analyzed:	05/10/91
File ID:	T7990	Reported:	05/17/91
Sample ID:	S428	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	81
Toluene-d_8	93
4-Bromofluorobenzene	78

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	33	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	40	
75-15-0	Carbon Disulfide	1400 *	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 **BQL: Below Quantitation Limit**

***: See Footnotes**

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-19	Analyzed:	05/10/91
File ID:	T7991	Reported:	05/17/91
Sample ID:	S431	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	950	2.09	44
1,1,2-Trichloro-1,2,2-trifluoroethane	37	4.02	186
Unknown	19	13.11	-
Unknown	17	23.57	-

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-19	Analyzed:	05/10/91
File ID:	T7991	Reported:	05/17/91
Sample ID:	S431	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	81
Toluene-d_8	101
4-Bromofluorobenzene	79

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	25	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	25	
75-15-0	Carbon Disulfide	300	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	41	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	26	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 . **BQL: Below Quantitation Limit**

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-20	Analyzed:	05/09/91
File ID:	T7975	Reported:	05/17/91
Sample ID:	S434	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	590	2.15	44
1,1,2-Trichloro-1,2,2-trifluoroethane	47	4.01	186
Unknown	110	6.76	-
Unknown	130	9.79	-
Unknown	[b] 110	10.89	-
Unknown	100	13.51	-
Unknown AH	18	20.81	-
Unknown AH	23	21.29	-
Unknown AH	30	21.91	-
Unknown	24	23.63	-

Comments:

AH = Aliphatic Hydrocarbon

[b]: **See Footnotes**

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-20	Analyzed:	05/09/91
File ID:	T7975	Reported:	05/17/91
Sample ID:	S434	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	79
Toluene-d_8	98
4-Bromofluorobenzene	73

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	52	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	170	
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone	46	
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	32	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	24	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-21	Analyzed:	05/10/91
File ID:	T7992	Reported:	05/17/91
Sample ID:	S437	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	2100	1.85	44
1,1,2-Trichloro-1,2,2-trifluoroethane	60	4.02	186
Unknown	15	12.83	-
Unknown AH	15	18.96	-
Unknown AH	19	20.75	-
Unknown AH	19	21.23	-
Unknown AH	19	21.85	-
Unknown	18	23.57	-

Comments:

AH = Aliphatic Hydrocarbon

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-21	Analyzed:	05/10/91
File ID:	T7992	Reported:	05/17/91
Sample ID:	S437	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	70
Toluene-d_8	93
4-Bromofluorobenzene	71

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	32	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	1300 [a]	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 **BQL: Below Quantitation Limit**

[a]: See Footnotes

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-22	Analyzed:	05/10/91
File ID:	T7986	Reported:	05/17/91
Sample ID:	S439	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	420	2.12	44
Unknown AH	54	18.99	-
Unknown AH	16	19.41	-
Unknown AH	42	20.78	-
Unknown AH	65	21.20	-
Unknown AH	53	21.82	-
Unknown AH	23	22.44	-
Unknown	16	23.54	-

Comments:

AH = Aliphatic Hydrocarbon

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-22	Analyzed:	05/10/91
File ID:	T7986	Reported:	05/17/91
Sample ID:	S439	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	76
Toluene-d_8	94
4-Bromofluorobenzene	72

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	23	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	130	
75-15-0	Carbon Disulfide	410	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone	140	
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	39	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene	27	
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	56	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-23	Analyzed:	05/09/91
File ID:	T7974	Reported:	05/17/91
Sample ID:	S4F1	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	510	2.16	44
Unknown alkane	33	21.92	-

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-23	Analyzed:	05/09/91
File ID:	T7974	Reported:	05/17/91
Sample ID:	S4F1	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	81
Toluene-d_8	100
4-Bromofluorobenzene	74

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	57	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	59	
75-15-0	Carbon Disulfide	1400 [a]	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	23	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	35	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 **BQL: Below Quantitation Limit**

[a]: See Footnotes

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-24	Analyzed:	05/08/91
File ID:	T7966	Reported:	05/17/91
Sample ID:	S491	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	1300	2.12	44
1,1,2-Trichloro-1,2,2-trifluoroethane	620	3.98	186
Unknown	82	10.79	-
Unknown AH	30	20.71	-
Unknown AH	40	21.19	-
Unknown AH	45	21.74	-
Unknown AH	52	21.95	-
Unknown AH	39	22.36	-
Unknown AH	24	23.46	-

Comments:

AH = Aliphatic Hydrocarbon

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-24	Analyzed:	05/08/91
File ID:	T7966	Reported:	05/17/91
Sample ID:	S491	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	81
Toluene-d_8	100
4-Bromofluorobenzene	73

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	990	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	51	
75-15-0	Carbon Disulfide	2100 [a]	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	66	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	380	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 **BQL: Below Quantitation Limit**

[a]: See Footnotes

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-25	Analyzed:	05/10/91
File ID:	T7987	Reported:	05/17/91
Sample ID:	S492	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	690	2.17	44
1,1,2-Trichloro-1,2,2-trifluoroethane	940	4.03	186
Unknown PNA	19	14.70	-
Unknown AH	18	20.76	-
Unknown AH	30	21.24	-
Unknown AH	36	21.79	-
Unknown AH	22	22.41	-
Unknown AH	21	24.61	-

Comments:

AH = Aliphatic Hydrocarbon

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-25	Analyzed:	05/10/91
File ID:	T7987	Reported:	05/17/91
Sample ID:	S492	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	77
Toluene-d_8	91
4-Bromofluorobenzene	72

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	220	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	120	
75-15-0	Carbon Disulfide	3400 [a]	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane	24	
78-93-3	2-Butanone	350	
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	150	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	870	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

a: See Footnotes

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-26	Analyzed:	05/13/91
File ID:	T7997	Reported:	05/17/91
Sample ID:	S493	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	[b] 910	2.17	44
1,1,2-Trichloro-1,2,2-trifluoroethane	[b] 1900	4.03	186
Unknown AH	30	21.87	-

Comments:

AH = Aliphatic Hydrocarbon

[b]: **See Footnotes**

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-26	Analyzed:	05/13/91
File ID:	T7997	Reported:	05/17/91
Sample ID:	S493	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	87
Toluene-d_8	98
4-Bromofluorobenzene	78

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	430	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	1700 [a]	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane	69	
78-93-3	2-Butanone	4500 [a]	
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	340	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	2600 [a]	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

[a]: See Footnotes

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-27	Analyzed:	05/09/91
File ID:	T7971	Reported:	05/17/91
Sample ID:	S494	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	1200	2.16	44
1,1,2-Trichloro-1,2,2-trifluoroethane	4100	4.02	186
Unknown AH	21	20.75	-
Unknown AH	35	21.16	-
Unknown AH	32	21.78	-
Unknown AH	17	22.40	-

Comments:

AH = Aliphatic Hydorcarbon

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-27	Analyzed:	05/09/91
File ID:	T7971	Reported:	05/17/91
Sample ID:	S494	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	79
Toluene-d_8	98
4-Bromofluorobenzene	72

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	760	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	1300 [a]	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane	280	
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	640	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate	51	
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	5600	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 **BQL: Below Quantitation Limit**

[a]: See Footnotes

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-28	Analyzed:	05/09/91
File ID:	T7972	Reported:	05/17/91
Sample ID:	S495	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	2300	1.85	44

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-28	Analyzed:	05/09/91
File ID:	T7972	Reported:	05/17/91
Sample ID:	S495	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	75
Toluene-d_8	99
4-Bromofluorobenzene	68

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	93	
75-15-0	Carbon Disulfide	25	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-29	Analyzed:	05/09/91
File ID:	T7973	Reported:	05/17/91
Sample ID:	S496	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Carbon dioxide	1500	1.88	44

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	05/07/91
RTL ID:	10507A-29	Analyzed:	05/09/91
File ID:	T7973	Reported:	05/17/91
Sample ID:	S496	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	67
Toluene-d_8	92
4-Bromofluorobenzene	62

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	34	
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

Name: Kenneth Skipka
Affiliation: RTP Environmental Associates
Phone: (516) 333-4526
Address: 400 Post Ave, #302, Westbury, NY 11590
Client/Job No: Town of Oyster Bay (LKBOBL) - AQ4
Job Name: Air Quality Survey Location: Oyster Bay landfill

CHAIN OF CUSTODY RECORD

Sample No.	Lab I.D. No.	Date	Time	Matrix	No. of Containers	Well OVA Reading (ppm) Initial	Final
S42	S42 (T)	5/3/91	1328 EDT	Soil Gas	1	1.0	3.5
S42	S42 (T/C)	"	"	"	"	"	"
S44	S44 (T)	5/3/91	1421 EDT	"	"	0.4	0.0
S44	S44 (T/C)	"	"	"	"	"	"
S45	S45 (T)	5/3/91	1152 EDT	"	"	1.1	0.3
S45	S45 (T/C)	"	"	"	"	"	"
S46	S46 (T)	5/3/91	1215 EDT	"	"	1.1	0.7
S46	S46 (T/C)	"	"	"	"	"	"
S413	S413 (T)	5/3/91	1129 EDT	"	"	/	1.8
S413	S413 (T/C)	"	"	"	"	"	"

Comments: Page 1 of 4

Relinquished by: J. Wang Date: 5/6/91 Shipment Method: Federal Express
Time: 1330 EDT Airbill No.:

Received by: Date: Relinquished by: Date:
Time: Time:

Received by: Date: Relinquished by: Date:
Time: Time:

Final Disposition of Samples:

Received by: Date: Time:

CHAIN OF CUSTODY FORM

RTP ENVIRONMENTAL ASSOCIATES INC.

: Kenneth Skipka
ation: RTP Environmental Associates
hone: (516) 333-4526
Address: 400 Post Ave, #302, Westbury, NY 11590
Client/Job No: Town of Oyster Bay (LKBOBL) - AQ4
Job Name: Air Quality Survey Location: Oyster Bay landfill

CHAIN OF CUSTODY RECORD

Lab I.D. No.	Date	Time	Matrix	No. of Containers	Well OVA Reading Initial (ppm)	Final
S416(T)	5/3/91	1104 EDT	Soil Gas	1	3.4	3.3
S416(T/c)	:	:	:	:	:	:
S421(T)	5/3/91	1041 EDT	:	:	5.2	5.5
S421(T/c)	:	:	:	:	:	:
S422(T)	5/2/91	1642 EDT	:	:	0.5	1.6
S422(T/c)	:	:	:	:	:	:
S428(T)	5/3/91	1009 EDT	:	:	3.4	3.8
S4 (T/c)	:	:	:	:	:	:
S (T)	5/2/91	1616 EDT	:	:	11.	0.3
S431(T/c)	:	:	:	:	:	:

: Page 2 of 4

d by: J. Wang Date: 5/6/91 Shipment Method: Federal Express
Time: 1330 EDT Airbill No:

y: Date: Relinquished by: Date:
Time: Time:

y: Date: Relinquished by: Date:
Time: Time:

sition of Samples:

y: Date: Time:

CHAIN OF CUSTODY FORM

RTP ENVIRONMENTAL ASSOCIATES INC.

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4
dfield
FORM
ITES INC.

Name: Kenneth Skipka
Affiliation: RTP Environmental Associates
Phone: (516) 333-4526
Address: 400 Post Ave, #302, Westbury NY 11590
Client/Job No: Town of Oyster Bay (LKBOBLY-AQ4)
Job Name: Air Quality Survey Location: Oyster Bay landfill

CHAIN OF CUSTODY RECORD

Sample No.	Lab I.D. No.	Date	Time	Matrix	No. of Containers	Well OVA Reading Initial (ppm)	Final
S492	S492(T)	5/3/91	1513 EDT	Soil Gas	1	0.0	2.6
S492	S492(T/c)	:	:	:	:	:	:
S493	S493(T)	5/3/91	1530 EDT	:	:	7.9	0.6
S493	S493(T/c)	:	:	:	:	:	:
S494	S494(T)	5/3/91	1550 EDT	:	:	0.0	0.0
S494	S494(T/c)	:	:	:	:	:	:
S495	S495(T)	5/3/91	1548 EDT	:	:	0.0	0.0
S495	S495(T/c)	:	:	:	:	:	:
S496	S496(T)	5/3/91	1555 EDT	:	:	0.0	0.0
S496	S496(T/c)	:	:	:	:	:	:

Comments: Page 4 of 4

Relinquished by: J. Wang Date: 5/6/91 Shipment Method: Federal Express
Time: 1330 EDT Airbill No.:

Received by: Date: Relinquished by: Date:
Time: Time:

Received by: Date: Relinquished by: Date:
Time: Time:

Final Disposition of Samples:

Received by: Date: Time:

CHAIN OF CUSTODY FORM

RTP ENVIRONMENTAL ASSOCIATES INC.

Name: Kenneth Skipka
Affiliation: RTP Environmental Associates
Phone: (516) 333-4526
Address: 400 Post Ave, #302, West
Client/Job No: Town of Oyster Bay (LKBC
Job Name: Air Quality Survey Locatio

CHAIN OF CUSTODY REC

Sample No.	Lab I.D. No.	Date	Time	Matrix	No. of Containers	Ambient OVA Reading Initial (PPm)	Final
A44	A44(T/L)	5/2/91 to 5/3/91	1420 EDT 1600 EDT	Air	1	0.0↔0.2	0.0
:	A44(L)	:	:	Water	:	:	:
A45	A45(L)	:	1700 EDT	Water	1	N/A	N/A

Comments: Page 2 of 2

Relinquished by: J. Wang Date: 5/6/91 Shipment Method: Federal Express
Time: 1210 EDT Airbill No:

Received by: Date: Relinquished by: Date:
Time: Time:

Received by: Date: Relinquished by: Date:
Time: Time:

Final Disposition of Samples:

Received by: Date: Time:

CHAIN OF CUSTODY FORM

RTP ENVIRONMENTAL ASSOCIATES INC.

Name: Kenneth Skipku
Affiliation: RTP Environmental Associates
Phone: (516) 333-4526
Address: 400 Post Ave. #302, Westbury, NY 11590
Client/Job No: Town of Oyster Bay (LKBOBL)
Job Name: Air Quality Survey Location: Oyster Bay landfill

CHAIN OF CUSTODY RECORD

Sample No.	Lab I.D. No.	Date	Time	Matrix	No. of Containers	Ambient OVA Reading Initial (PPm)	Final
A41	A41(T)	5/2/91 to 5/3/91	1339 EDT 1315 EDT	Air	1	0.0 ↔ 1.6	0.0
:	A41(T/c)	:	:	:	:	:	:
:	A41(L)	:	:	Water	:	:	:
A42	A42(T)	:	1350 EDT 1250 EDT	Air	1	0.0	0.0
:	A42(T/c)	:	:	:	:	:	:
:	A42(L)	:	:	Water	:	:	:
A43	A43(T)	:	:	Air	1	0.0	0.0
:	A43(T/c)	:	:	:	:	:	:
:	A43(L)	:	:	Water	:	:	:
A44	A44(T)	:	1620 EDT 1600 EDT	Air	1	0.0 ↔ 0.2	0.0

Comments: Page 1 of 2

Relinquished by: J. Wang Date: 5/6/91 Shipment Method: Federal Express
Time: 1210 EDT Airbill No:

Received by: Date: Relinquished by: Date:
Time: Time:

Received by: Date: Relinquished by: Date:
Time: Time:

Final Disposition of Samples:

Received by: Date: Time:

CHAIN OF CUSTODY FORM

RTP ENVIRONMENTAL ASSOCIATES INC.

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
AMBIENT AIR QUALITY SURVEY
AND
SOIL GAS QUALITY SURVEY

Third Quarter Report

RTP ENVIRONMENTAL ASSOCIATES INC.

AIR • WATER • SOLID WASTE CONSULTANTS

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
AMBIENT AIR QUALITY SURVEY
AND
SOIL GAS QUALITY SURVEY

Third Quarter Report

Prepared for:

Town of Oyster Bay
Department of Public Works
Syosset, New York

Prepared by:

RTP Environmental Associates, Inc.
400 Post Avenue
Westbury, New York

MARCH 1991

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

AMBIENT AIR QUALITY SURVEY AND SOIL GAS QUALITY SURVEY

THIRD QUARTER REPORT

TABLE OF CONTENTS

		Page No.
1.0	INTRODUCTION	1
2.0	METHODOLOGY AND PROTOCOLS	1
2.1	Program Definition	1
2.2	Gas Sampling	2
2.2.1	General Scope	2
2.2.2	Modified VOST Gas Sampler	5
2.2.3	Sample Volume Selection	8
2.2.4	Other Sampling Equipment	11
2.3	Meteorological Data	12
3.0	SAMPLING AND ANALYSIS	12
3.1	Background	12
3.2	Ambient Air Sampling	13
3.3	Soil Gas Sampling	16
3.4	Analytical Laboratory Procedures	17
4.0	DISCUSSION OF RESULTS	18
4.1	Ambient Air Concentrations	18
4.2	Soil Gas Concentrations	18

APPENDICES:
A - RAP, Attachment 2
B - Monitoring Protocols and Sampling Equipment Descriptions
C - Chronology - Ambient Air and Soil Gas Sampling Event
D - Analytical Results

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

AMBIENT AIR QUALITY SURVEY AND SOIL GAS QUALITY SURVEY

THIRD QUARTER REPORT

LIST OF TABLES

		Page No.
2.1	Summary of Analytical Parameters for Air and Soil Gas Samples	6
2.2	General Relationship Between Micro-Tip Readings and Sample Volume	10
3.1	Summary of Ambient Air and Subsurface Soil Gas Sampling	14
4.1	Oyster Bay VOST Ambient Air Sample Results	19
4.2	Oyster Bay VOST Soil Gas Sample Results	20

LIST OF FIGURES

2.1	Ambient Air and Soil Monitoring Sites at OBSWDC	3
2.2	Schematic of EPA Reference Volatile Organic Sampling Train (VOST)	7
2.3	Modified VOST Sampler	9

TRODUCTION

:nvironmental Associates, Inc. (RTP) was contracted by the Town of Oyster Bay through
Consultant, Lockwood Kessler & Bartlett, Inc. (LKB), to perform the sampling and analysis
bient air and soil gases in the areas at and surrounding the Old Bethpage Landfill at the
: Bay Solid Waste Disposal Complex. The general scope of the program was defined in
-der on Consent which is presented in Appendix A. Since the Consent Decree was not
t as to the specific methodology and testing protocols to be followed, RTP, in conjunction
he Town, LKB and analytical laboratories, developed a complete protocol and analysis
gy for meeting the general requirements stipulated by the Decree. The air program was
esigned to be consistent with the other components of the Consent Decree.

ulated in the Consent Decree, the ambient air quality and soil gas quality were monitored
eral positions around the landfill. The samples were analyzed using USEPA protocols and
sults tabulated. Four sampling events were to be conducted during the initial year of the
m. Subsequent sampling events would be conducted on an annual basis or as directed
: S

s the third quarterly report on sampling and analysis of ambient air and soil gases. The
t contains the sampling protocol and investigation methodology for air and soil gas analysis
ons of the Consent Decree. It provides the sample collection, sample handling and
tical procedures applied for this program. The third sampling event was conducted on
uary 4th and 5th, 1991 and the results for this event are contained in this report.

METHODOLOGY AND PROTOCOLS

PROGRAM DEFINITION

nformance with the RAP Attachment 2 of the Consent Decree (83 CIV 5357), as shown in
ndix A, the Town of Oyster Bay initiated an investigation of the ambient air quality and soil
uality in the vicinity of the Old Bethpage Landfill. This report addresses three of the
onents listed in the RAP, (1) ambient air sampling, (2) 30" deep subsurface gas sampling
(3) subsurface gas sampling at various depths.

The objective of the program is to examine the ambient air concentration of trace volatile organic compounds in the vicinity of the Old Bethpage Landfill. During the third sampling event, ambient air samples were collected over a 24-hour period at three locations and short-term subsurface soil gas grab samples were collected at eighteen different locations as specified in the Consent Decree.

The sampling procedures follow those developed during the first round of sampling. The program also involved the collection of meteorological parameters from atop the landfill to specifically define the micrometeorological conditions existing during the ambient air and subsurface soil gas sampling events.

2.2 GAS SAMPLING

2.2.1 General Scope

As required by the RAP Attachment 2, ambient air samples are to be collected over a 24-hour period at three locations around the landfill, (1) along Winding Road to the east and southeast of the landfill, (2) to the west of the landfill along Round Swamp Road, and (3) to the north of the landfill. The RAP also states that samples at the above three locations should be collected quarterly during the initial year of the program and, if approved by the State, on an annual basis thereafter. Samples are to be analyzed for volatile organic compounds.

The sample collection program modified the ambient air sampling scope initially stated in RAP to account for site geometry. The selected ambient air sampling locations are shown in Figure 2.1. The 24-hour ambient air samples were taken at locations A-1 and A-4 and two 24-hour samples were taken at location A-2/A-3 for a total of four ambient air samples. The reason for collecting two samples at a single site (A-2/A-3) was to provide the analytical sensitivity at two flow ranges. The first round of sampling indicated a considerable range in ambient concentrations of various volatile organic compounds. Therefore, the two ranges of sample volumes were necessary to achieve acceptable analytical sensitivity for the target compound list.

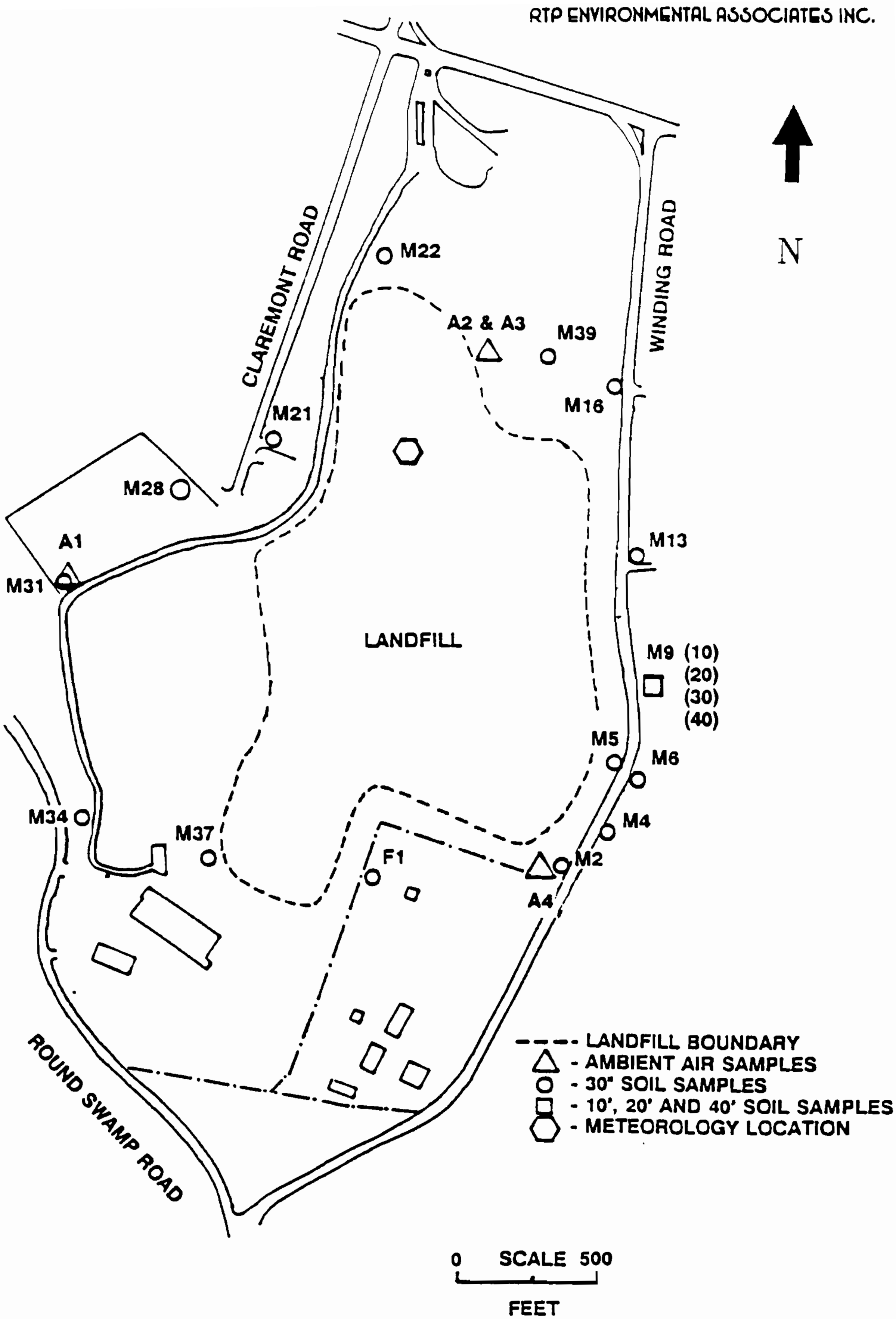


FIGURE 2.1: AMBIENT AIR AND SOIL MONITORING SITES AT OBSWDC

The RAP requires the collection and analysis of samples from fourteen (14) 30" deep wells at different locations surrounding the landfill on a quarterly basis during the initial year of the program and, if approved by the State, on an annual basis thereafter. In this third quarterly sampling event, all 30" wells listed in the Consent Decree were sampled. These included well locations M2, M4, M5, M6, M13, M16, M21, M22, M28, M31, M34, M37, M39 and F1 as identified in Figure 2.1. The sampling methodology used in the initial sampling event was also utilized in this case.

The third component of the RAP required subsurface soil gas samples to be collected from ten (10), twenty (20), thirty (30), and forty (40) foot depths at location M9 as shown in Figure 2.1. Again, sampling is required on a quarterly basis during the initial year of the program and, if approved by the State, on an annual basis thereafter. M9 was totally reconstructed for this third quarter sampling event. This enabled samples to be taken from all four well depths.

As in the initial sampling event, the sampling procedure being applied was the modified VOST method. A modified VOST approach was decided upon for several reasons:

- o Standard absorbent traps for ambient air sampling may miss several compounds because of the volatility of many organics at ambient temperatures. By cooling the absorbent traps to near 32°F, the modified method would likely allow the traps to capture compounds that might normally go undetected.

- o Using a VOST trap series would provide data directly compatible with the thermal oxidizer tests being performed as part of the Consent Decree.

- o Since ambient air concentrations of VOC's are likely to be very low in the area surrounding the landfill, a method that would allow for the collection of large volumes of gas had to be developed.

- o Large volumes of ambient air were necessary because of the analytical limitations posed by standard gas chromatograph - mass spectrographic (GC/MS) methods.

o Evacuated canister methods were reviewed and deemed unacceptable because of low total volume capacity and potential leaks.

o The VOST series traps are applicable for both ambient air and soil gas monitoring.

o The interference problems associated with sample bags and glass bulb methods were deemed unacceptable and had to be avoided.

A summary of the volatile organic compounds that could be evaluated by using the above methodology is presented in Table 2.1. This is the target compound list for the third round of the test and it is consistent with the VOC constituents being evaluated in the thermal oxidizer testing portion of the Consent Decree.

2.2.2 Modified VOST Gas Sampler

The Volatile Organic Sampling Train (VOST) is one of three EPA methods identified to collect VOC's from stacks (EPA, 1984). A schematic diagram of the principal components of the standard VOST is shown in Figure 2.2. The VOST consists of a quartz or glass lined probe with a glass wool particulate plug, an isolation valve, a water cooled gas condenser with a thermocouple placed at the outlet to monitor gas stream temperature, a sorbent cartridge containing Tenax, an empty impinger for condensate removal, a second water cooled glass condenser, a second sorbent cartridge containing Tenax and petroleum based charcoal (3:1 by volume; approximately 1 gram of each), a silica gel drying tube, a calibrated rotameter, a sampling pump, and a dry gas meter.

The standard VOST is not designed for portable ambient air monitoring work. It is designed to extract and concentrate volatile organic compounds with boiling points less than or equal to 100° centigrade from stack gas effluents. The major difficulties with using a standard VOST in the field for ambient air quality work are the power requirements, setup and assembly problems and the breakage of glassware.

EPA, 1984 Compendium of Methods for Determination of Toxic Organic Compounds in Ambient Air. (Riggin & Purdue) EPA-600/4-84-041, Research Triangle Park, North Carolina.

TABLE 2.1

SUMMARY OF ANALYTICAL PARAMETERS FOR AIR AND SOIL GAS SAMPLES

VOLATILES*

Acetone
Benzene
Bromodichloromethane
Bromoform
Bromomethane
2-Butanone

Carbon Disulfide
Carbon Tetrachloride
Chlorobenzene
Chloroethane
Chloroethylvinylether
Chloroform
Chloromethane

Dibromochloromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,2-Dichloroethene
1,1-Dichloroethene
1,2-Dichloropropane
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene

Ethylbenzene
2-Hexanone
4-Methyl-2-Pentanone
Methylene Chloride
Styrene

1,1,2,2,-Tetrachloroethane
Tetrachloroethene
Toluene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethene
Trichlorofluoromethane
Vinyl Acetate
Vinyl Chloride
Xylenes (total)

*The GC/MS Analysis also was used to detect the next 10 highest peaks not specifically identified above. (See lab analysis - Appendix D)

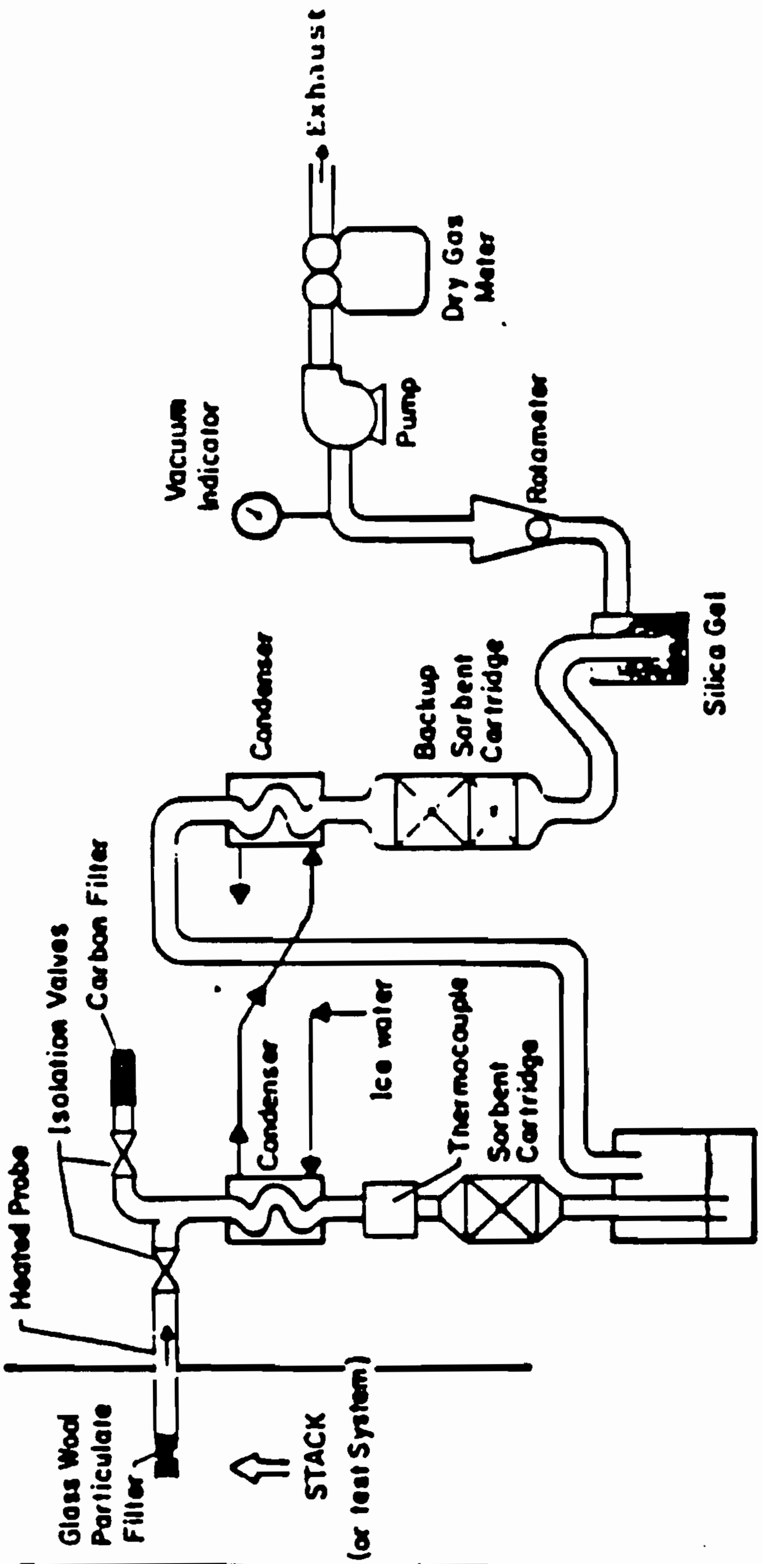


FIGURE 2.2: SCHEMATIC OF EPA REFERENCED VOLATILE ORGANIC SAMPLING TRAIN (VOST)

RTP modified the EPA standard VOST unit to make it portable and to account for air flow volumes necessary to achieve the analytical sensitivity required in both ambient air and subsurface soil gas sampling programs that are required by the Consent Decree. Figure 2.3 shows the RTP modified VOST. The key components of the modified VOST are: precalibrated portable sampling pump, rotameter, filter, pre-weighted VOST Tenax sorbent glass tube, pre-weighted VOST Tenax/charcoal sorbent glass tube, condensate impinger, aluminum tube holder, ice bath and ice pack, sampling cane, and cooler enclosure. The VOST sorbent tubes used in the modified sampling train are the same as those used in the VOST EPA referenced method. However, the SKC sampling pump and rotameter were used instead of the standard VOST flow controlled sampling pump and rotameter, and the ice bath, ice pack and condensate impinger were used instead of two condensers.

2.2.3 Sample Volume Selection

The selection of sample volume for both air and soil gas samples for this study was investigated. In general, the sample volume or sample size is limited by the analytical instrumentation being applied at the host laboratory and the period of sampling required in the Consent Decree. Since sample detection is based on nanogram concentrations of constituents, appropriate sample volumes were necessary to provide the analytical sensitivity desired.

In general, analytical instruments can normally detect between a few nanograms to thousands of nanograms of individual constituents in a sample. The analytical instrument's lower limit of detection for this case was set between 20 and 200 nanograms. The upper range of detection (calibration limit) was nominally set at approximately 100 times the lower detection limits. Therefore, in order to provide the correct mass loading of constituents on the sample substrate, sample volumes were approximated based on Photovac Micro-Tip values as presented in Table 2.2. Since the Micro-Tip has a lower limit of detection at 0.1 ppm, it was not always possible to specify the exact sample volume required to consistently achieve the proper mass loading on each sampling tube. Therefore, to avoid missing compounds because of insufficient sample volume for ambient air samples, high volume (1000 liters) and low volume (24 liters) sample sizes were selected.

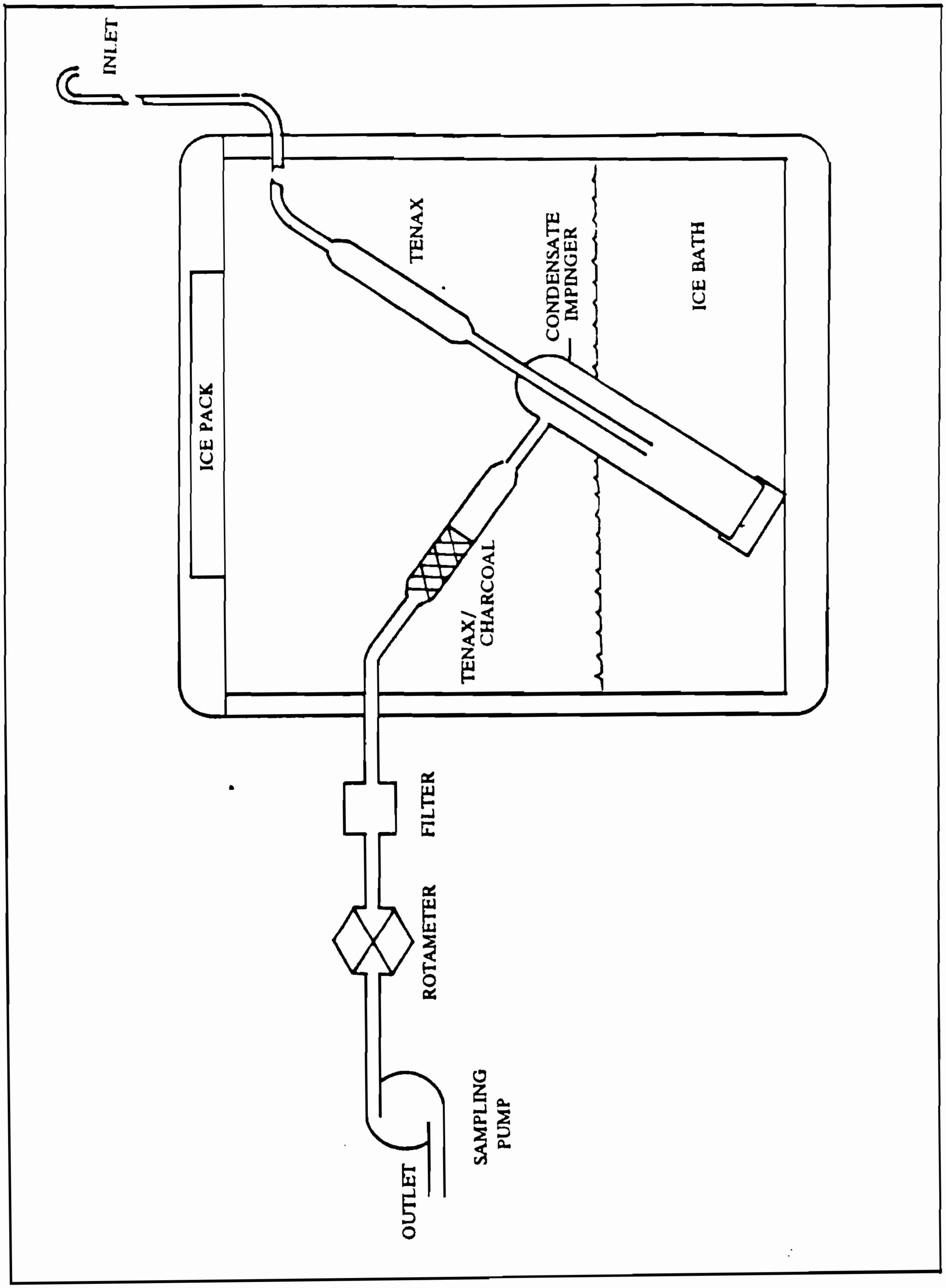


FIGURE 2.3: MODIFIED VOST SAMPLER

TABLE 2.2

GENERAL RELATIONSHIP BETWEEN MICRO-TIP READINGS AND SAMPLE VOLUME

MICRO-TIP READINGS* (ppm)	SAMPLE VOLUME (liters)
<0.1 to 0.5	1000 to 10
2 to 5	1
5 to 10	0.5
10 to 15	0.1
15 to 20	0.05
>20	0.01

*Micro-Tip photoionization detector with 11.7 ev lamp.

It was previously determined that a 10 liter sample volume would be appropriate for sampling shallow soil gas wells. Removing more than a 10 liter sample would have meant that ambient air from the surface would have been introduced into the well being sampled.

2.2.4 Other Sampling Equipment

The SKC sampling pump used in this study is a model MOD 224-PCXR7 universal exhaust pump. It automatically shuts down for low battery voltage and excess back pressure. The accuracy of the sampling pump is about +/- 5% of the set nominal flow rate.

The SKC sampling pump can be programmed to operate continuously and intermittently. Also, it can be used to collect different total sample volumes at different flow rates. The pump can be programmed to continuously draw samples at a desired flow rate over a pre-assigned time period. This capability is particularly important in the ambient air sampling event. It makes it possible to collect ambient air samples intermittently over a 24-hour total elapsed time period to give a 24-hour average VOC concentration as specified in the Consent Decree. The only factor that limits the overall sampling time would be the pump battery capacity which was expanded by using a larger capacity battery.

SKC electronic calibrator Model 712 is used prior to each sampling event to set the pump to a desired nominal flow rate. It is used again after all sampling events to establish the exact sample volume collected during each test. SKC calibrator is a digital film flow meter consisting of a microprocessor and a sensitive bubble meter with two photo-sensor lines. The flow rate shown on the digital film flow meter is calculated by the microprocessor. The flow is based upon the bubble meter inner diameter and the elapsed time taken by a bubble passing between the two photo-sensor lines. The accuracy of this calibrator is around +/-2% of the reading.

The purpose of using a pump rotameter is to visually check and record the readings during sampling and not to determine the precise flow rate. The flow rate is determined by the digital film flow meter as discussed above.

A Photovac Micro-Tip meter was also used to assist the monitoring program. It is a hand held instantaneously reading analyzer that measures the total concentration of all ionizable compounds (in the unit of ppm). It is to be used before and after each sampling event to measure the total gross VOC concentration. The meter has a minimum detection limit (MDL) of 0.1 ppm. Micro-Tip is used to verify and adjust, if necessary, the appropriate nominal pump flow rate for each ambient air and subsurface soil gas sample.

2.3 METEOROLOGICAL DATA

Ambient onsite meteorological data was collected during the ambient air quality and soil gas tests. Meteorological data provide information on ambient conditions occurring during the tests. The specific equipment used to measure and record onsite meteorological data is identified and presented in Appendix B.

The meteorological parameters of interest in this program are: wind speed, wind direction, temperature, relative humidity, turbulence, barometric pressure and precipitation. The meteorological equipment used included a 10 foot meteorological tower, solid-state barometric pressure sensor, precipitation gauge, three-cup anemometer, counterbalanced wind vane coupled to a precision, low-torque potentiometer, temperature sensor and a fully programmable CR10 measurement data logger and control module. The pressure sensor and the CR10 data logger/controller was enclosed inside a portable instrument case. The remainder of the equipment was mounted on the meteorological tower. Appendix B provides a detailed description of the meteorological sampling and data processing protocols.

3.0 SAMPLING AND ANALYSIS

3.1 BACKGROUND

The program's scope of work for sampling and analysis of ambient air quality levels in the vicinity of the Old Bethpage Landfill was principally guided by the NYSDOL Consent Decree. As mentioned in Section 2.0, the EPA reference sampling mechanism was modified to account for site conditions and monitoring requirements. All locations specified in the Consent Order were sampled.

Analytical laboratory equipment provided concentration measurements based on mass loading of specific substrates within the sampling tubes. It was, therefore, important to determine how much pollutant mass was contained in each gaseous sample from each soil gas well and ambient air location. Historical data did not define what specific ambient levels were to be expected, therefore, a portable ambient air and soil gas monitor (Photovac Micro-Tip Total Hydrocarbon Analyzer) having detection ranges down to 0.1 ppm was used in this case to preliminarily define sample loadings.

3.2 AMBIENT AIR SAMPLING

The third quarterly 24-hour ambient air sampling event was conducted on February 4th and 5th, 1991. Three locations at the Old Bethpage Landfill were selected as illustrated on Figure 2.1. At locations A1 and A4, high volume, 24-hour ambient air samples were collected using the modified VOST sampler. At locations A2 and A3, high volume and low volume 24-hour modified VOST samples were collected. The critical parameters are summarized in Table 3.1.

The sampling trains were partially assembled according to the air sampling protocol presented in Appendix B prior to taking the four ambient air samplers to their respective field locations. Ice was placed in the coolers, the personal sampling pumps were calibrated, positioned and connected, and the inlet to the sampling port was sealed. The VOST tubes were removed from their protective cases at the sampling sites and then the end caps and fittings were removed. The tubes were installed and the samplers were placed in their respective positions as shown in Figure 2.3. The sampler design for the tests has been described in Section 2.2.

The sampler for Location A4 was positioned first on the east side of the landfill near Winding Road as shown in Figure 2.1. Sampler A1 was positioned to the west of the landfill. Samplers at both A1 and A4 were set to collect 500 2-minute discrete samples at a 1.0 liter per minute (lpm) nominal flow rate over a 24-hour period. These settings would allow for the collection of two 1,000 liter samples at A1 and A4, respectively. During the intervening minute, the sampler was programmed to shut off. The reason the pump was set at 1.0 lpm was to place the pump at a sampling rate that was removed from the extreme ends of the pump's operating range which is 0.1 lpm to 5.0 lpm while at the same time, collecting a total air volume of approximately 1,000

TABLE 3.1

SUMMARY OF AMBIENT AIR SAMPLING

SITE ID	SAMPLE ID	TESTING DATE	DURATION (minutes)	SAMPLING HEIGHT	NOMINAL FLOWRATE (l/min)	DESIRED QUANTITY (liter)	ACTUAL QUANTITY (liter)
A1	A13	Feb 4-5	1440	36"	1.0	1,000	962
A2	A23	Feb 4-5	1440	36"	1.0	1,000	955
A3	A33	Feb 4-5	1440	36"	1.0	24	24.8
A4	A43	Feb 4-5	1440	36"	1.0	1,000	912

SUMMARY OF SUBSURFACE SOIL GAS SAMPLING

WELL ID	SAMPLE ID	TESTING DATE	DURATION (minutes)	WELL DEPTH	NOMINAL FLOWRATE (l/min)	DESIRED QUANTITY (liter)	ACTUAL QUANTITY (liter)
M2	M23	Feb 5	10	30"	1.0	10.0	10.1
M4	M43	Feb 4	10	30"	1.0	10.0	10.1
M5	M53	Feb 4	10	30"	1.0	10.0	10.1
M6	M63	Feb 4	10	30"	1.0	10.0	10.1
M13	M133	Feb 4	10	30"	1.0	10.0	10.1
M16	M163	Feb 4	10	30"	1.0	10.0	10.1
M21	M213	Feb 4	10	30"	1.0	10.0	10.1
M22	M223	Feb 4	10	30"	1.0	10.0	10.1
M28	M283	Feb 4	10	30"	1.0	10.0	10.1
M31	M313	Feb 4	10	30"	1.0	10.0	10.1
M34	M343	Feb 4	10	30"	1.0	10.0	11.1
M37	M373	Feb 4	10	30"	1.0	10.0	10.1
M39	M393	Feb 4	10	30"	1.0	10.0	12.6
F1	MF13	Feb 5	10	30"	1.0	10.0	10.1
M9	M913	Feb 5	10	10'	1.0	10.0	10.1
M9	M923	Feb 5	10	20'	1.0	10.0	10.1
M9	M933	Feb 5	10	30'	1.0	10.0	10.1
M9	M943	Feb 5	10	40'	1.0	10.0	10.1

liters over the 24-hour period. Samplers A-4 and A-1 began sampling at 1026 EST and 1119 EST on February 4, 1991.

Samplers A-2 and A-3 were then set up north of the landfill to the southwest of soil gas well M39. Sampler A-2 was set to collect 500 2-minute samples at 1.0 lpm over the 24-hour period, the same set up as for Samplers A-1 and A-4. Sampler A-3 was set to collect a low volume sample. To achieve this, the pump was programmed to run for 1-minute out of every hour at 1 lpm. This would allow for the collection of 24 discrete 1-minute samples over the 24-hour sampling period with the total air volume being approximately 24 liters. Sampler A-3 began sampling at 1040 EST and Sampler A-2 was started at 1054 EST on February 4, 1991.

The ambient total VOC concentration was monitored at each site by a Photovac Micro-Tip. Ambient total VOC concentrations were measured to be 0.0 ppm at the initiation of all sampling. Based on this ambient concentration, flow rates were set at 1.0 lpm for all four pumps. These rates would achieve the desired range in sample volumes necessary for analytical sensitivity requirements.

Periodic checks (every two to six hours) were made at the ambient air sampling locations. Pump operations were monitored and VOST train integrity, battery station flow rates and ice levels in the samplers were checked. In all, each sampler was checked five to seven times during the 24-hour sampling period. Rotameter readings were within established ranges. Sampling proceeded according to plan over the 24-hour sampling periods at all sites.

All air sampling units were programmed to end sampling at the conclusion of the 24-hour sampling event. The final VOC ambient concentrations at all sites were 0.0 ppm based on the Micro-Tip reading. Pump elapsed run time readings were recorded, VOST traps were removed, and the condensate was collected in clean septum vials. Ultra distilled water was used to triple rinse the condensate impingers and the rinse water was collected in the corresponding clean septum vials. All traps and tubes were labeled and shipped to the analytical laboratory as per the established protocol.

The analytical laboratory for this test was Research Triangle Laboratories. The laboratory received all tubes in good condition. The laboratory analytical results along with the data observed during the sampling event will be discussed in Section 4.0. A more detailed chronology of the ambient air sampling event is presented in Appendix C.

3.3 SOIL GAS SAMPLING

The soil gas sampling elements of the Consent Decree require soil gas samples be extracted from several 30" deep subsurface gas wells and from 10', 20' 30' and 40' deep subsurface gas wells. The decree does not specify the volume of sample, constituents to be analyzed, time period for collection, conditions for collection, analytical instrumentation, minimum level of detection and other parameters necessary to specifically define the nature of the tests and the applicability of the test results. Based on the other elements of the work scope in the Consent Decree, RAP Attachment 2, it was decided to follow the protocols and procedures outlined in Section 2.3 and presented in Appendix B for all soil gas samples.

The first step in the soil gas test was to assemble the sampling trains. The sampler design is equivalent to that used for the ambient air samples except for the following modifications. The sample probe was modified to include a 36" long, 1/4" diameter, stainless steel tube that was attached to the sampler inlet line in place of the sampling cane. Prior to use, the sample probe tube was heated to purge any oils/VOC's attached to the stainless steel. After purging, the tubes were capped to prevent inadvertent exposure to trace VOC's. The sampler pump was calibrated and programmed for specific flow rates at each soil gas sampling point based on the total VOC concentrations observed in the well prior to removal of a soil gas sample. Total VOC well concentrations were monitored by the Photovac Micro-Tip.

Soil gas samples were collected at M2, M4, M5, M6, M13, M16, M21, M22, M28, M31, M34, M37, M39, F1 and M9 (10', 20', 30' and 40' depths) as shown on Figure 2.1 and as summarized in Table 3.1. All 30" soil gas wells were temporarily sealed with modeling clay for approximately two hours prior to the collection of the soil gas samples. M9 wells have individual shut off valves which were all closed prior to the sampling event. The general procedure of collecting a sample was as follows. The modeling clay was removed from the well. The stainless steel sampling probe attached to the Micro-Tip was inserted into the well to a depth of 26" and sealed from the atmosphere using a teflon tap plug. The Micro-Tip (30" wells) were run for approximately 30 seconds to extract the stagnant well gases and total VOC well concentrations were monitored continuously. SKC pumps were used to extract stagnant gases from the deep wells. The duration of pump operation at the M9 cluster wells depended on the well depth of each soil gas probe. Since well gas concentrations were not exceptionally high, the sampling pumps during soil gas sample collection were set at a rate of 1.0 lpm and run for a total of 10 minutes at each well site. This procedure resulted in approximately 10.0 liters of soil gas being drawn through the VOST trap at each well. At the end of the sample, the Micro-Tip was used to record well concentrations. The VOST tubes were then removed from the train, labelled and packed for shipment to the laboratory. The lines and probe were purged with charcoal filtered clean air for several minutes prior to sampling the next soil gas well.

A detailed chronology of the soil gas sampling is presented in Appendix C.

3.4 ANALYTICAL LABORATORY PROCEDURES

Prepackaged clean VOST tubes were supplied by Research Triangle Laboratories (RTL) for use in this study. Upon arrival at RTP, the sampling tubes were refrigerated until their use in the field program. RTL was selected as the analytical laboratory for the third quarter tests.

RTL was forwarded a list of the VOC's that were initially identified as the target compound list for this monitoring program. RTL evaluated both Tenax and Tenax/charcoal traps from each sample set as a single laboratory run. There did not appear to be a need for separating front half from back half for this test sequence because of limited concentrations measured by the Micro-Tip. Each condensate sample was analyzed individually on the GC/MS analytical column. The RTL report is presented in Appendix D. RTL did experience fairly high concentrations of various compounds, predominantly carbon disulfide in the first VOST soil samples. Upon consultation with RTP Environmental staff, it was decided that a 10:1 split of all VOST tubes should be performed to assure that analytical sensitivity would be within the calibrated range of the GC/MS. The report provides a complete description of the analysis of samples.

4.0 DISCUSSION OF RESULTS

4.1 AMBIENT AIR CONCENTRATIONS

For the third quarter sampling event at the Old Bethpage Landfill, the ambient air concentrations at selected sites were monitored over a 24-hour period on February 4th and 5th, 1991. The sites have been identified and the monitoring and analysis methods discussed in preceding sections of this report. Laboratory analytical results are translated into ambient air concentrations in this section.

Table 4.1 contains a survey of the analytical results from the air samples collected at the Old Bethpage Landfill on February 4th and 5th, 1991. These values are in nanograms per cubic meter and have been adjusted for flow volumes as calibrated from the digital flow meter. That is, Samples A13, A23 and A43 are adjusted to total sample volumes of 962, 955 and 912 liters, respectively. Sample A33 was a low sample volume tube with flow volume equalling 24.8 liters. The table includes minimum detection limits for each sample. All ambient air sample concentrations have been adjusted for trip blank/field blank concentrations. These results will be evaluated more completely when the fourth quarter samples are available for analysis.

4.2 SOIL GAS CONCENTRATIONS

Soil gas concentrations were monitored on February 4th and 5th, 1991 at all selected soil gas well sites identified in the Consent Decree. Table 4.2 provides a summary of the soil gas concentrations at the wells identified above. These concentration values are reported in nanograms per cubic meter of soil gas. The table also includes minimum detection limits for each compound. All soil gas sample concentrations were adjusted for trip blank/field blank concentrations. These results will be more fully evaluated when the remaining quarterly analyses are available.

TABLE 4.1

OYSTER BAY VOST AMBIENT AIR SAMPLE RESULTS

	24-HOUR AMBIENT AIR SAMPLES								BLANK SAMPLE	
	A13		A23		A33		A43		FIELD	TRIP
COMPOUND NAME	MDL	CONC.	MDL	CONC.	MDL	CONC.	MDL	CONC.	FB3	TB3
									---(ng)---	
Acetone	208		209	*	8065		219			
Benzene	208	6653	209	*	8065	8065	219	6031		
Bromodichloromethane	208		209	*	8065		219			
Bromoform	208		209	*	8065		219			
Bromomethane	208		209	*	8065		219			
2-Butanone	208		209	*	8065		219			
Carbon Disulfide	208	5242	209	*	8065	50121	219	2130	57	
Carbon Tetrachloride	208	551	209	*	8065		219	570		
Chlorobenzene	208		209	*	8065		219			
Chloroethane	208		209	*	8065		219			
2-Chloroethyl Vinyl Ether	208		209	*	8065		219			
Chloroform	208		209	*	8065		219			
Chloromethane	208		209	*	8065	3347	219	4934		
Dibromochloromethane	208		209	*	8065		219			
1,1-Dichloroethane	208		209	*	8065		219			
1,2-Dichloroethane	208		209	*	8065		219			
1,2-Dichloroethene	208		209	*	8065		219			
1,1-Dichloroethene	208		209	*	8065		219			
1,2-Dichloropropane	208		209	*	8065		219			
cis-1,3-Dichloropropene	208		209	*	8065		219			
trans-1,3-Dichloropropene	208		209	*	8065		219			
Ethylbenzene	208	3742	209	*	8065	7661	219	3728		
2-Hexanone	208		209	*	8065		219			
4-Methyl-2-pentanone	208		209	*	8065		219			
Methylene chloride	208	1975	209	*	8065	3548	219	2083		
Styrene	208	593	209	*	8065		219	570		
1,1,2,2-Tetrachloroethane	208		209	*	8065		219			
Tetrachloroethene	208	9771	209	*	8065	11290	219	10965		
Toluene	208	19751	209	*	8065	44355	219	15351		
1,1,1-Trichloroethane	208	6341	209	*	8065	14919	219	7127		
1,1,2-Trichloroethane	208		209	*	8065		219			
Trichloroethene	208	3534	209	*	8065	3065	219	3838		
Trichlorofluoromethane	208	2495	209	*	8065	16935	219	2632		
Vinyl acetate	208		209	*	8065		219			
Vinyl chloride	208		209	*	8065		219			
Total Xylenes	208	23909	209	*	8065	48387	219	21930		

MDL = Minimum detection limit based on actual sample volume.
* = Mass spec shutdown due to high CO2 at 1.54 minutes. No information available.

[1]. All concentrations are corrected for blank concentrations and the values below MDL are typically not presented.
[2]. Concentrations given are in nanograms per cubic meter per 24-hour average collection period.

TABLE 4.2

OYSTER BAY VOST SOIL GAS SAMPLE RESULTS

COMPOUND NAME	MDL	SOIL GAS SAMPLES M23	M43	M53	M63	M133	M163	M213	M223	M283	M313	M343	M373	M393	MF13	M913	M923	M933	M943	BLANK SAMPLE FIELD FB3 (ng)	TRIP TB3
Acetone	20000																				
Benzene	20000																				
Bromodichloromethane	20000																				
Bromoform	20000																				
Bromomethane	20000																				
2-Butanone	20000											54955		32540				673267			
Carbon Disulfide	20000	132970	28020	251782	88416	87426	172574	202277		261683	172574	148018	28020	328810	301287	350792	410198	222079	113168	57	
Carbon Tetrachloride	20000																				
Chlorobenzene	20000																				
Chloroethane	20000																				
2-Chloroethyl Vinyl Ether	20000																				
Chloroform	20000																				
Chloromethane	20000																				
Dibromochloromethane	20000																				
1,1-Dichloroethane	20000																		93069		
1,2-Dichloroethane	20000																				
1,2-Dichloroethene	20000																				
1,1-Dichloroethene	20000																				
1,2-Dichloropropane	20000																				
cis-1,3-Dichloropropene	20000																				
trans-1,3-Dichloropropene	20000																				
Ethylbenzene	20000																				
2-Hexanone	20000																				
4-Methyl-2-pentanone	20000																				
Methylene chloride	20000																				
Styrene	20000																				
1,1,2,2-Tetrachloroethane	20000																				
Tetrachloroethene	20000															53465	128713	316832	1683168		
Toluene	20000								60396												
1,1,1-Trichloroethane	20000								42574								23762	32673	168317		
1,1,2-Trichloroethane	20000																				
Trichloroethene	20000																				
Trichlorofluoromethane	20000															24752	28713	38614	138614		
Vinyl acetate	20000																				
Vinyl chloride	20000																				
Xylenes(total)	20000								22772												

MDL = Minimum Detection Limit based On the Norminal Sample Volume of 10 Liters.

[1]. Only concentrations above MDL corrected for blank concentrations are presented above.
[2]. Concentrations are in nanograms per cubic meter of soil gas.
[3]. The MDL for soil gas sample M223 is 2000 ng.

APPENDIX A

RAP, ATTACHMENT 2

RAP Attachment 2

OLD BETHPAGE LANDFILL
SUPPLEMENTAL GAS MONITORING PROGRAM

The supplemental landfill gas monitoring program for the Old Bethpage Landfill Remediation Program contains five components. These are 1) the collection of ambient air samples; 2) the collection of subsurface gas samples at a depth of 30"; 3) the collection of subsurface gas samples at depths of 10', 20', 30' and 40'; 4) the collection of thermal oxidizer emission samples (stack testing); and 5) the measurement of gas pressure to ascertain negative pressure created by the gas collection system. These data requirements supplement the existing methane gas monitoring program and will be reported in the annual reports produced under that program.

The location of the proposed sampling points are shown on Drawing No. 1, entitled "Old Bethpage Landfill Zero Percent Methane Gas Migration Contours, 1986 Annual Site Survey". A description of the various components of this program follows.

Ambient Air Samples

Ambient air samples (24 hr. samples) will be collected at three locations around the landfill as shown on Drawing No. 1. One location will be along Winding Road to the east and southeast of the landfill (near M-3 shown on Drawing No. 1). One location will be to the west of the landfill along Round Swamp Road (near M-33). A third location will be north of the landfill (between M-17 and M-22). Samples at these locations will be collected quarterly during the initial year of the program and, if approved by the State, on an annual basis thereafter. Samples will be analyzed for volatile organic compounds.

30" Deep Subsurface Gas Samples

Fourteen subsurface gas samples will be collected at a depth of 30" at the following locations surrounding the landfill as shown on Drawing No. 1: F-1, M-2, M-4, M-5, M-6, M-13, M-16. M-21, M-22, M-28, M-31, M-34, M-37 and M-39. Samples will be collected on a quarterly basis during the initial year of the program and, if approved by the State, on an annual basis thereafter. Samples will be analyzed for volatile organic compounds.

Subsurface Gas Samples at Various Depths

Subsurface gas samples will be collected at depths of 10', 20', 30', and 40' at location M-9 (to be repaired or replaced) shown on Drawing No. 1. Samples will be collected on a quarterly basis during the initial year of the program and, if approved by the State, on an annual basis thereafter. Samples will analyzed for volatile organic compounds.

Thermal Oxidizer Emissions

Thermal oxidizer emissions will be sampled (in the incinerator stack) on a quarterly basis during the initial year of the program. The emissions will be related to oxidizer incinerator temperatures during this initial year of sampling. Thereafter, the oxidizer temperatures will be monitored on a monthly basis to insure that temperatures needed to volatilize the organics are being maintained in the oxidizer. The emissions will continue to be sampled on an annual basis. Samples will be analyzed for volatile organic compounds.

Pressure Readings

Pressure readings will be taken at three locations around the perimeter of the gas collection system to ascertain whether a vacuum is created around the system. This data will assist in monitoring the effectiveness of the system and in determining whether the system needs adjustment or enhancement. One reading will be taken to the south of the landfill at either F-6 or F-9 (existing probes) shown on Drawing No. 1. A new probe will be installed and a reading taken to the northwest of landfill between LGV 16 and LGV 17. The third probe will be installed and a reading taken to the southeast of the landfill between TGV-1 and LGV-9. Pressure readings will be taken on a quarterly basis during the initial year of the program and, if approved by the State, on an annual basis thereafter.

APPENDIX B

AMBIENT AIR SAMPLING PROTOCOL

1. Obtain pre-conditioned VOST tube pairs from analytical laboratory. Prior to testing, inspect condition of outer sample holding tube and inner sampling traps and note abnormalities (loose caps, fittings, cracks, Tenax discoloration, etc.) and refrigerate in resealed shipping container.

2. Assemble sampling trains including:
   - o Clean and double rinse coolers with distilled water.
   - o Attach sampling cane.
   - o Calibrate and set desired sample pump rate according to manufacturer's specifications.
   - o Attach precalibrated personnel sampling pump to exterior of sampling cooler.
   - o Install aluminum trap holder and partially fill cooler (1/4 full) with ice.
   - o Close cooler lid, cap sample inlet and transport sampling assembly to selected sampling site along with VOST traps.

3. Remove VOST trap pair from shipping container and follow USEPA VOST procedures augmented as follows. Label trap and shipping container with sample number/location. Install traps in modified VOST sampling train for ambient air. Label trap and shipping container with sample number/location.

4. Monitor gross VOC concentrations with portable OVA and determine acceptability of precalibrated flow rates. Adjust flow rate according to OVA reading. Reading of zero for VOC indicates 1000 liter volume on high flow samples is appropriate. Greater than zero, adjust high flow rate sampling interval to accumulate no more than 100 ug of total VOC on tube pair.

5. Leak check system by drawing a vacuum over sample train with cap on sample inlet. Turn on pump. Draw vacuum. Pump failure should occur within 40 seconds. If not, fix air leak and repeat.

6. Set sample pump for appropriate sampling interval. Remove cap from sample inlet, start sample event.

7. Examine pump operation for proper cycling and record rotameter reading, sample time on, sample location, sample ID and other observations such as OVA reading, general site conditions, etc.

8. Repeat QA check approximately every four (4) hours. Examine sample lines, ice level, pump operation, note all changes and significant events.

9. At conclusion of 24-hour sampling period, record sample run time reading and check sample lines, ice level, OVA reading in the field log. Record total flow, time of pump stoppage. Do a leak check as per Item 5 above and note results. Then turn off sample pump.

10. Open sampler lid and remove VOST shipping tubes. Remove VOST traps, wrench tighten VOST caps and place in shipping tubes. Remove impinger trap, pour contents into clean septum vial and top off with ultra pure distilled water. Label and place in shipping container. Place VOST shipping tubes in air freight shipping container with manifest.

11. Disassemble sample trains, clean and return to storage.

12. Send sampling traps and vials to laboratory for analysis.

SOIL GAS SAMPLING PROTOCOL

Follow procedures defined in ambient air sampling protocol with the following exceptions.

1. Assemble soil gas sampling probe consisting of a precleaned stainless steel tube and teflon sampling line and substitute for ambient air probe.

2. Transport sampling tubes and sampling train to field observation points.

3. Record ambient VOC reading.

4. Remove cap from sampling well, insert sampling probe connected to OVA and draw sufficient volume of sample to clear lines and sampling probe and well. Record average and highest VOC reading during line clearing procedure by using Micro-Tip.

5. Using last recorded VOC value, determine sample volume that would effectively place 10 to 100 ug of total VOC's into VOST trap.

6. Reconnect soil gas sample probe to modified VOST unit.

7. Turn on sampling pump with a 0.5 l/min to 1.0 l/min sample rate for 10 minutes if OVA reading is zero or for calculated sampling rate and interval if OVA provides non-zero result.

8. Turn off pump, recording ON/OFF time, flow rates, rotameter reading, and ambient OVA reading at end of test.

9. Remove sample VOST traps as per ambient air sampling procedure.

10. Monitor soil gas concentration in well and record result at end of test. If greater than initial OVA value, submit supplemental data to laboratory regarding special handling instructions, be explicit on volumes and likely concentrations.

METEOROLOGICAL MONITORING PROTOCOL

1. Establish weather conditions appropriate for conducting ambient air and soil gas survey. (Falling atmospheric pressure, steady wind direction over 24-hour period, rainfall less than 30 percent chance).

2. Assemble precalibrated field meteorological equipment including portable wind vane, anemometer, ambient temperature, relative humidity atmospheric pressure, precipitation and sigma theta sensors onsite. Select site to be representative of general area circulation patterns.

3. Perform proper alignment checks and begin operation.

4. Record data in 15 minute block averages and translate to hourly values for a period preceding test and during entire ambient air and soil gas survey.

5. Recheck alignments and reasonableness of values at end of test period and remove equipment. Note all problems/conditions that could influence data accuracy, quality or test results.

6. Prepare data base in format suitable for inclusion in ambient air/soil gas survey.

SAMPLE TRAIN

A volatile organics sampling train (VOST) similar to EPA Method 0030 was constructed for ambient and ground well measurements of volatile organic compounds (VOC's). The Tenax and Tenax/charcoal traps were supplied and analyzed by Research Triangle Laboratories.

The sample train was enclosed in a thermally insulated container with the inlet line and exhaust (vacuum) pump mounted externally.

A 1/4" O.D. teflon tube served as the inlet line. It connected to the glass open end of the first Tenax trap. The other end of the Tenax trap was attached to a condensate impinger, whose dry outlet was connected to a Tenax/Charcoal trap (the "Breakthrough" trap). The exhaust of this trap went through tygon tubing to the sample pump.

The condensate impinger was immersed in an ice water bath during sampling.

MICRO-TIP HL200
CALIBRATION AND USE

The Micro-Tip is a hand held analyzer that measures the total concentration of all ionizable chemicals present in the sample. It does not differentiate between individual pollutants.

Prior to use, measuring ambient air and well VOC concentrations, the unit was calibrated.

Procedures used are detailed in Chapter 6.3 of the Micro-Tip Users Manual, published by PhotoVac International, Incorporated, 741 Park Avenue, Huntington, New York 11743-9969.

Charcoal filtered ambient air was used as the zero gas. 99 PPM of Isobutylene was employed as the span gas. The HL200 has internal computing capacity to identify zero and span points and make necessary slope adjustments to correct observed values automatically.

SKC Model 224-PCXR7
UNIVERSAL SAMPLE PUMP

The pumps used for sampling were electronically flow-controlled to +/-5% of the set point constant flow. They have automatic shutdown for low battery voltage, pinched hose, or excess back pressure. (See Operating Instructions Universal Sample Pump MOD 224-PCXR7 published by SKC, Inc. National Service Center, 334 Valley View Road, Eighty Four, PA. 15330).

Pumps were run at approximately 1 lpm.

The high flow units were programmed to sample approximately 1,000 minutes of each 1,440 minute period. A GEL CEL battery was connected in parallel to the OEM battery to provide sufficient power for the 24-hour period.

The planned sample was 1,000 liters.

Low flow samplers were scheduled to run 24 minutes out of the 1440 minute total test period. The sample total was to be 24 liters.

The pump rotameters were used for visual checks during sampling, not as precise flow indicators, which was determined by the electronic flow calibrator.

PUMP CALIBRATOR

An SKC Model 712 Electronic Calibrator (Digital Film Flowmeter) was used.

This digital film flow meter is provided with a micro-processor that calculates the flow rate based on bubble meter diameter and elapsed time of passage between two photo-sensor lines. Accuracy is stated at +/-2% of the reading.

The operator calibrated the ambient air sampling pumps prior to the test. A pre-start calibration and a comparison check on the low flow measurements was completed.

APPENDIX C

CHRONOLOGY - AMBIENT AIR SAMPLING

SAMPLER A-1

- February 4, 1991

Start Sampler A-1 using pump #2A and sampling unit #1 at 1119 EST. The nominal flow rate was 1 liter per minute (lpm). The sampler was programmed to run 1000 minutes out of next 24 hours. The sampling location was A1 as shown in Figure 2.1. This location is northwest of the landfill.

The initial ambient VOC concentration reading was 0.0 ppm and the initial rotameter reading was 1.25 lpm.

Checked rotameter readings at 1337 EST, 1614 EST and 2145 EST. All readings were 1.25 lpm.

- February 5, 1991

The operator checked the sampler four times (0344 EST, 0834 EST, 1019 EST and 1053 EST) and the rotameter readings were all at 1.25 lpm. The pump operation was normal during the whole sampling period. No unusual events were noted. The sampler was removed from services according to the protocol. The ambient OVA reading was 0.0.

SAMPLER A-2

- February 4, 1991

Sampler A-2 began sampling at 1054 EST. Pump #2 was used for sampling unit #2. The sampling location was A2 which is north of the landfill. The nominal flow rate was 1 lpm and the initial rotameter reading was 1.25 lpm. Ambient VOC concentration was monitored before sampling started, the reading was 0.0 ppm.

Rotameter readings were checked again at 1047 EST, 1516 EST and 2127 EST. The readings were 1.25 lpm.

- February 5, 1991

Inspected A-2 at 0331 EST. No problems were noted. Rotameter reading was 1.18 lpm.

At 0845 EST, the rotameter reading went up to 1.24 lpm.

The last inspection on the Sampler was at 1032 EST. No disconnections were found and rotameter readings were back to 1.25 lpm. The sampler was removed from service according to the established protocol. The ambient OVA reading was 0.0 ppm.

SAMPLER A-3

- February 4, 1991

The sampler was started at 1040 EST with pump #4 and sampling unit #3. Again, the normal flow rate was 1 lpm. The pump was programmed to run 24 minutes over 24 hours to collect a 24 liter sample. The sample location is also north of the landfill approximately three feet from sampler A-2. The initial rotameter reading was 1.25 lpm and the initial ambient VOC concentration was 0.0 ppm. A maximum and minimum thermometer was set inside the sampler to measure the maximum and minimum temperatures during the sampling period.

Check rotameter reading at 1347 EST. The reading was 1.25 lpm.

Sampler A-3 was rechecked again at 1440 EST. No problems were noticed. The rotameter ball was resting on 1.25 lpm. At 2140 EST, the rotameter reading went up to 1.26 lpm.

- February 5, 1991

Checked Sampler A-3 at 0340 EST and 0840 EST. Rotameter indicated readings of 1.25 lpm. At the end of sampling, all connections were in order. The recorded maximum and minimum temperatures with the A-3 sampling unit were 55°F and 32°F. The sampler was removed from service according to the established protocol. The ambient OVA reading was 0.0 ppm.

SAMPLER A-4

- February 4, 1991

Sampler A-4 was positioned southeast of the landfill location at A4 as shown on Figure 2.1. It was started at 1026 EST. Pump #5 was programmed for this sampler to run at a nominal flow rate of 1 lpm for 1,000 minutes over the next 24 hours to collect 1000 liters of samples. Sampling unit #4 was utilized.

The rotameter reading was 1.25 lpm at the beginning of the test. Micro-Tip meter indicated an initial ambient VOC concentration of 0.0 ppm. Sampler A-4 was inspected three times before midnight at 1357 EST, 1538 EST and 2122 EST. All tubes were still connected properly. No condensation was noticed and the rotameter readings went down to 1.15 lpm, 1.12 lpm and 1.10 lpm respectively. At 1450 EST, the site inspector observed that three LILCO trucks were parked by the sampler. They were requested to park elsewhere and they moved when requested by the site inspector.

- February 5, 1991

Check Sampler A-4 at 0326 EST, the reading went down to 1.06 lpm.

At 0826 EST, the rotameter reading went back up to 1.26 lpm, but by 1025 EST, the reading went down again to 1.18 lpm. This erratic behavior of the pump could not be explained. The pumps automatically adjust to the proper flow rate thus the total volume sampled should not be severely affected.

The unit was taken out of service at the conclusion of the 24-hour test period according to established protocols. The ambient OVA reading was 0.0 ppm.

CHRONOLOGY - SOIL GAS SAMPLING

FEBRUARY 4, 1991

- SAMPLE M373

Commenced soil gas testing at 1231 EST for 36" well located at M37, next to the pond. The sampling rate was nominally 1 lpm and the run was 10 minutes in duration. The initial rotameter reading was 1.25 lpm and maintained that level during the testing. The ambient and well VOC readings were taken using Micro-Tip meter prior to testing. The ambient concentration was 0.0 ppm. The well concentration was 1.9 ppm at the beginning and then dropped to 0.0 ppm after a few seconds. Water drops appeared in the inlet line and the impinger two minutes after the test started. The inlet tube was replaced and the impinger was cleaned with distilled water before sampling of the second well.

- SAMPLE M343

The second soil gas sample was collected between 1305 and 1315 EST. The well location was M34 near haul road and waste management building. The nominal sampling rate was 1 lpm. The initial and final rotameter reading were 1.25 lpm.

The initial well VOC concentration was 2.9 ppm and final concentration was 0.0 ppm. The ambient VOC concentration was 0.0 ppm both at the beginning and at the end of sampling.

- SAMPLE M313

Soil sample M313 was taken between 1335 and 1345 EST. This site was northwest of the landfill along haul road. Again, the nominal flow rate was 1 lpm and both initial and final rotameter readings were 1.25 lpm.

The Micro-Tip ambient and well VOC readings before, during and after the testing were 0.0 ppm.

- SAMPLE M283

The sampling was started at M28 at 1358 EST with the nominal flow rate of 1 lpm. The test ran for 10 minutes. The rotameter reading was 1.25 lpm during the entire test. The initial and final well VOC concentrations were 0.0 ppm. The ambient VOC concentration was 0.0 ppm.

- SAMPLE M223

The well location was M22 along haul road north of the landfill. The sample was taken between 1424 EST and 1434 EST with a nominal flow rate of 1 lpm. The rotameter reading was 1.25 lpm throughout the run. The Micro-Tip meter was utilized to take ambient and well VOC concentrations. All readings were 0.0 ppm. During the test, operators smelled odors from transfer trailers parked across the street on the other side of haul road.

- SAMPLE M213

Soil gas sample M213 was collected from well M21. This well is located along Claremont Road west of the landfill. The sample was collected from 1447 and 1457 EST. The nominal sampling rate was 1 lpm. The rotameter read 1.25 lpm at the start and at the end of the 10 minute test.

Micro-Tip measurements of ambient and well VOC concentrations were 0.0 ppm.

- SAMPLE M393

M39 (depth 36") was the site for soil sample M393. The sampling was started at 1518 EST with a nominal flow rate of 1 lpm. The rotameter read 1.25 lpm at the start and remained constant during the test. The pump ran 2.5 minutes longer than the planned 10 minutes.

Operators noted the well was only one foot away from a telephone pole. Also, aged garbage such as bike tires, soda cans, etc. were around the well site. The ambient VOC concentration before and after the test was 0.0 ppm. The well VOC concentration before and after the test was 0.0 ppm.

- SAMPLE M163

Sample M163 was taken from well M16, which was located on the west side of Winding Road northeast of the landfill. The sample was taken between 1540 and 1550 EST. The rotameter reading was 1.25 lpm throughout the testing. All readings for both well and ambient VOC's were 0.0 ppm at the beginning and at the end of testing.

The operator noted that the well was three feet away from a telephone pole.

- SAMPLE M133

The sample was collected at well M13. This well is near the intersection of a driveway and Winding Road. It was noticed that a telephone pole was about five feet away from the well.

The pump flow rate was 1 lpm and the rotameter reading was 1.25 lpm during the sampling period. The sampling ran from 1600 to 1610 EST. The initial and final well VOC readings as well as ambient VOC readings were 0.0 ppm.

- SAMPLE M53

Sample M53 was collected at M5, west of Winding Road between 1618 and 1628 EST. The rotameter readings were 1.25 lpm at all times.

Micro-Tip meter was utilized to read the ambient VOC and well VOC concentrations. All readings for ambient air was 0.0 ppm. The readings for well was 1.5 ppm when the meter was plugged into the well and then it dropped to 0.1 ppm when the readings stabilized. The final well VOC reading was around 0.1 ppm.

- SAMPLE M63

This sample was taken from soil gas M6 located east of Winding Road, across the street from well M5. The testing started at 1634 EST and ran for 10 minutes at the nominal flow rate of 1 lpm. The initial and final rotameter reading was 1.25 lpm. Initial and final ambient air VOC readings indicated a 0.0 ppm concentration via the Micro-Tip meter. Well VOC concentrations were also taken before and after the testing. The readings were 2.9 ppm and 0.0 ppm. No adjustments were made to sample volumes.

- SAMPLE M43

The sampling was started at 1652 EST at M4, east of Winding Road, and lasted for 10 minutes as scheduled.

The nominal pump flow rate was 1 lpm and rotameter reading was 1.25 during the test.

Micro-Tip ambient VOC readings were 0.0 ppm before and after the testing. The initial well OVA reading was 0.1 ppm, and the final reading was around 0.7 ppm. No adjustments were made to sample volume.

FEBRUARY 5, 1991

- SAMPLE M23

Started sampling at 958 EST. The nominal sampling rate was 1 lpm, and the initial and final rotameter reading was 1.25 lpm. The sampling well was M2 on the west side of Winding Road. The Micro-Tip readings for both ambient VOC and well VOC was 0.0 ppm.

- SAMPLE MF13

Sample MF13 was collected from well F1 located at Fireman's Training Center. About eight feet away from the well was a fence enclosing a subsurface vault.

The testing started at 1015 EST and ended at 1025 EST as scheduled. The rotameter reading during the testing period was 1.25 lpm.

Micro-Tip readings indicated both ambient VOC and well VOC of 0.0 ppm at the beginning and at the end of testing.

- SAMPLE M913

This sample was collected from the 10 foot well at M9. There are four deep wells at M9 and this one was marked with a blue tape at the end.

The well was evacuated at 1 lpm for 1.5 minutes prior to sampling to remove a full well volume of gas. The amount of time required to evacuate the deep well was calculated from the well depth, the diameter of the well pipe and the pump flow rate.

The rotameter reading was 1.25 lpm at the start and at the end of the 10 minute test.

Micro-Tip measurements before and after sampling indicated 0.0 ppm ambient VOC concentration and well VOC concentration.

- SAMPLE M923

The sample was collected from the 20 foot well also located at M9. The end of the well was marked with green tape. Since this well was two times deeper than the 10 foot well, the pump was run for three minutes to evacuate the well prior to sampling. With the nominal sampling rate of 1 lpm, sample collection occurred between 1100 and 1110 EST.

The rotameter reading during the 10 minute sampling period was 1.25 lpm.

The Micro-Tip readings for both ambient VOC and well VOC indicated 0.0 ppm.

- SAMPLE M933

It was the 30 foot deep well also at M9. The end of the well was marked with red tape. The well was evacuated for 4.5 minutes at 1 lpm prior to sampling started at 1120 EST.

The rotameter reading was 1.25 lpm at the start and at the end of the 10 minute testing. Before the sampling, the well VOC concentration was 6.7 ppm and the well concentration was 0.0 ppm at the end of sampling.

Ambient VOC concentrations were 0.0 ppm as indicated by Micro-Tip readings both at the beginning and at the end of sampling.

- SAMPLE M943

The sampling site was again M9 and the well was 40 foot deep with yellow tape marked at the end of it. The pump was set to run 6 minutes at 1 lpm to evacuate the well prior to sampling and then was set at the same flow rate to collect sample from 1142 to 1152 EST.

The rotameter reading was 1.25 lpm during the 10 minute sampling period. Micro-Tip meter indicated both initial and final ambient as well as VOC concentrations at 0.0 ppm.

- SAMPLE FB3

The sample was collected as a field blank sample at 1135 EST and lasted for 5 minutes. The tubes were connected to an impinger inside the sampler which was set next to the well M9. The pump was not used for this sampling. The ambient VOC reading was 0.0 ppm during sample collection.

- SAMPLE TB3

This was a trip blank sample. The tubes were carried along with the other VOST tubes but were returned unopened to the laboratory for analysis.

APPENDIX D

RESEARCH TRIANGLE LABORATORIES

February 25, 1991

Mr. Ken Skipka
RTP Environmental Associates
400 Post Avenue
Westbury, NY 11590

RE: 10206B

Dear Mr. Skipka:

Enclosed please find the results of analysis for the samples submitted to our laboratory on 02/06/91.

If you have any questions concerning these reports, please contact me at the number listed below.

Sincerely,

RESEARCH TRIANGLE LABORATORIES, INC.

J. Wayne Jones

J. Wayne Jones
Chemist

JWJ/rch

Enclosures

INTRODUCTION

Scope:

To analyze (VOST) Tenax: Tenax/Charcoal cartridge pairs and condensates for the Target Compound List (TCL) and tentatively identify the 10 greatest Non-TCL peaks by Desorb-Purge-Trap Desorb Gas Chromatography Mass Spectrometry (DPTD GC/MS).

Method Summary:

Sample cartridges are analyzed by desorb-purge-trap-desorb gas chromatography/mass spectrometry (DPTD GC/MS). Daily analytical checks are performed on cartridge blanks and reagent water. The daily GC/MS performance test required for this method is described in SW 846, Method 8240. The key Abundance Criteria for 4-Bromofluorobenzene (BFB) must be met before any samples are analyzed. All standards, blanks and samples are spiked with a known amount of BFB to maintain a constant check of system performance.

Sample Desorption:

The DPTD GC/MS procedures are those described in SW 846 Method 5040. The spiked sample cartridge is placed in the thermal desorption apparatus (Nutech 8533) and desorbed in the VOST system by heat to 200 °C for 10 minutes. Consideration is given for individual analysis of cartridges. The desorbed components then pass into the bottom of the water column, are purged from the water and collected on the internal analytical sorbent trap. After the 10-minute desorption period, the analytical trap is dry purged for 2 minutes. The compounds are desorbed from the analytical trap into the GC/MS system.

A 5.0 milliliter aliquot of the condensate sample is placed into the bottom of the water column and purged for 10 minutes. The volatile components are then collected and analyzed as stated above.

Calculations:

All compounds detected that coincide with those of the Target Compound List (TCL) are calculated using equation #1 and response factors derived from in-house standards. All tentatively identified compounds are calculated, using equation #2 and a standard TIC response factor of one (1.0). Compounds quantified by equation #2 are qualified as being estimates.

EQ #1: $$ng = \frac{(Ax)(Is)}{(Ais)(RF)}$$

EQ #2: $$ng = \frac{(Ax)(Is)}{(Ais)(1.0)}$$

where:
- Ax = Response for compound
- Ais = Response for internal standard
- Is = Amount of internal standard in nanograms (ng)
- RF = Response factor

ANALYTICAL CONDITIONS

Equipment:

HP 5970 GC/MS/DS tuned to BFB criteria

GC Conditions:

Temp 1	:	0 °C
Time 1	:	4.0 minutes
Ramp Rate	:	6.0 °C/minutes
Temp 2	:	160 °C
Time 2	:	5.0 minutes

Column:

VOCOL (Supelco),
Length 60 m,
Film thickness 1.5 um,
Internal diameter 0.75 mm,
Construction of Borosilicate glass
with fused silica ends

Mass Spectrometer Conditions:

Run Time	:	25 minutes
Scan Range	:	35 - 260 AMU
Scan Delay	:	1.25 minutes
Ion Source Temp	:	200 °C
Electron Multiplier	:	2000 ± 200 EV
Separator Temp	:	225 °C

Sample Chronicle:

Client	RTP Environmental Assoc
RTL Project ID	10206B
Analysis Type	VOST / Condensate
Date of Collection	02/04 - 05/91
Date Received	02/06/91
Date Authorized	02/07/91
Date Analyzed	02/15 - 22/91
Date Reported	02/25/91

Narrative:

Several notable occurrences were observed during the analysis of the VOST samples.

- Sample M-223 showed limited recovery due to a desorption error. Surrogate and internal standard recoveries fell below RTL's acceptable limits. The amounts reported are estimates.

- Sample M-43 experienced a data acquisition problem at 19.29 minutes. Three RTL target compounds were expected after this time (Bromoform, 1,1,2,2-Tetrachloroethane, and RTL's third surrogate: BFB). No difficulties were observed in the sample recovery or analysis. Generally, the RTP project did not show any quantitatable amounts of the two targets in prior samples. All other recoveries of internal standards met QC measures.

- Data base library searches: Unknown compound is used only in cases where the TIC searched resulted with a report stating "no data base entries retrieved". When possible an identification is made to similar type compounds. Limited ID can occur due to coeluting compounds usually more than two and or lower abundance. The later offers few ions for the library search.

RTL remains available to assist with questions concerning these reports or sampling procedures.

Footnotes:

[a]: The value listed is greater than RTL's established calibration range (20 to 1000 ng). However experience has shown that extrapolated results are considered a very good estimate of actual amounts.

When splits are installed, the ratio of the split extends RTL's calibration or quantitation range.

- Split 10:1
- Calibration Range: 200 to 10000 ng
- Maximum column load per compound: 100000 ng

REFERENCES

Federal Register, 44, 69464, December 3, 1979

Protocol for the Collection and Analysis of Volatile POHCs Using VOST, EPA-600/8-84-007 available from ORD Publications, Center for Environmental Research Information, Cincinnati, Ohio 45268

NIOSH Manual of Analytical Methods, HEW Publication No. (NIOSH) 75-121, available from Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402

Supelco Bulletin 769, "Determination of Organic Vapors in the Industrial Atmosphere", 1977: Supelco, Inc., Bellefonte, PA 16823

Test Methods for Evaluation of Solid Waste, SW 846 Methods 0030, 8240, 5040, 5030

Compendium of Methods for the Determination of Toxic Organic Compounds in Air, PB87-168688, Battelle Columbus Laboratories, Columbus, Ohio

SAMPLE RESULTS

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-4	Analyzed:	02/19/91
File ID:	T7535	Reported:	02/25/91
Sample ID:	A13	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	68
Toluene-d_8	61
4-Bromofluorobenzene	83

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	2400	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	5100	
75-09-2	Methylene Chloride	1900	
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	6100	
56-23-5	Carbon Tetrachloride	530	
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene	6400	
79-01-6	Trichloroethene	3400	
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene	19000 *	
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	9400	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene	3600	
1330-20-7	Xylene (total)	23000 *	
100-42-5	Styrene	570	
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000 Split: 10:1

*: See Footnotes BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-4	Analyzed:	02/19/91
File ID:	T7535	Reported:	02/25/91
Sample ID:	A13	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
2-Methylbutane	8200	2.67	72
3-Methylpentane	6700	6.24	86
Unknown PNA	3500	8.98	-
2,6,7-Trimethyldecane	2300	19.52	184
Decane & Propylbenzene Coeluting	4300	20.43	142,120
Ethylmethylbenzene Isomer	14000	20.70	120
Ethylmethylbenzene Isomer	3500	21.36	120
Ethylmethylbenzene Isomer	8700	21.67	120
Ethylmethylbenzene Isomer	2500	22.72	120
Undecane	5500	23.28	156

Split: 10:1

Comments:

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-1	Analyzed:	02/18/91
File ID:	T7527	Reported:	02/25/91
Sample ID:	A33	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	78
Toluene-d_8	87
4-Bromofluorobenzene	78

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane	83	
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	420	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	1300 *	
75-09-2	Methylene Chloride	88	
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	370	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene	200	
79-01-6	Trichloroethene	76	
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene	1100 *	
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	280	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene	190	
1330-20-7	Xylene (total)	1200 *	
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 BQL: Below Quantitation Limit

*: See Footnotes

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-3	Analyzed:	02/19/91
File ID:	T7533	Reported:	02/25/91
Sample ID:	A23	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	*
Toluene-d_8	*
4-Bromofluorobenzene	*

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		*
75-01-4	Vinyl Chloride		*
74-83-9	Bromomethane		*
75-00-3	Chloroethane		*
75-69-4	Trichlorofluoromethane		*
75-35-4	1,1-Dichloroethene		*
67-64-1	Acetone		*
75-15-0	Carbon Disulfide		*
75-09-2	Methylene Chloride		*
540-59-0	1,2-Dichloroethene		*
75-34-3	1,1-Dichloroethane		*
78-93-3	2-Butanone		*
67-66-3	Chloroform		*
107-06-2	1,2-Dichloroethane		*
71-55-6	1,1,1-Trichloroethane		*
56-23-5	Carbon Tetrachloride		*
108-05-4	Vinyl Acetate		*
71-43-2	Benzene		*
79-01-6	Trichloroethene		*
78-87-5	1,2-Dichloropropane		*
75-27-4	Bromodichloromethane		*
10061-01-5	*cis*-1,3-Dichloropropene		*
10061-02-6	*trans*-1,3-Dichloropropene		*
79-00-5	1,1,2-Trichloroethane		*
124-48-1	Dibromochloromethane		*
75-25-2	Bromoform		*
108-10-1	4-Methyl-2-pentanone		*
110-75-8	2-Chloroethyl Vinyl Ether		*
108-88-3	Toluene		*
591-78-6	2-Hexanone		*
127-18-4	Tetrachloroethene		*
108-90-7	Chlorobenzene		*
100-41-4	Ethylbenzene		*
1330-20-7	Xylene (total)		*
100-42-5	Styrene		*
79-34-5	1,1,2,2-Tetrachloroethane		*

Quantitation Range (ng): 200 - 10000 Split: 10:1

BQL: Below Quantitation Limit

* Mass spec shutdown due to high CO_2 at 1.54 minutes. No information available.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-3	Analyzed:	02/19/91
File ID:	T7533	Reported:	02/25/91
Sample ID:	A23	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
CO_2	-	1.54	44

Comments:

Mass spec shutdown due to high CO_2 at 1.54 minutes. No information available.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-1	Analyzed:	02/18/91
File ID:	T7527	Reported:	02/25/91
Sample ID:	A33	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
2-Methylbutane	1100	2.73	72
3-Methylpentane	440	6.26	86
Methylcyclopentane	190	7.81	84
3-Methylheptane	140	13.11	114
Decane & Propylbenzene Coeluting	160	20.48	142,120
Ethylmethylbenzene Isomer	660	20.76	120
Ethylmethylbenzene Isomer	160	21.42	120
1,7,7-Trimethylbicyclo[2.2.1]hept-2-ene	150	22.24	136
Methylpropylbenzene Isomer	240	23.31	134

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-2	Analyzed:	02/18/91
File ID:	T7528	Reported:	02/25/91
Sample ID:	A43	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	85
Toluene-d_8	59
4-Bromofluorobenzene	72

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane	4500	
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	2400	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	2000	
75-09-2	Methylene Chloride	1900	
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	6500	
56-23-5	Carbon Tetrachloride	520	
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene	5500	
79-01-6	Trichloroethene	3500	
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene	14000 *	
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	10000	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene	3400	
1330-20-7	Xylene (total)	20000 *	
100-42-5	Styrene	520	
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000 **Split: 10:1**

***: See Footnotes** **BQL: Below Quantitation Limit**

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-2	Analyzed:	02/18/91
File ID:	T7528	Reported:	02/25/91
Sample ID:	A43	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
CO_2	8900	1.72	44
2-Methylbutane	8300	2.65	72
3-Methylpentane	6100	6.21	86
2,6,7-Trimethyldecane	3300	19.57	184
Decane & Propylbenzene Coeluting	3800	20.46	142,120
Ethylmethylbenzene Isomer	7100	20.74	120
Ethylmethylbenzene Isomer	4200	21.39	120
Ethylmethylbenzene Isomer	6300	21.70	120
Benzaldehyde	2900	21.91	106
Methylpropylbenzene Isomer	5700	23.30	134

Split: 10:1

Comments:

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-8	Analyzed:	02/18/91
File ID:	T7526	Reported:	02/25/91
Sample ID:	A13	Description:	Condensate

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	80
Toluene-d_8	90
4-Bromofluorobenzene	78

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	21	
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride	69	
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-8	Analyzed:	02/18/91
File ID:	T7526	Reported:	02/25/91
Sample ID:	A13	Description:	Condensate

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
CO_2	130	1.73	44

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-7	Analyzed:	02/18/91
File ID:	T7525	Reported:	02/25/91
Sample ID:	A23	Description:	Condensate

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	85
Toluene-d_8	91
4-Bromofluorobenzene	79

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride	69	
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 **BQL: Below Quantitation Limit**

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-7	Analyzed:	02/18/91
File ID:	T7525	Reported:	02/25/91
Sample ID:	A23	Description:	Condensate

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
CO_2	140	1.73	44

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-5	Analyzed:	02/15/91
File ID:	T519	Reported:	02/25/91
Sample ID:	A-33	Description:	Condensate

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	88
Toluene-d_8	91
4-Bromofluorobenzene	85

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-5	Analyzed:	02/15/91
File ID:	T519	Reported:	02/25/91
Sample ID:	A-33	Description:	Condensate

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
CO_2	170	1.71	44

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-6	Analyzed:	02/15/91
File ID:	T7520	Reported:	02/25/91
Sample ID:	A-43	Description:	Condensate

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	90
Toluene-d_8	95
4-Bromofluorobenzene	91

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 **BQL: Below Quantitation Limit**

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-6	Analyzed:	02/15/91
File ID:	T7520	Reported:	02/25/91
Sample ID:	A-43	Description:	Condensate

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
CO_2	210	1.71	44

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-17	Analyzed:	02/20/91
File ID:	T7547	Reported:	02/25/91
Sample ID:	M23	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	74
Toluene-d_8	81
4-Bromofluorobenzene	82

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	1400	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000 Split: 10:1

BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-17	Analyzed:	02/20/91
File ID:	T7547	Reported:	02/25/91
Sample ID:	M23	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Unknown	30	2.60	-
Unknown	26	6.09	-
Unknown Hydrocarbon	23	21.39	-
Unknown	29	24.67	-

Split: 10:1

Comments:

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-19	Analyzed:	02/22/91
File ID:	T7575	Reported:	02/25/91
Sample ID:	M-43	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	88
Toluene-d_8	93
4-Bromofluorobenzene	*

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	340	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform	*	
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane	*	

Quantitation Range (ng): 200 - 10000 Split: 10:1

*: See Narrative BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-19	Analyzed:	02/22/91
File ID:	T7575	Reported:	02/25/91
Sample ID:	M-43	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
None Detected	-	-	-

Split: 10:1

Comments:

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-25	Analyzed:	02/22/91
File ID:	T7576	Reported:	02/25/91
Sample ID:	M-53	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	81
Toluene-d_8	90
4-Bromofluorobenzene	82

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	2600	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000 Split: 10:1

BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-25	Analyzed:	02/22/91
File ID:	T7576	Reported:	02/25/91
Sample ID:	M-53	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
None Detected	-	-	-

Split: 10:1

Comments:

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-22	Analyzed:	02/22/91
File ID:	T7577	Reported:	02/25/91
Sample ID:	M-63	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	79
Toluene-d_8	83
4-Bromofluorobenzene	78

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	950	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000 **Split: 10:1**

BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-22	Analyzed:	02/22/91
File ID:	T7577	Reported:	02/25/91
Sample ID:	M-63	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Unknown	42	23.25	-

Split: 10:1

Comments:

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-20	Analyzed:	02/20/91
File ID:	T7548	Reported:	02/25/91
Sample ID:	M133	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	82
Toluene-d_8	85
4-Bromofluorobenzene	70

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	940	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000 Split: 10:1

BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-20	Analyzed:	02/20/91
File ID:	T7548	Reported:	02/25/91
Sample ID:	M133	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
None Detected	-	-	-

Split: 10:1

Comments:

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-23	Analyzed:	02/20/91
File ID:	T7550	Reported:	02/25/91
Sample ID:	M163	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	83
Toluene-d_8	80
4-Bromofluorobenzene	75

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	1800	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000 Split: 10:1

BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-23	Analyzed:	02/20/91
File ID:	T7550	Reported:	02/25/91
Sample ID:	M163	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Unknown	35	3.14	-
Unknown	38	20.71	-
Unknown	20	21.70	-
Unknown	21	22.19	-

Split: 10:1

Comments:

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-21	Analyzed:	02/20/91
File ID:	T7549	Reported:	02/25/91
Sample ID:	M213	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	87
Toluene-d_8	86
4-Bromofluorobenzene	80

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	2100	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000 Split: 10:1

BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-21	Analyzed:	02/20/91
File ID:	T7549	Reported:	02/25/91
Sample ID:	M213	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
None Detected	-	-	-

Split: 10:1

Comments:

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-24	Analyzed:	02/22/91
File ID:	T7569	Reported:	02/25/91
Sample ID:	M-223	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	*
Toluene-d_8	*
4-Bromofluorobenzene	*

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	430 *	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene	610 *	
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)	230 *	
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): * BQL: Below Quantitation Limit

*: See Narrative

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-24	Analyzed:	02/22/91
File ID:	T7569	Reported:	02/25/91
Sample ID:	M-223	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Unknown	100 *	13.98	-
Unknown	52 *	14.54	-
Unknown	110 *	14.63	-
Unknown	110 *	20.42	-
Unknown	110 *	20.74	-
Unknown	39 *	21.63	-
Unknown	47 *	21.66	-
D-limonene	330 *	22.21	136
Unknown	77 *	23.24	-
Unknown	35 *	23.80	-

Comments:

***: See Narrative**

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-28	Analyzed:	02/22/91
File ID:	T7571	Reported:	02/25/91
Sample ID:	M-283	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	84
Toluene-d_8	94
4-Bromofluorobenzene	86

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	2700	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000 Split: 10:1

BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-28	Analyzed:	02/22/91
File ID:	T7571	Reported:	02/25/91
Sample ID:	M-283	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
None Detected	-	-	-

Split: 10:1

Comments:

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-26	Analyzed:	02/22/91
File ID:	T7570	Reported:	02/25/91
Sample ID:	M-313	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	87
Toluene-d_8	89
4-Bromofluorobenzene	78

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	1800	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000 Split: 10:1

BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-26	Analyzed:	02/22/91
File ID:	T7570	Reported:	02/25/91
Sample ID:	M-313	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
None Detected			

Split: 10:1

Comments:

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-16	Analyzed:	02/22/91
File ID:	T7579	Reported:	02/25/91
Sample ID:	M-343	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	94
Toluene-d_8	99
4-Bromofluorobenzene	82

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	1700	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone	610	
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000 **Split: 10:1**

BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-16	Analyzed:	02/22/91
File ID:	T7579	Reported:	02/25/91
Sample ID:	M-343	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
1-Bromo-2-methylbutane	56	9.36	150
Unknown Hydrocarbon	16	21.93	N/A

Split: 10:1

Comments:

N/A: Not Available

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-27	Analyzed:	02/22/91
File ID:	T7574	Reported:	02/25/91
Sample ID:	M-373	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	89
Toluene-d_8	76
4-Bromofluorobenzene	78

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	340	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000 Split: 10:1

BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-27	Analyzed:	02/22/91
File ID:	T7574	Reported:	02/25/91
Sample ID:	M-373	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Naphthalene	25	22.93	128
Unknown PNA	46	23.03	-

Split: 10:1

Comments:

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-18	Analyzed:	02/22/91
File ID:	T7573	Reported:	02/25/91
Sample ID:	M-393	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	86
Toluene-d_8	89
4-Bromofluorobenzene	80

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	4200	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone	410	
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000 Split: 10:1

BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-18	Analyzed:	02/22/91
File ID:	T7573	Reported:	02/25/91
Sample ID:	M-393	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Unknown	20	10.69	-
Unknown	19	19.58	-
Unknown	22	20.43	-
Ethylmethylbenzene Isomer	40	20.69	120
Ethylmethylbenzene Isomer	19	21.38	120
Trimethylbenzene Isomer	49	21.65	120
Unknown	23	22.44	-
Unknown	19	22.72	-
Unknown	56	23.26	-

Split: 10:1

Comments:

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-9	Analyzed:	02/22/91
File ID:	T7572	Reported:	02/25/91
Sample ID:	MF-13	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	84
Toluene-d_8	90
4-Bromofluorobenzene	84

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	3100	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000 **Split: 10:1**

BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-9	Analyzed:	02/22/91
File ID:	T7572	Reported:	02/25/91
Sample ID:	MF-13	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Unknown	22	21.39	-
Unknown	14	22.58	-

Split: 10:1

Comments:

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-13	Analyzed:	02/19/91
File ID:	T7537	Reported:	02/25/91
Sample ID:	M913	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	79
Toluene-d_8	93
4-Bromofluorobenzene	83

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	250	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	3600	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	540	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000

Split: 10:1

BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-13	Analyzed:	02/19/91
File ID:	T7537	Reported:	02/25/91
Sample ID:	M913	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
1,1,2-Trichloro-1,2,2-trifluoroethane	790	4.03	186

Split: 10:1

Comments:

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-12	Analyzed:	02/19/91
File ID:	T7536	Reported:	02/25/91
Sample ID:	M923	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	80
Toluene-d_8	91
4-Bromofluorobenzene	78

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	290	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	4200	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	240	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	1300	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000 **Split: 10:1**

BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-12	Analyzed:	02/19/91
File ID:	T7536	Reported:	02/25/91
Sample ID:	M923	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
1,1,2-Trichloro-1,2,2-trifluoroethane	1800	4.06	186

Split: 10:1

Comments:

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-14	Analyzed:	02/22/91
File ID:	T7578	Reported:	02/25/91
Sample ID:	M-933	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	95
Toluene-d_8	98
4-Bromofluorobenzene	87

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	390	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	2300	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone	6800	
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	330	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	3200	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000 Split: 10:1

BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-14	Analyzed:	02/22/91
File ID:	T7578	Reported:	02/25/91
Sample ID:	M-933	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
1,2-Dichloro-1,1,2-trifluoroethane	130	3.39	152
1,1,2-Trichloro-1,2,2-trifluoroethane	2600	4.02	186
Unknown Hydrocarbon	40	9.80	N/A
Ethylcyclopropane	480	19.80	70
Azulene	17	23.08	128

Split: 10:1

Comments:

N/A: Not Available

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-15	Analyzed:	02/19/91
File ID:	T7538	Reported:	02/25/91
Sample ID:	M943	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	80
Toluene-d_8	91
4-Bromofluorobenzene	84

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane	1400	
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	1200	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane	940	
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	1700	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene	17000 *	
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Range (ng): 200 - 10000 Split: 10:1

*: See Footnotes BQL: Below Quantitation Limit

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-15	Analyzed:	02/19/91
File ID:	T7538	Reported:	02/25/91
Sample ID:	M943	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
Unknown Hydrocarbon	140	3.50	-
1,1,2-Trichloro-1,2,2-trifluoroethane	12000	4.08	186
Unknown PNA	61	15.90	-

Split: 10:1

Comments:

The amounts shown are calculated for the original cartridge before splitting.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-11	Analyzed:	02/20/91
File ID:	T7546	Reported:	02/25/91
Sample ID:	FB3	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	79
Toluene-d_8	85
4-Bromofluorobenzene	78

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	57	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-11	Analyzed:	02/20/91
File ID:	T7546	Reported:	02/25/91
Sample ID:	FB3	Description:	Condensate

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
CO_2	3000	1.59	44

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-10	Analyzed:	02/20/91
File ID:	T7545	Reported:	02/25/91
Sample ID:	TB	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	83
Toluene-d_8	87
4-Bromofluorobenzene	81

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

No Targets Detected

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	RTP Environmental Associates	Received:	02/06/91
RTL ID:	10206B-10	Analyzed:	02/20/91
File ID:	T7545	Reported:	02/25/91
Sample ID:	TB	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Retention Time (minutes)	Molecular Weight (AMU)
CO_2	1900	1.62	44

Comments:

Name: Kenneth Skipka
Affiliation: RTP Environmental Associates
Phone: (516) 333-4526
Address: 400 Post Ave. #302, Westbury NY 11590
Client/Job No: Town of Oyster Bay (LKBCBL)
Job Name: Air Quality Survey Location: Oyster Bay landfield

CHAIN OF CUSTODY RECORD

Sample No.	Lab I.D. No.	Date	Time	Matrix	No. of Containers	Ambient OVA Reading Initial	Ambient OVA Reading Final
A13	A13 A	Feb 4, 91 Feb 5, 91	1119 EST 1053 EST	Air	1	0.0 PPm	0.0 PPm
A13	A13 B	Feb 4, 91 Feb 5, 91	1119 EST 1053 EST	Air	1	0.0 PPm	0.0 PPm
A13	A13 C	Feb 4, 91 Feb 5, 91	1119 EST 1053 EST	Water	1	0.0 PPm	0.0 PPm
A23	A23 A	Feb 4-5 1991	1100 EST 1035 EST	Air	1	0.0 PPm	0.0 PPm
A23	A23 B	Feb 4-5 1991	1100 EST 1035 EST	Air	1	0.0 PPm	0.0 PPm
A23	A23 C	Feb 4-5 1991	1100 EST 1035 EST	Water	1	0.0 PPm	0.0 PPm
A33	A33 A	Feb 4-5 1991	1040 EST	Air	1	0.0 PPm	0.0 PPm
A33	A33 B	Feb 4-5 1991	1040 EST 1100 EST	Air	1	0.0 PPm	0.0 PPm
A33	A33 C	Feb 4-5 1991	1040 EST 1100 EST	Water	1	0.0 PPm	0.0 PPm
A43	A43 A	Feb 4-5 1991	1026 EST 1026 EST	Air	1	0.0 PPm	0.0 PPm

Comments: Page 1 of 2

Relinquished by: J. Wang Date: Feb. 5, 91 Shipment Method: Federal Express
Time: 4:30 P Airbill No.:

Received by: W Stallings Date: 2-6-91 Relinquished by: Date:
Time: 10:30 Am Time:

Received by: Date: Relinquished by: Date:
Time: Time:

Final Disposition of Samples:

Received by: Date: Time:

CHAIN OF CUSTODY FORM

RTP ENVIRONMENTAL ASSOCIATES INC.

Name: Kenneth Skipku

Affiliation: RTP Environmental Associates

Phone: (516) 333-4526

Address: 400 Post Ave. #302, Westbury, NY 11590

Client/Job No: Town of Oyster Bay (LKBCBL)

Job Name: Air Quality Survey Location: Oyster Bay Landfill

CHAIN OF CUSTODY RECORD

Sample No.	Lab I.D. No.	Date	Time	Matrix	No. of Containers	Ambient OVA Reading Initial	Final
A43	A43 B	Feb 4-5 1991	1026 EST 1026 EST	Air	1	0.0 ppm	0.0 ppm
A43	A43 C	Feb 4-5 1991	1026 EST 1026 EST	Water	1	0.0 ppm	0.0 ppm

Comments: Page 2 of 2

Relinquished by: J. Wang Date: Feb 5 '91 Shipment Method: Federal Express
Time: 4:30 pm Airbill No.:

Received by: W. Stallings Date: 2-6-91 Relinquished by: ______ Date: ______
Time: 10:30 AM Time: ______

Received by: ______ Date: ______ Relinquished by: ______ Date: ______
Time: ______ Time: ______

Final Disposition of Samples: ______

Received by: ______ Date: ______ Time: ______

CHAIN OF CUSTODY FORM

RTP ENVIRONMENTAL ASSOCIATES INC.

Name: Kenneth Skipka
Affiliation: RTP Environmental Associates
Phone: (516) 333-4526
Address: 400 Post Ave. #302, Westbury NY 11590
Client/Job No: Town of Oyster Bay (LKBOBL)
Job Name: Air Quality Survey Location: Oyster Bay landfield

CHAIN OF CUSTODY RECORD

Sample No.	Lab I.D. No.	Date	Time	Matrix	No. of Containers	Well OVA Reading Initial	Final
M23	M23A	Feb 5, 91	958 EST	Soil Gas	1	0.0 (PPm)	0.0 (PPm)
M23	M23B	Feb. 5, 91	958 EST	Soil Gas	1		
M43	M43A	Feb 4, 91	1652 EST	Soil Gas	1	0.0→0.1	0.5→0.9
M43	M43B	Feb. 4, 91	1652 EST	Soil Gas	1		
M53	M53A	Feb. 4, 91	1618 EST	Soil Gas	1	1.5 ↔ 0.1	0.2 ↔ 0.1
M53	M53B	Feb 4, 91	1618 EST	Soil Gas	1		
M63	M63A	Feb 4, 91	1634 EST	Soil Gas	1	2.9	0.0
M63	M63B	Feb. 4, 91	1634 EST	Soil Gas	1		
M133	M133A	Feb. 4, 91	1600 EST	Soil Gas	1	0.0	0.0
M133	M133B	Feb. 4, 91	1600 EST	Soil Gas	1		

Comments: Page 1 of 4

Relinquished by: J. Wang Date: Feb. 5, 91 Shipment Method: Federal Express
Time: 4:30 pm Airbill No.:

Received by: W. Stallings Date: 2-6-91 Relinquished by: Date:
Time: 10:30 AM Time:

Received by: Date: Relinquished by: Date:
Time: Time:

Final Disposition of Samples:

Received by: Date: Time:

CHAIN OF CUSTODY FORM

RTP ENVIRONMENTAL ASSOCIATES INC.

Name: Kenneth Skipka
Affiliation: RTP Environmental Associates
Phone: (516) 333-4526
Address: 400 Post Ave. #302, Westbury NY 11590
Client/Job No: Town of Oyster Bay (LKBOBL)
Job Name: Air Quality Survey Location: Oyster Bay Landfill

CHAIN OF CUSTODY RECORD

Sample No.	Lab I.D. No.	Date	Time	Matrix	No. of Containers	Well OVA Reading Initial	Well OVA Reading Final
M163	M163A	Feb 4 91	1540 EST	Soil Gas	1	0.0	0.0
M163	M163B	:	:	:	.		
M213	M213A	Feb 4 91	1447 EST	Soil Gas	1	0.0	0.0
M213	M213B	:	:	:	:	:	:
M223	M223A	Feb 4 91	1424 EST	Soil Gas	1	0.0	0.0
M223	M223B	:	:	:	.	.	.
M283	M283A	Feb. 4 91	1358 EST	Soil Gas	1	0.0	0.0
M283	M283B	:	:	:	:		
M313	M313A	Feb 4 91	1335 EST	Soil Gas	1	0.0	0.0
M313	M313B	Feb. 4. 91	1335 EST	:	:		

Comments: Page 2 of 4

Relinquished by: J. Wang Date: Feb. 5, 91 Shipment Method: Federal Express
Time: 4:30 PM Airbill No.:

Received by: W. Dolling Date: 2-6-91 Relinquished by: Date:
Time: 10:30 AM Time:

Received by: Date: Relinquished by: Date:
Time: Time:

Final Disposition of Samples:

Received by: Date: Time:

CHAIN OF CUSTODY FORM

RTP ENVIRONMENTAL ASSOCIATES INC.

Name: Kenneth Skipka
Affiliation: RTP Environmental Associates
Phone: (516) 333-4526
Address: 400 Post Ave. #302, Westbury NY 11590
Client/Job No: Town of Oyster Bay (LKBOBL)
Job Name: Air Quality Survey Location: Oyster Bay Landfill

CHAIN OF CUSTODY RECORD

Sample No.	Lab I.D. No.	Date	Time	Matrix	No. of Containers	Well OVA Reading Initial	Well OVA Reading Final
M343	M343A	Feb.4.91	1305 EST	Soil Gas	1	20.9 (ppm)	0.0 (ppm)
M343	M343B	Feb.4.91	1305 EST	:	:		
M373	M373A	Feb.4.91	1231 EST	Soil Gas	1	0.0→1.9	0.0
M373	M373B	:	:		:		
M393	M393A	Feb.4.91	1515 EST	Soil Gas	1	0.0	0.0
M393	M393B	:	:	:	:		
MF13	MF13A	Feb.5.91	1015 EST	Soil Gas	1	0.0	0.0
MF13	MF13B	:	:	:	:		
M913	M913A	Feb.5.91	1045 EST	Soil Gas	1	0.0	0.0
M913	M913B	Feb.5.91	1045 EST	Soil Gas	:		

Comments: Page 3 of 4

Relinquished by: J. Wung Date: Feb. 5, 91 Shipment Method: Federal Express
Time: 4:30 PM Airbill No.:

Received by: W. Stallings Date: 2-6-91 Relinquished by: Date:
Time: 10:30 AM Time:

Received by: Date: Relinquished by: Date:
Time: Time:

Final Disposition of Samples:

Received by: Date: Time:

CHAIN OF CUSTODY FORM

RTP ENVIRONMENTAL ASSOCIATES INC.

1991 ANNUAL REPORT

APPENDIX D
LANDFILL GAS THERMAL OXIDIZER
EMISSIONS TESTS
(FOURTH QUARTER REPORTS)

JUNE 1992

LANDFILL GAS THERMAL OXIDIZER EMISSION TESTS
FEBRUARY 1991
Old Bethpage Landfill
Town of Oyster Bay

APCC AIR POLLUTION CHARACTERIZATION AND CONTROL, LTD.

60 Industrial Park Road West, Tolland, CT 06084 (203) 871-8557

AIR POLLUTION
CHARACTERIZATION
AND CONTROL, LTD.

LANDFILL GAS THERMAL OXIDIZER EMISSION TESTS
FEBRUARY 1991
Old Bethpage Landfill
Town of Oyster Bay

Prepared By:

Thomas D. Russell
Principal Engineer

March 1991

APCC Project 90003

60 Industrial Park Road West, Tolland, CT 06084 (203) 871-8557

TABLE OF CONTENTS

Section No.	Title	Page No.
1.0	INTRODUCTION	1
2.0	RESULTS AND DISCUSSION	3
2.1	VOC Emission Measurements	3
2.2	Continuous Emission Monitoring	5
2.3	Combustion Efficiency	6
3.0	PROCESS AND OPERATIONS	8
3.1	Landfill Gas Control Systems	8
3.2	Landfill Gas Control Systems Operations	10
4.0	SAMPLING AND ANALYTICAL METHODS	12
4.1	VOC Emission Measurements	12
4.2	Continuous Emission Monitoring of THC, NOx, SO_2, O_2, CO_2 and CO	16
4.3	Combustion Efficiency	19
5.0	QUALITY ASSURANCE	20
5.1	Sampling Quality Assurance	20
5.1.1	CEM System	20
5.1.2	VOST Method	21
5.2	Analytical Quality Control	21
5.2.1	VOST Method	22

APPENDIX

A	Volatile Organic Compound Emissions Data Summaries
B	Volatile Organic Compound Emissions Field Data
C	Volatile Organic Compound Laboratory Data
D	Continuous Emission Monitoring Field Data
E	Flow Measurement Field Data
F	Landfill Gas Control System Data
G	Calibrations and Gas Certifications
H	Chain of Custody

LIST OF TABLES

Table No.	Title	Page No.
2-1	VOST Summary	4
2-2	CEM Summary	7
3-1	Summary of Operational Data	11

LIST OF FIGURES

Figure No.	Title	Page No.
3-1	Gas Control System Schematic	9
4-1	Sampling Port and Traverse Point Locations	14
4-2	VOST Schematic	15
4-3	CEM Schematic	18

1.0 INTRODUCTION

Air Pollution Characterization and Control, Ltd. (APCC) was contracted by Lockwood, Kessler & Bartlett, Inc. (LKB), consultant to The Town of Oyster Bay, to perform a series of quarterly emission measurement programs to characterize the air emissions of the Landfill Gas (LFG) Thermal Oxidizer at the Old Bethpage landfill in the Town of Oyster Bay, New York. The Town of Oyster Bay was mandated by the New York State Department of Law to conduct air emission testing on the oxidizer stack, and to repeat the testing quarterly for a period of one year. The oxidizer is part of an odor control system used to destroy combustible gases collected from wells at the perimeter of the landfill.

The forth quarterly emission measurement program was performed on 20 February 1991 by Tom Russell, Don Smith, and Peter Day of APCC and consisted of continuous emission monitoring and replicate samples collected and analyzed for 48 volatile organic compounds (VOC). Continuous emission monitoring was conducted for the following six parameters :

- Sulfur dioxide (SO_2)
- Nitric oxides (NO_x)
- Carbon monoxide (CO)
- Total hydrocarbons (THC)
- Carbon Dioxide (CO_2)
- Oxygen (O_2)

Concurrent with the continuous measurements, replicate samples were collected and analyzed for the 48 volatile and semi-volatile organic compounds listed below.

Chloromethane	Trichloroethane	1,3-Dichloropropane
Bromomethane	Dibromochloromethane	(Cis) 1,3-Dichloropropene
Vinyl Chloride	1,1,2-Trichloroethane	Trans 1,3-Dichloropropene
Chloroethane	1,1,1-Trichloroethane	1,1-Dichloroethene
Methylene chloride	Carbon tetrachloride	1,1-Dichloroethane
Bromoform	Chloroform	(trans) 1,2-Dichloroethene
Tetrachloroethene	Vinyl acetate	1,2-Dichloroethane
Iodomethane	1,2-Dichloropropane	Bromodichloromethane
Benzene	Chlorobenzene	1,1,2,2-Tetrachloroethane
Toluene	1,2-Dichlorobenzene	Dichlorodifluoromethane
Xylenes	1,3-Dichlorobenzene	Trichlorofluoromethane
Ethyl Benzene	1,4-Dichlorobenzene	2-Chloroethyl vinyl ether
Styrene	1,1,2-Trichloro-1,2,2-Trifluoroethane	Carbon disulfide
Thiophene		3-Methylthiophene
Acetone	2-Butanone	2-Hexanone

Acrolein	Acrylonitrile Benzaldehyde	4-Methyl-2-Pentanone

Mr. Raymond Wegener of LKB and Mr. Kenneth Skipka of RTP Environmental Associates Inc. (RTP) were present during the test program. RTP was retained by LKB to perform Quality Assurance for the test program. Mr. Michael Rogers of the Town of Oyster Bay supervised the operation of the Landfill Gas Control System. Mr. William Bonelli recorded all data from the operation of the thermal oxidizer into the operation log and provided APCC with copies of the pertinent information. No regulatory personnel were present.

Section 2 of this report presents a discussion of the results of the test program. Section 3 presents a description of the gas control system and discusses operations during the test program. A description of all sampling and analytical methods is presented in Section 4 and Section 5 presents the APCC Quality Assurance Plan for this program.

2.0 RESULTS AND DISCUSSION

A summary of Volatile Organic Compound emission measurements performed utilizing the Volatile Organic Sampling Train (VOST) is presented in Table 2-1. A complete breakdown of emission data for each sample run is presented in Appendix A. A summary of continuous emission monitoring measurements for THC, SO_2, NO_x, CO, O_2 and CO_2 is presented in Table 2-2. Sampling was performed over an 11-hour period on 20 February 1991.

2.1 VOC Emission Measurements

A series of 11 VOST runs was performed at the exhaust of the LFG Thermal Oxidizer. Four runs plus a condensate sample constitute a single test. Three tests were performed (run # 8 is omitted). Table 2-1 presents test times, stack gas volumetric flowrates, emission concentrations and emission rates for the three tests performed as well as the average.

During test run # 8, power to the site was momentarily interrupted causing the oxidizer unit to trip. Due to the trip, run #8 for VOC and CEM was aborted and with the concurrence of Mr. Wegener and Mr. Skipka, the run was not repeated. After the unit was back on line and stabilized, run 9 was performed.

VOST samples were analyzed for the Target Compound List (TCL) presented in Table 2-1.

In general, emissions of most compounds sought were Below the Quantitation Limits (BQL) of 20 nanograms per sample. This calculates to Lower Limit of Detection (LLD) for average emission concentrations of 1.27 ng/l and an average emission rate of 1.10E-05 pounds per hour or 1.39E-06 grams per second (for this source). The Laboratory Manager, Mr. Thomas Conally has informed APCC that the lower detection limit for acrolein and acrylonitrile are 200ng. In each case where there was no detection, the emission results are calculated using the minimum detectable limits. It must be noted that the actual emission of these compounds are probably well below the rate shown. Emissions of some compounds were, however detected.

Carbon Disulfide was detected in all tests except V5 and V6. V10 was measured as 27,000 nanograms, however this was well above the calibration range of 20-1000 ng and above the maximum loading capacity for the instrument. Therefore, the value 27000 ng is considered an estimate. Since the level of V10 is above the expected norm for this source, the possibility exists that the sample was contaminated in the laboratory or during transit. Due to this possibility, the value of V10 will be considered an outlier for calculations. The other runs containing Carbon Disulfide ranged from 74 ng for V2 to 400 ng for V12. These equate to a range of 7.57E-06 lbs/hr for V2 to 4.59E-05 lbs/hr for V12. V10 calculates to be 3.10E-03 lbs/hr. Field blank 1 contained 29 ng of Carbon Disulfide but none was detected in any of the other field blanks, trip blanks, or condensate samples. The detection of the smaller quantities indicates the possibility of actual emissions, however run V10 appears to be possible contamination during laboratory procedures.

TABLE 2-1
VOST SUMMARY
OLD BETHPAGE LANDFILL GAS
THERMAL OXIDIZER
FEBRUARY 20, 1991

TEST NUMBER RUN NUMBERS TEST TIME FLOWRATE (dscfm)	A 1,2,3,4 0816-1155 2173		B 5,6,7 1230-1519 2623		C 9,10,11,12 1538-1902 2446		AVERAGE 1 thru 12 0816-1902 2414	
Target Compound	Concentration (ng/l)	Emissions (lbs/hr)	Concentration (ng/l)	Emissions (lbs/hr)	Concentration (ng/l)	Emissions (lbs/hr)	Concentration (ng/l)	Emissions (lbs/hr)
Chloromethane	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Vinyl Chloride	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Bromomethane	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Chloroethane	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
1,1-Dichloroethene	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Acetone	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Carbon Disulfide	7.78	6.32E-05	3.74	3.67E-05	11.83	1.08E-04	7.78	6.94E-05
Methylene Chloride	2.26	1.84E-05	5.92	5.81E-05	3.01	2.76E-05	3.73	3.47E-05
1,2-Dichloroethene	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
1,1 Dichloroethane	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
2-Butanone	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Chloroform	1.41	1.15E-05	1.35	1.33E-05	1.25	1.15E-05	1.34	1.21E-05
1,2-Dichloroethene	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
1,1,1-Trichloroethane	1.50	1.22E-05	1.35	1.33E-05	1.25	1.15E-05	1.37	1.23E-05
Carbon Tetrachloride	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Vinyl Acetate	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Benzene	1.46	1.19E-05	1.35	1.33E-05	1.25	1.15E-05	1.36	1.22E-05
Trichloroethene	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
1,2-Dichloropropane	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Bromodichloromethane	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
cis-1,3-Dichloropropene	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
trans-1,3-Dichloropropene	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
1,1,2-Trichloroethane	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Dibromochloromethane	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Bromoform	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
4-Methyl-2-pentanone	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Toluene	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
2-Hexanone	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Tetrachloroethene	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Chlorobenzene	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Ethylbenzene	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Xylenes	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Styrene	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
1,1,2,2-Tetrachloroethane	1.26	1.02E-05	1.35	1.33E-05	1.25	1.15E-05	1.29	1.17E-05
Acrolein (2-Propenal)	12.58	1.02E-04	10.07	8.18E-05	12.58	1.02E-04	11.74	9.55E-05
Acrylonitrile (2-Propenenitrile)	12.58	1.02E-04	10.07	8.18E-05	12.58	1.02E-04	11.74	9.55E-05
1,2-Dichlorobenzene	1.26	1.02E-05	1.01	8.18E-06	1.26	1.02E-05	1.17	9.55E-06
1,3-Dichlorobenzene	1.26	1.02E-05	1.01	8.18E-06	1.26	1.02E-05	1.17	9.55E-06
1,4-Dichlorobenzene	1.26	1.02E-05	1.01	8.18E-06	1.26	1.02E-05	1.17	9.55E-06
Dichlorodifluoromethane	1.26	1.02E-05	1.01	8.18E-06	1.26	1.02E-05	1.17	9.55E-06
1,3-Dichloropropene	1.26	1.02E-05	1.01	8.18E-06	1.26	1.02E-05	1.17	9.55E-06
Iodomethane	1.26	1.02E-05	1.01	8.18E-06	1.26	1.02E-05	1.17	9.55E-06
3-Methylthiophene	1.26	1.02E-05	1.01	8.18E-06	1.26	1.02E-05	1.17	9.55E-06
Thiophene	1.26	1.02E-05	1.01	8.18E-06	1.26	1.02E-05	1.17	9.55E-06
1,1,2-Trichloro-1,2,2-trifluoroethane	1.26	1.02E-05	1.01	8.18E-06	1.26	1.02E-05	1.17	9.55E-06
Benzaldehyde	1.26	1.02E-05	1.01	8.18E-06	1.26	1.02E-05	1.17	9.55E-06
2-Chloroethyl vinyl ether	1.26	1.02E-05	1.01	8.18E-06	1.26	1.02E-05	1.17	9.55E-06
Trichlorofluoromethane	1.26	1.02E-05	1.01	8.18E-06	1.26	1.02E-05	1.17	9.55E-06

Benzene was detected at a level of 36 ng in V1. The corresponding emission rate is 3.68E-06 lbs/hr. No Benzene was detected in any of the trip blanks or condensate samples or field blanks.

1-1-1Trichloroethane was detected in sample tubes V1andV10. Quantified levels ranged from the detection limit of 20 ng to 39 ng. Corresponding emissions rates ranged from 2.80E-06 to 3.99E-06 pounds per hour. No 1-1-1Trichloroethane was detected in any of the tube blanks or condensate samples or blanks.

Methylene chloride was found in V10 at a level of 160 ng or 1.84E-05 lbs/hr. It is possibly an analytical anomality and was not actually detected, since it was only detected in V10 and not found in any other sample, field blank, trip blank or condensate.

In addition to the above mentioned compounds, acetone and chloroform were detected in every condensate sample and blank. Chloroform was also detected in run V1 at a level of 32 ng or 3.27E-06 lbs/hr. The levels detectedin the condensate samples and blanks ranged from 340 ng to 460 ng for acetone and 22 ng to 40 ng for chloroform. The trend of relatively repeatable concentrations in the condensate, coupled with the total absence of acetone and chloroform in any of the tube samples (except chloroform in V1) indicates that the presence of acetone and chloroform is probably due to slightly contaminated H_2O reagent used in the test method.

All VOST test runs were performed in accordance with the methodology as described in Section 4.1 of this report. Average results for the B Series are for three runs only. Leak checks of the sampling train were performed before and following each test run and found acceptable.

In several of the VOST samples, interference from matrix effects caused lower recovery of the third internal surrogate. In all but 3 of these samples, recoveries are still within QC requirements (50 - 150%). In the three outlying samples, the laboratory recomputed the surrogate recovery based on the internal standard from the Method Blank. Any targets that may have been in these samples, probaly experienced the same interference.

During desorption of sample V6, an instrument malfunction prevented complete collection of the sample. As a result, the internal standards were approximately 90% below expected values, and any target compounds or TICs are estimated.

Summaries for the individual VOST test runs are presented in Appendix A. Field data is presented in Appendix B. Analytical data can be found in Appendix C.

2.2 Continuous Emission Monitoring

A summary of continuous emission monitoring (CEM) performed concurrent (with the exception of CEM run #1) with the VOST tests is presented in Table 2-2. CEM was performed to determine emission concentrations and mass emission rates of THC, SO_2, NO_x, CO, O_2 and CO_2. Concentrations of pollutant gases (THC, SO_2, NO_x, and

CO) averaged 3.4 ppm, 0.5 ppm, 12.1 ppm and 2.1 ppm respectively. Diluent gas concentrations (O_2 and CO_2) averaged 12.9% and 8.9% respectively. These concentrations were corrected for analyzer calibration drift in each case.

A leak at the probe output was detected prior to the start of CEM run #1. The run was not started and the leak repaired and checked. CEM run #2 was started at the same time as VOC run #2.

APCC has replaced the SO_2 analyzer used previously with a new "state of the art" analyzer. The current analyzer is not subject to possible interferences as the old one may have been. The new analyzer indicated very low SO_2 emissions which was expected.

All CEM was performed in accordance with EPA Methods 3A, 6C, 7E, 10 and 25A. Calibration drift and linearity checks, as well as system leak and bias checks were performed as described in Section 4.2 and found acceptable. Raw CEM field data, along with calibrations are presented in Appendix D. Calibration gas certifications are presented in Appendix G.

2.3 Combustion Efficiency

Combustion efficiency was determined using the average CO and CO2 concentrations from the CEM data as well as the equation presented in Section 4.3. The average measured combustion efficiency for the Thermal Oxidizer on the test day was 99.998%. This calculation may not, however, be totally representative of actual combustion efficiency as the landfill gas contains 15% to 20% carbon dioxide.

TABLE 2-2
OLD BETHPAGE LANDFILL GAS THERMAL OXIDIZER
CONTINUOUS EMISSION MONITORING SUMMARY
FEBRUARY 20, 1991

TEST NO.	START TIME	STOP TIME	FLOWRATE (DSCFM)	THC (ppm)	THC (CORR)	THC (lbs/hr)	SO2 (ppm)	SO2 (CORR)	SO2 (lbs/hr)	NOx (ppm)	NOx (CORR)	NOx (lbs/hr)	CO (ppm)	CO (CORR)	CO (lbs/hr)	O2 (%)	O2 (CORR)	CO2 (%)	CO2 (CORR)	TEMP (°F)	N2 (%)	MW DRY (G/MOL)
1	VOID	VOID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	920	1000	2173	8.0	7.5	0.043	1.0	1.0	0.022	14.9	14.4	0.232	6.9	6.4	0.065	11.0	11.8	8.1	8.2	1527	80.8	29.708
3	1015	1055	2173	7.0	6.5	0.038	1.0	1.0	0.022	13.0	12.5	0.202	3.7	3.2	0.035	11.9	23.2	7.0	7.1	1604	69.7	26.404
4	1115	1155	2173	2.8	2.4	0.016	1.0	1.0	0.022	12.6	12.1	0.196	3.7	3.2	0.035	10.4	10.3	9.4	8.5	1531	80.2	29.920
5	1230	1310	2623	4.1	3.6	0.027	0.9	0.9	0.024	13.0	12.5	0.244	1.9	1.4	0.022	9.7	20.6	9.5	9.6	1610	69.8	28.828
6	1325	1405	2623	5.1	4.6	0.033	1.0	1.0	0.026	9.7	9.2	0.182	1.7	1.2	0.019	10.7	10.7	9.2	8.3	1540	80	29.872
7	1416	1456	2623	5.8	5.4	0.039	0.0	0.0	0.000	9.7	9.2	0.182	2.8	2.3	0.032	13.0	13.0	6.6	6.7	1580	80.3	28.548
8	VOID	VOID	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	1538	1616	2446	2.6	2.1	0.016	0.0	0.0	0.000	13.0	12.5	0.228	0.0	0.0	0.000	10.4	10.4	9.3	9.4	1649	80.2	29.878
10	1631	1711	2446	2.3	1.6	0.014	0.0	0.0	0.000	13.6	13.1	0.238	1.9	1.4	0.020	9.9	9.9	9.6	9.7	1531	80.4	29.904
11	1727	1607	2446	1.0	0.5	0.006	0.0	0.0	0.000	13.0	12.5	0.228	1.1	0.6	0.012	10.0	10.0	9.4	9.5	1510	80.5	29.878
12	1622	1902	2446	0.0	0.0	0.000	0.0	0.0	0.000	13.0	12.5	0.228	2.0	1.5	0.021	10.3	10.3	9.5	9.6	1606	80.1	29.904
Average			2414		3.4	0.023		0.5	0.011		12.1	0.216		2.1	0.026		12.9		6.9	1569		

3.0 PROCESS AND OPERATIONS

3.1 Landfill Gas Control System

The Old Bethpage landfill is equipped with a gas control system that pumps low heat content landfill gas (approximately 20% methane) from perimeter wells to a thermal oxidizer. The landfill gas control system utilizes a network of extraction wells, collection header piping and blowers to create a subterranean vacuum, ventilate the surrounding soils and thereby prevent offsite migration of landfill gas (LFG). The collected gases are oxidized by high temperature incineration to reduce landfill emissions of volatile organic compounds and odor contaminants. Figure 3-1 presents a schematic of the gas control system.

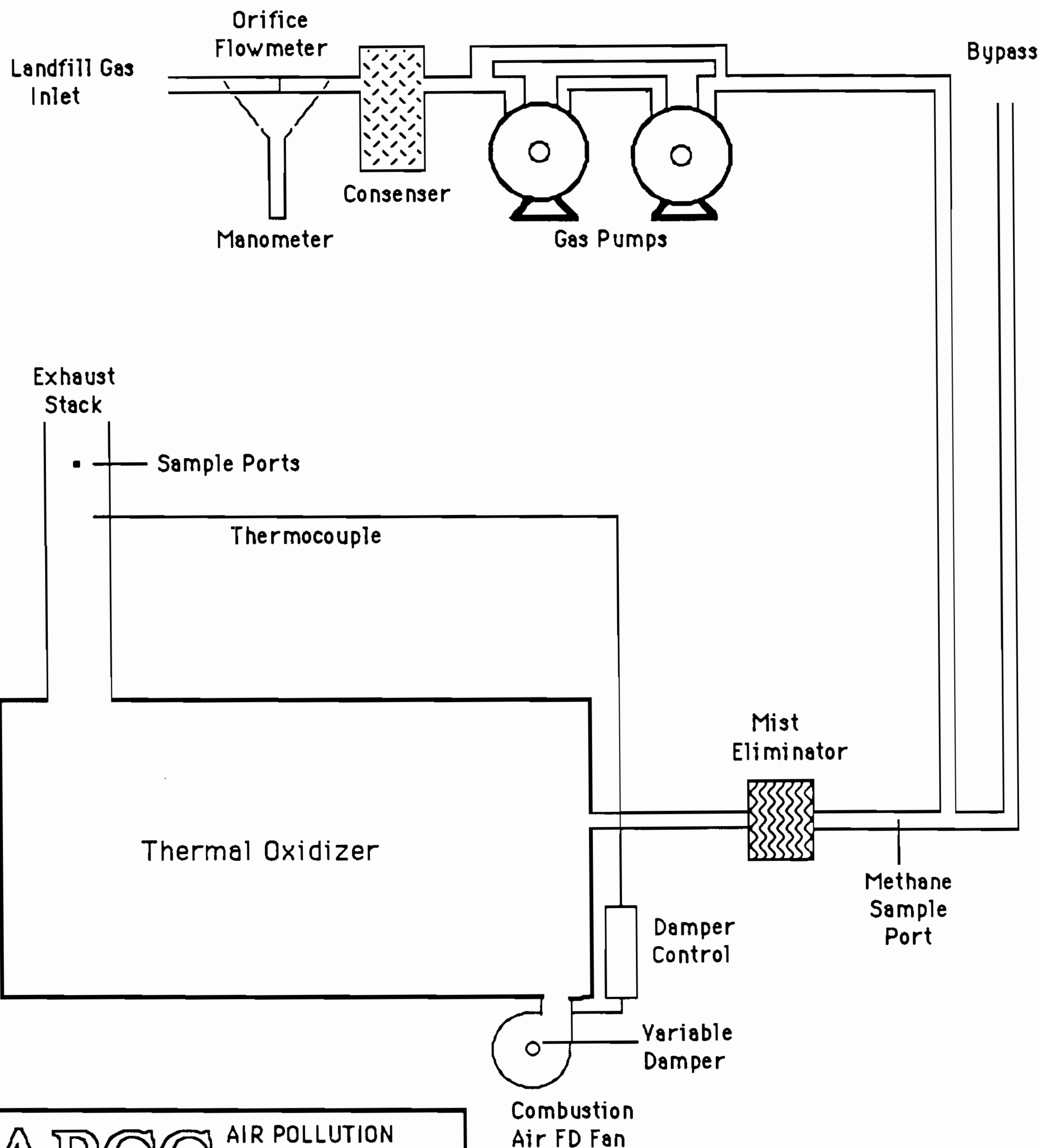
Gas collection begins with 24 wells, each approximately 35 feet in depth. The wells are equipped with shutoff valves, sampling ports and access flanges. Average gas flow from each well is 2.4 cubic feet per minute per foot of well screen. Minimum flow is 0.3 cfm. The wells are connected to a collection header consisting of approximately 6,500 feet of 10 inch pipe.

The interior surfaces of the header are cooler than the bulk temperature of the gas, which causes condensation to form as the gas cools to a new, lower saturation temperature. The pipe is sloped to a condensate collection system consisting of three (3) condensate collection wells, two (2) water separators and a demister with pads to remove condensed moisture from the LFG. Condensate production is estimated to be 135 gallons per day at a gas flow of 100 cfm in winter and 91 gpd at100 cfm in summer.

The LFG is drawn through the system by dual Rotron DR10 regenerative independently controlled blowers providing vacuum at the individual well-heads under variable suction and flow conditions. A second set of blowers is always on stand-by. Blower Skid 1 was in operation during the test program. A manometer measures pressure drop across an orifice calibrated to determine the gas volumetric flowrate. Each blower is piped for either parallel or series operation. Blower Skid 1 is rated for 125-960 cfm while Blower Skid 2 is rated for 500-960 cfm at 1.7-3.4 psig. The blowers also provide pressure on their exit side to move the gas through the discharge piping to the thermal oxidizer. Between the blowers and the thermal oxidizer are an emergency bypass stack and a Koch Flexi-Chevron mist eliminator as a final remover of entrained droplets.

The high temperature Thermal Oxidizer, designed and manufactured by John Zink Co. to break down complex organic molecules into carbon dioxide and water, is rated for 500-2,000 CFM with an exhaust gas temperature of 1400 to 1800 °F and a 0.3 second retention time. The pilot can be fueled with either propane or LFG. The unit is equipped with an automatic LFG safety valve that is actuated by either an LFG header problem or a flame-out condition. Header problems are detected by a feedline differential pressure switch when the pressure measures less than 10 or greater than 25 inches of water column. Flame-out conditions are detected with ultraviolet sensitive flame scanners.

FIGURE 3-1
LANDFILL GAS
THERMAL OXIDIZER



APCC AIR POLLUTION CHARACTERIZATION and CONTROL, LTD.

The unit is equipped with a Buffalo Forge Size 600 combustion air blower. A variable flow inlet damper is regulated automatically with a Honeywell damper control keyed to stack temperature . The controller is typically set at 1600 °F.

The quantity and composition of the LFG is highly variable. The design flowrate can range from 500 to 2000 cfm at a percent methane range from 20% to 40% by volume. Carbon dioxide ranges from 15% to 40% and air ranges from 20% to 60%. The carbon dioxide content of the exhaust gas is significantly lower due to the dilution from the combustion air. The hydrogen sulfide concentration is between 0 - 500 ppm and the relative humidity is 100%.

3.2 LFG Control System Operations

The operation of the LFG Control System was monitored on a regular basis by Mr. William Bonelli under the supervision of Mr. Michael Rogers, both of the Town of Oyster Bay . Parameters monitored include: blower vacuum and measured LFG flowrate, LFG methane content as measured by an MSA combustible gas analyzer, burner temperature (exhaust) and the position of the variable damper on the combustion air fan. A summary of these measurements is presented below in Table 3-1. Complete operational logs are presented in Appendix F.

TABLE 3-1
SUMMARY OF LFG CONTROL SYSTEM
OPERATIONAL DATA

Test No.	Blower Vacuum (in. wc)	LFG Flow (cfm)	Methane (%)	Temperature (°F)	Damper (%)
1	22	880	21	1597	95.3
2	22	880	21	1596	96.1
3	22	880	21	1597	96.6
4	22	880	21	1598	96.6
5	22	880	20	1592	94.1
6	22	880	20	1591	96.4
7	22	880	20	1594	97.1
8	N/A	N/A	N/A	N/A	N/A
9	22	880	20	1563	97.6
10	22	880	20	1595	100
11	22	880	20	1564	100
12	22	880	20	1582	100

4.0 SAMPLING AND ANALYTICAL METHODS

Air pollution emission measurements were performed at the oxidizer exhaust stack to determine emission concentrations and rates of the selected volatile and semi-volatile organics listed in Section 1, THC, SO_2, NO_x, CO, O_2 and CO_2. Sampling port and traverse point locations are presented in Figure 4-1. Sampling was performed in accordance with EPA Reference Methods 1, 2, 3A, 6C, 7E, 10, 25A and the EPA VOST (SW 846 Method 0030) procedure.

4.1 VOC Emission Measurements

Sampling was performed to determine the emission rate of the Selected VOC's by utilizing the EPA Volatile Organic Sampling Train (VOST) procedure as outlined in EPA - SW 846 Method 0030. The slow VOST option was used. This option requires three 40-minute samples to constitute a test. For quality assurance purposes, APCC collected four 40-minute samples to constitute a test. Three tests of four runs each were conducted.

Sample Collection

A 20-liter (nominal) sample of effluent gas containing POHCs is drawn from the source at a flow rate of approximately 0.5 liters per minute for 40 minutes, using a heated (250±25°F) glass lined probe and a VOST sampling train. A schematic of the train is shown in Figure 4-2. The gas stream is cooled to <20°C by passage through a water cooled condenser and volatile compounds are collected on a pair of sorbent resin traps. Liquid condensate is collected in an impinger placed between the two resin traps. The first resin trap (front trap) contains approximately 1.6 grams Tenax and the second trap (back trap) contains approximately one gram each of Tenax and petroleum based charcoal, 3:1 by volume. A total of four pairs of sorbent traps are used to collect VOC's from the effluent gas stream for each test. Three pairs for each test run plus one spare pair (in the event of analytical problems) are utilized. A total of three tests (12 cartridge pairs) were performed. A velocity traverse was performed in accordance with EPA Methods 1 and 2 during each test in order to determine exhaust volumetric flowrate and mass emission rates.

Sample Recovery

All sample cartridges were sealed with Swage-lok fittings and kept on ice until ready for analysis. Condensate was recovered and combined for each test series. Past experience has shown only a few ml to be collected in four test runs combined since most of the moisture was adsorbed by the Tenax.

Sample Analysis

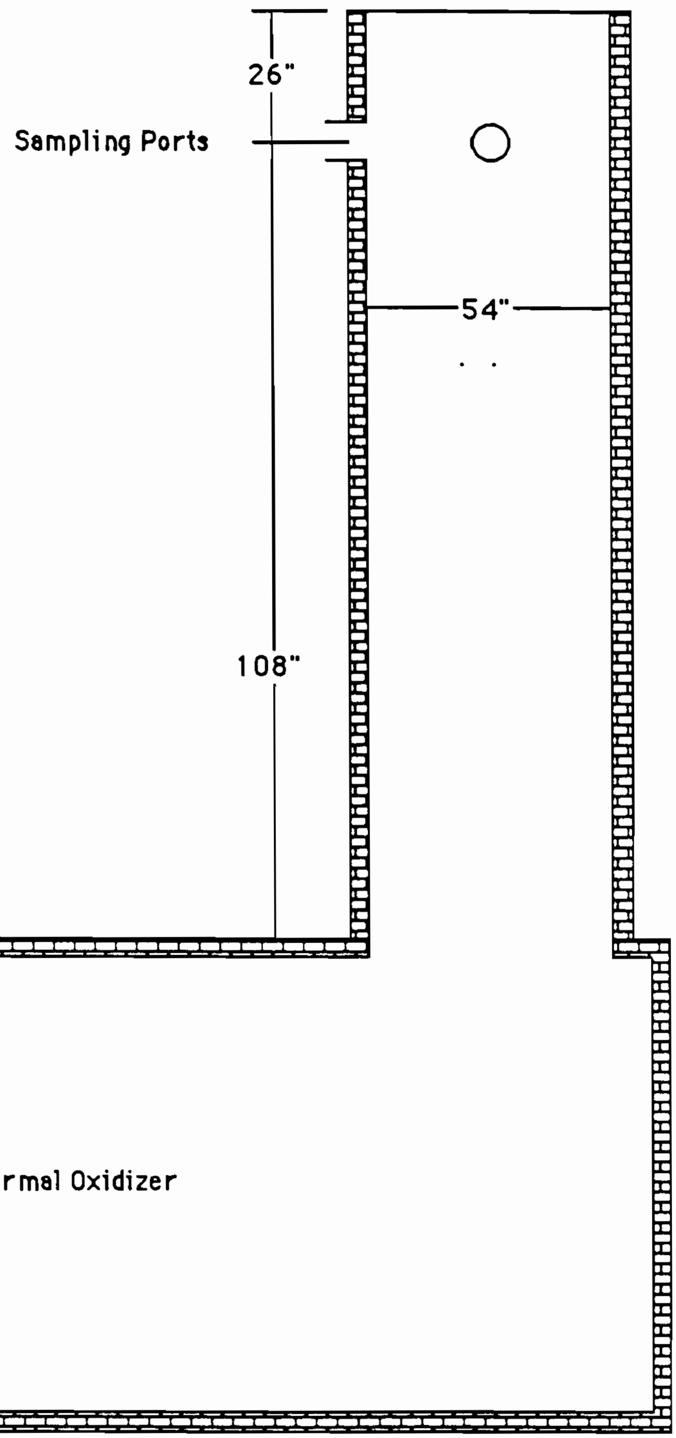
Sample analysis was performed by Research Triangle Laboratories in Durham, North Carolina. The contents of the paired sorbent cartridges are spiked with an internal standard and thermally desorbed for 10 minutes at 180°C with the carrier gas flow reversed so that the effluent flow from the analytical trap is directed into the GC/MS. The compounds are separated by temperature programmed gas chromatography and detected by low resolution mass spectrometry. The concentrations are calculated using the internal standard technique. Condensate samples are analyzed in a similar manner. Results are typically in the nanogram range, with a Lower Quantification Limit of 20 ng per run . No concentrations were detected in the range of suspected breakthrough. All cartridges were analyzed in pairs.

All samples were analyzed for the Target Compound List (TGL) plus the ten next largest peaks. Any compounds discussed in Section 1.0 that do not appear on the TGL are not presented with the results in Section 2.0. The concentrations of these compounds can be assumed to be below the detection limit of the method (<20 ng) as they did not appear on the the analyses.

APCC AIR POLLUTION CHARACTERIZATION and CONTROL, LTD.

FIGURE 4-1
SAMPLING PORT AND TRAVERSE POINT LOCATIONS

TRAVERSE POINT	DISTANCE FROM WALL
1	1.7"
2	5.7"
3	10.5"
4	17.4"
5	36.6"
6	43.5"
7	48.3"
8	52.3"



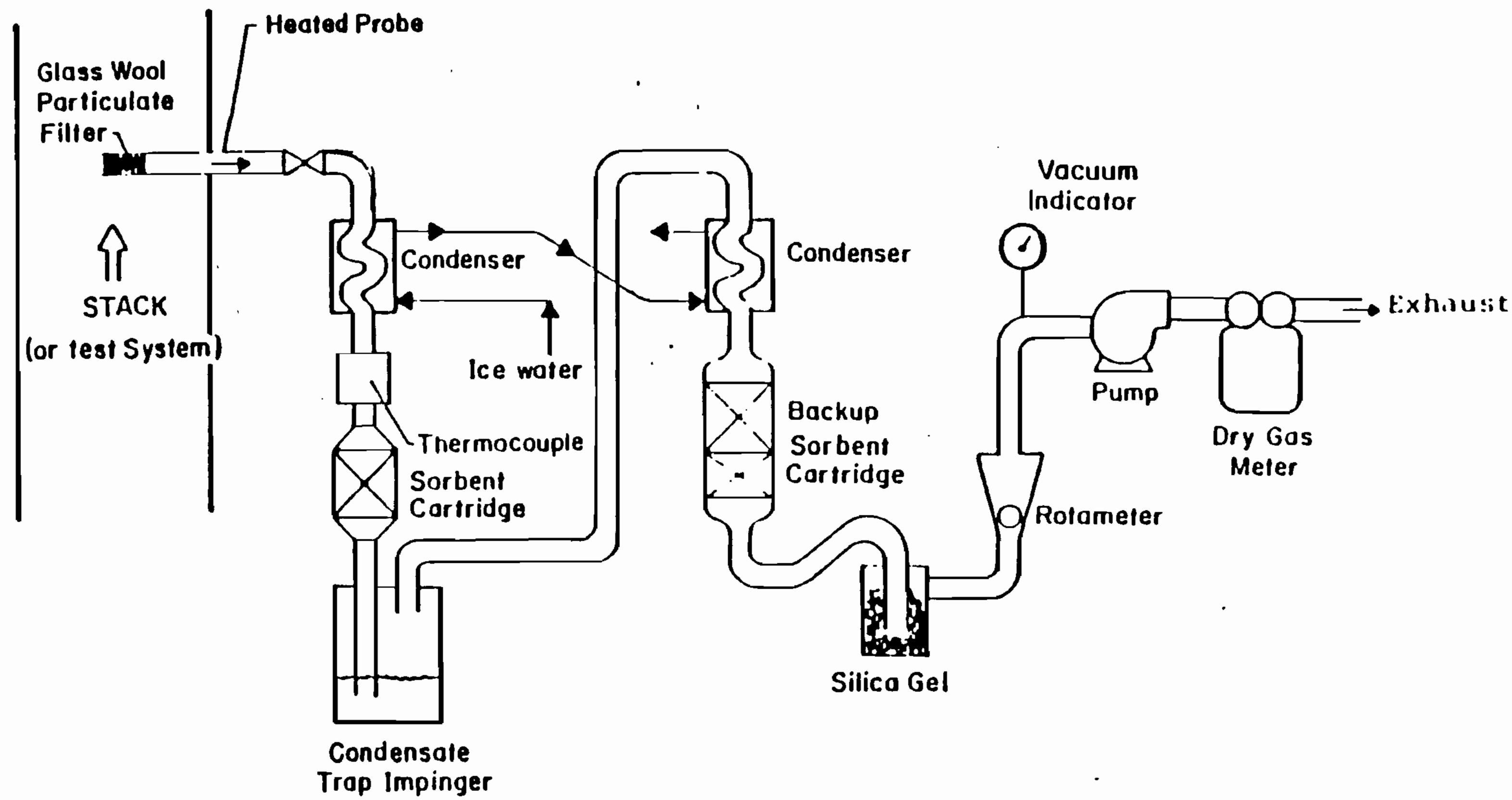


FIGURE 4-2
SCHEMATIC OF
VOLATILE ORGANIC SAMPLING TRAIN
(VOST)

4.2 Continuous Emission Monitoring of THC, NO_x, SO_2, CO, O_2, and CO_2

Continuous emission monitoring (CEM) was performed at the exhaust stack to determine concentrations and emission rates of THC, NO_x, SO_2, CO, O_2 and CO_2 according to EPA Methods 25A, 7E, 6C, 10, and 3A. A schematic of the CEM system is presented in Figure 4-3. All CEM data was recorded using a Tracor/Westronics automatic digital data logger. The CEM system was housed in the APCC Environmental Monitoring Laboratory at the base of the exhaust stack.

A gas stratification check was performed at 16 traverse points in the stack as described in Section 4.1. Oxygen concentrations were monitored for drastic changes, as a second CEM system was not available for comparison. No significant stratification was present.

Sample Conditioning System

A heated (250°F) Alundum thimble filter serves to remove large particulate matter from the sample gas stream. The thimble filter is mounted on the back end of a heated (250°F±25°F) stainless steel sampling probe with a stainless steel nozzle facing away from the stack gas flow. The sample stream is then drawn through heated (300°F nominal) Teflon sample line to two standard Greenburg-Smith type impingers (with impingement stems broken off) immersed in an ice-bath to remove the moisture from the gas stream. The sample is then drawn through Teflon tubing by a leak-free Teflon double diaphragm pump to a stainless steel sample manifold with an atmospheric by-pass rotameter. The analyzers draw samples from this manifold.

Total Hydrocarbon Analyzer

A RATFISCH Model RS55 Total Hydrocarbon Analyzer, which utilizes a flame ionization detector (FID) to measure, as carbon, hydrocarbons C_1 through C_{18} ; will be used to determine Total Hydrocarbons concentrations as methane. Approximately 5 lpm of exhaust gas is drawn from the stack through 50 feet of Teflon sample line heated to 300°F (nominal). The sample gas is drawn through a heated filter and valving by a heated pump. The sample gas then enters the heated detector bench which contains the FID. Flame ionization is a process of continuously creating ions by flame, whereby, upon combustion, hydrocarbon molecules and carbon atoms are separated into positive ions and free electrons. The positive ions are attracted to the burner (-); the free electrons are attracted to the collector cylinder (+). An electron flow is established from the burner to the collector cylinder, proportional to the ionization created by the flame. The resulting current is detected and amplified by an electrometer/amplifier circuit. The output of the amplifier provides a signal to a recorder for real-time continuous monitoring.

Nitrogen Oxides Analyzer

A Thermo Electron Company (TECO) Model 10 chemiluminescent NO_x analyzer was used to monitor total emissions of NO_x as nitric oxide. The chemiluminescent reaction of NO and ozone provides the basis for this analytical method. Monitoring was performed in accordance with EPA Method 7E.

Sulfur Dioxide Analyzer

A Western Research Model 721AT2 SO_2 analyzer was used to monitor SO_2 emissions. The analyzer design is based upon a single source emitting the appropriate wavelengths. The radiation from the source is chopped by a single pair of narrow band pass radiation rejection filters continuously rotated through the radiation path and then split into two paths; measuring and reference. The measuring path contains the cell through which the sample is passed, the reference path contains the "sealed" sample cell which is filled with instrument quality air. The radiation passed by the cells is then detected by a pair of photomultiplier tubes; one for each radiation path. It is these signals whch are used in the calculation of the final output. This concept enables the rejection of interfering gases.

Carbon Monoxide Analyzer

A Westinghouse/Maihak UNOR 6N nondispersive infrared gas analyzer was used to continuously monitor concentrations of CO in the exhaust stream. The analyzer operates on the measurement principle based on CO having a characteristic absorption spectra in the infrared range. It contains an infrared detector that uses the nondispersive single beam technique with alternate modulation of the sample and reference cells. Radiation absorbed by CO in the sample cell produces a capacitance change in the detector which is proportional to the CO concentration.

Oxygen Analyzer

A Westinghouse/Maihak OXIGOR O_2 analyzer was used to monitor concentrations of oxygen in the exhaust stream. This instrument utilizes the magnetic dumbbell sphere (paramagnetic) principle, which comparatively measures the magnetic susceptibility of a gas volume by the force acting upon a non-magnetic test body suspended in a disproportionate magnetic field. Output current is linearly proportional to the oxygen concentration.

Carbon Dioxide Analyzer

A Westinghouse/Maihak FINOR CO_2 analyzer was used to monitor carbon dioxide emissions. This instrument operates on the principle of carbon dioxide having a known characteristic absorption spectra in the infrared range. Radiation absorbed by CO_2 in the sample cell produces a capacitance change in the detector which is proportional to the CO_2 concentration.

Data Acquisition and Handling

All CEM data was monitored by a Tracor/Westronics 3000 digital data logger which recorded using its integral color printer. Trends were monitored using the strip chart mode for THC, NOx, SO_2, CO, O_2, CO_2 and stack temperature with averages printed digitally for 40-minute intervals to coincide with each VOST test run. Emission

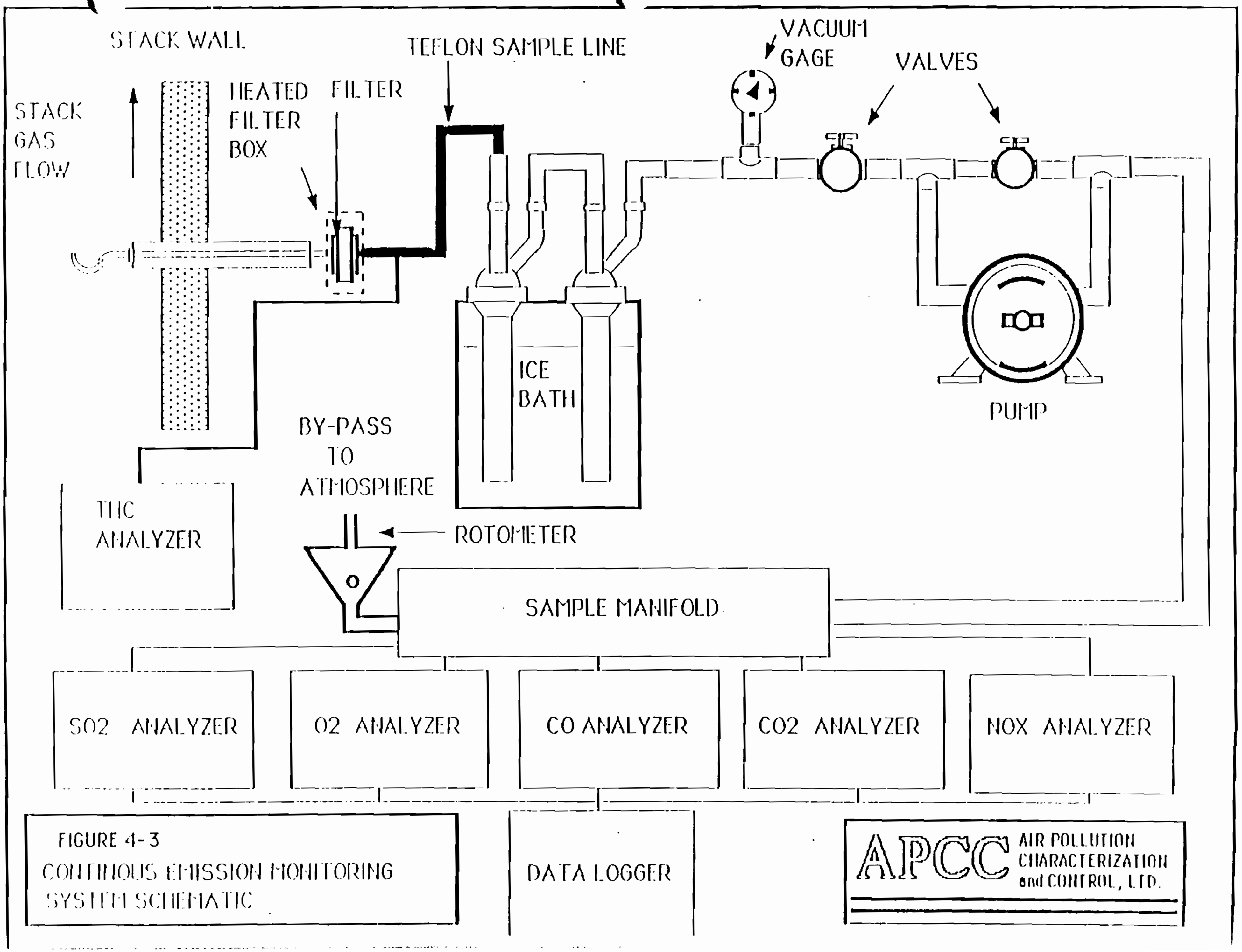


FIGURE 4-3
CONTINOUS EMISSION MONITORING SYSTEM SCHEMATIC

printed digitally for 40-minute intervals to coincide with each VOST test run. Emission data were "viewed" by the data logger at 5-second intervals. This enabled real-time emission data to be available on-site.

CEM System Calibrations

Calibrations of the CEM system were performed at the beginning and end of each test using either EPA Protocol 1 and/or NBS Traceable calibration gases. Calibration gases (zero, mid range and span) were introduced to the CEM system through a 3-way heated valve located at the back of the sampling probe. Each analyzer was also multi-point calibrated prior to the field test to establish instrument linearity. System leak checks and bias checks were performed before and after the test program.

Calibrations were performed using NBS traceable zero and span gases (four points) at the beginning and end of the test program. Two point calibrations (zero and span) were performed prior to and following each test to determine instrument drift (if any). A total of twelve 40-minute tests shall be performed concurrent with the twelve VOST test runs.

4.3 Combustion Efficiency

The combustion efficiency of the oxidizer was determined using average CO and CO_2 concentrations measured by CEM for a given test period. This calculation affords a comparison of combustion efficiency (CE) verses emission concentration of THC and the selected VOC's. The following equation was utilized:

$$\%CE = \frac{\%CO_2 - \%CO}{\%CO_2} \times 100$$

5.0 QUALITY ASSURANCE

The project manager is responsible for implementation of the quality assurance program as applied to the project.

5.1 Sampling Quality Assurance

Generally, implementation of quality assurance procedures for source measurement programs is designed so that the work is done:

1. by competent, trained individuals experienced in the specific methodologies being used.

2. using properly calibrated equipment.

3. using approved procedures for sample handling and documentation.

Measurement devices, pitot tubes, dry gas meters, thermocouples and portable gas analyzers are uniquely identified and calibrated with documented procedures and acceptance criteria before and after each field effort. Records of all calibration data are maintained in the files.

Data are recorded on standard forms. Bound field notebooks are used to record observations and miscellaneous elements affecting data, calculations, or evaluation.

Prior to the test program APCC provides the following:

1. Filter numbers and tare weights of all filters available for the test.

2. The results of reagent blank runs on the reagents to be used during the test.

3. Calibrations of all pitot tubes, dry gas meters, orifice meters, sampling nozzles, and thermocouples which used during the test. All calibrations are performed within four months prior to the test date.

Specific details of APCC's QA program for stationary air pollution sources may be found in "Quality Assurance Handbook for Air Pollution Measurement Systems", Volume III (EPA-600/4-7-027b).

5.1.1 <u>CEM System</u>

The CEM system was calibrated at the beginning and end if each test and leak and bias checked daily. All calibration gases were either NBS certified or EPA Protocol 1. Multipoint calibrations were performed on each analyzer to establish linearity prior to sampling and then throughout the test program.

5.1.2 <u>VOST Method</u>

<u>Field Blanks</u> - Blank Tenax and Tenax/Charcoal cartridges were taken to the sampling site and the end caps removed for the period of time required to exchange two pairs of traps on the sampling train (approximately 5 minutes). After the two traps were exchanged, the end caps were replaced on the blank tubes which were returned to storage on ice until analysis. One pair of field blanks were included with each set of 8 VOST cartridge pairs collected.

<u>Trip Blanks</u> - One pair of blank cartridges (Tenax and Tenax/Charcoal) were included with shipment of cartridges to the site. These blanks were treated as any other cartridge except that the end caps were not removed. These cartridges were analyzed to monitor potential contamination which may have occurred prior to shipment.

<u>Blank Corrections</u> - All samples were blank corrected by subtracting blank values from actual sample values.

5.2 Analytical Quality Control

APCC maintains a vigorous quality control program for all samples analyzed. This program is based on the general guidelines given in "Handbook for Analytical Quality Control in Water and Wastewater Laboratories" (EPA-600/4-79-019; March 1979). This program suggests guidelines in the areas of:

- Laboratory services
- Instrument selection
- Glassware
- Reagents
- Solvents
- Gases
- Analytical performance
- Data handling and reporting
- Water and wastewater sampling
- Laboratory safety

APCC has made additions to the EPA program which include the following:

1. Triplicate analysis for each parameter on 10 percent of samples.

2. Ten percent of the samples are spiked by the laboratory manager with known amounts of the parameter of interest and re-analyzed to determine the percent recovery. A Shewhart control chart is used for the percent recovery control (EPA, Handbook of Analytical Quality Control in Water and Wastewater Laboratories, 1979).

3. Standards and curves are determined for each analysis using the appropriate standard. Least squares linear regressions calculations are used in determining the "best fit" to the data. Correlation coefficients are also calculated.

5.2.1 VOST Method

The analytical laboratory spiked all Tenax and Tenax/Charcoal cartridges with internal standards to monitor recovery efficiencies and laboratory performance. To establish the ability to generate acceptable accuracy and precision, the analytical lab spiked blank cartridges with the analytes of interest (surrogate POHCs) at two concentrations in the working range. The average percent recovery and the standard deviation for each was then calculated. The average recovery and standard deviation must fall within the expected range for determination of volatile POHCs using this method (50% to 150%). All recoveries were acceptable.

APPENDIX A

Volatile Organic Compound Emissions Data Summaries

VOST WORKSHEET
LKB/OYSTER BAY
OLD BETHPAGE LANDFILL GAS INCINERATOR
20-Feb-91

Test Number	1	2	3	4	Condensate	Total/Avg	(N l)	
Sample Volume (l)	20	20.01	19.98	20.01		80	79.48	
Meter Temperature (°C)	18	20	21	24		21		
Barometric Pressure (in. Hg)	29.79	29.79	29.81	29.81		29.80		
Flowrate (dscfm)	1710			2635		2173		
						Total	Concentration	Emissions
Target Compound	(ng)	(ng)	(ng)	(ng)	(ng)	(ng)	(ng/l)	(lbs/hr)
Chloromethane	20	20	20	20	20	100	1.26	1.02E-05
Vinyl Chloride	20	20	20	20	20	100	1.26	1.02E-05
Bromomethane	20	20	20	20	20	100	1.26	1.02E-05
Chloroethane	20	20	20	20	20	100	1.26	1.02E-05
1,1-Dichloroethene	20	20	20	20	20	100	1.26	1.02E-05
Acetone	20	20	20	20	20	100	1.26	1.02E-05
Carbon Disulfide	141	45	231	181	20	618	7.78	6.32E-05
Methylene Chloride	20	20	20	20	100	180	2.26	1.84E-05
1,2-Dichloroethene	20	20	20	20	20	100	1.26	1.02E-05
1,1 Dichloroethane	20	20	20	20	20	100	1.26	1.02E-05
2-Butanone	20	20	20	20	20	100	1.26	1.02E-05
Chloroform	32	20	20	20	20	112	1.41	1.15E-05
1,2-Dichloroethane	20	20	20	20	20	100	1.26	1.02E-05
1,1,1-Trichloroethane	39	20	20	20	20	119	1.50	1.22E-05
Carbon Tetrachloride	20	20	20	20	20	100	1.26	1.02E-05
Vinyl Acetate	20	20	20	20	20	100	1.26	1.02E-05
Benzene	36	20	20	20	20	116	1.46	1.19E-05
Trichloroethene	20	20	20	20	20	100	1.26	1.02E-05
1,2-Dichloropropane	20	20	20	20	20	100	1.26	1.02E-05
Bromodichloromethane	20	20	20	20	20	100	1.26	1.02E-05
cis-1,3-Dichloropropene	20	20	20	20	20	100	1.26	1.02E-05
trans-1,3-Dichloropropene	20	20	20	20	20	100	1.26	1.02E-05
1,1,2-Trichloroethane	20	20	20	20	20	100	1.26	1.02E-05
Dibromochloromethane	20	20	20	20	20	100	1.26	1.02E-05
Bromoform	20	20	20	20	20	100	1.26	1.02E-05
4-Methyl-2-pentanone	20	20	20	20	20	100	1.26	1.02E-05
Toluene	20	20	20	20	20	100	1.26	1.02E-05
2-Hexanone	20	20	20	20	20	100	1.26	1.02E-05
Tetrachloroethene	20	20	20	20	20	100	1.26	1.02E-05
Chlorobenzene	20	20	20	20	20	100	1.26	1.02E-05
Ethylbenzene	20	20	20	20	20	100	1.26	1.02E-05
Xylenes	20	20	20	20	20	100	1.26	1.02E-05
Styrene	20	20	20	20	20	100	1.26	1.02E-05
1,1,2,2-Tetrachloroethane	20	20	20	20	20	100	1.26	1.02E-05
Acrolein (2-Propenal)	200	200	200	200	200	1000	12.58	1.02E-04
Acrylonitrile (2-Propenenitrile)	200	200	200	200	200	1000	12.58	1.02E-04
1,2-Dichlorobenzene	20	20	20	20	20	100	1.26	1.02E-05
1,3-Dichlorobenzene	20	20	20	20	20	100	1.26	1.02E-05
1,4-Dichlorobenzene	20	20	20	20	20	100	1.26	1.02E-05
Dichlorodifluoromethane	20	20	20	20	20	100	1.26	1.02E-05
1,3-Dichloropropane	20	20	20	20	20	100	1.26	1.02E-05
Iodomethane	20	20	20	20	20	100	1.26	1.02E-05
3-Methylthiophene	20	20	20	20	20	100	1.26	1.02E-05
Thiophene	20	20	20	20	20	100	1.26	1.02E-05
1,1,2-Trichloro-1,2,2-trifluoroethane	20	20	20	20	20	100	1.26	1.02E-05
Benzaldehyde	20	20	20	20	20	100	1.26	1.02E-05
2-Chloroethyl vinyl ether	20	20	20	20	20	100	1.26	1.02E-05
Trichlorofluoromethane	20	20	20	20	20	100	1.26	1.02E-05

VOST WORKSHEET
LKB/OYSTER BAY
OLD BETHPAGE LANDFILL GAS INCINERATOR
20-Feb-91

Test Number	5	6	7	8	Condensate	Total/Avg	(N l)	
Sample Volume (l)	19.95	20	19.98	NA		59.93	59.14	
Meter Temperature (°C)	25	22	21	NA		23		
Barometric Pressure (in. Hg)	29.82	29.78	29.78	NA		29.79		
Flowrate (dscfm)	2635			2611		2623		

Target Compound	(ng)	(ng)	(ng)	(ng)	(ng)	Total (ng)	Concentration (ng/l)	Emissions (lbs/hr)
Chloromethane	20	20	20	NA	20	80	1.35	1.33E-05
Vinyl Chloride	20	20	20	NA	20	80	1.35	1.33E-05
Bromomethane	20	20	20	NA	20	80	1.35	1.33E-05
Chloroethane	20	20	20	NA	20	80	1.35	1.33E-05
1,1-Dichloroethene	20	20	20	NA	20	80	1.35	1.33E-05
Acetone	20	20	20	NA	20	80	1.35	1.33E-05
Carbon Disulfide	20	20	161	NA	20	221	3.74	3.67E-05
Methylene Chloride	20	20	20	NA	290	350	5.92	5.81E-05
1,2-Dichloroethene	20	20	20	NA	20	80	1.35	1.33E-05
1,1 Dichloroethane	20	20	20	NA	20	80	1.35	1.33E-05
2-Butanone	20	20	20	NA	20	80	1.35	1.33E-05
Chloroform	20	20	20	NA	20	80	1.35	1.33E-05
1,2-Dichloroethane	20	20	20	NA	20	80	1.35	1.33E-05
1,1,1-Trichloroethane	20	20	20	NA	20	80	1.35	1.33E-05
Carbon Tetrachloride	20	20	20	NA	20	80	1.35	1.33E-05
Vinyl Acetate	20	20	20	NA	20	80	1.35	1.33E-05
Benzene	20	20	20	NA	20	80	1.35	1.33E-05
Trichloroethene	20	20	20	NA	20	80	1.35	1.33E-05
1,2-Dichloropropane	20	20	20	NA	20	80	1.35	1.33E-05
Bromodichloromethane	20	20	20	NA	20	80	1.35	1.33E-05
cis-1,3-Dichloropropene	20	20	20	NA	20	80	1.35	1.33E-05
trans-1,3-Dichloropropene	20	20	20	NA	20	80	1.35	1.33E-05
1,1,2-Trichloroethane	20	20	20	NA	20	80	1.35	1.33E-05
Dibromochloromethane	20	20	20	NA	20	80	1.35	1.33E-05
Bromoform	20	20	20	NA	20	80	1.35	1.33E-05
4-Methyl-2-pentanone	20	20	20	NA	20	80	1.35	1.33E-05
Toluene	20	20	20	NA	20	80	1.35	1.33E-05
2-Hexanone	20	20	20	NA	20	80	1.35	1.33E-05
Tetrachloroethene	20	20	20	NA	20	80	1.35	1.33E-05
Chlorobenzene	20	20	20	NA	20	80	1.35	1.33E-05
Ethylbenzene	20	20	20	NA	20	80	1.35	1.33E-05
Xylenes	20	20	20	NA	20	80	1.35	1.33E-05
Styrene	20	20	20	NA	20	80	1.35	1.33E-05
1,1,2,2-Tetrachloroethane	20	20	20	NA	20	80	1.35	1.33E-05
Acrolein (2-Propenal)	200	200	200	NA	200	800	10.07	8.18E-05
Acrylonitrile (2-Propenenitrile)	200	200	200	NA	200	800	10.07	8.18E-05
1,2-Dichlorobenzene	20	20	20	NA	20	80	1.01	8.18E-06
1,3-Dichlorobenzene	20	20	20	NA	20	80	1.01	8.18E-06
1,4-Dichlorobenzene	20	20	20	NA	20	80	1.01	8.18E-06
Dichlorodifluoromethane	20	20	20	NA	20	80	1.01	8.18E-06
1,3-Dichloropropane	20	20	20	NA	20	80	1.01	8.18E-06
Iodomethane	20	20	20	NA	20	80	1.01	8.18E-06
3-Methylthiophene	20	20	20	NA	20	80	1.01	8.18E-06
Thiophene	20	20	20	NA	20	80	1.01	8.18E-06
1,1,2-Trichloro-1,2,2-trifluoroethane	20	20	20	NA	20	80	1.01	8.18E-06
Benzaldehyde	20	20	20	NA	20	80	1.01	8.18E-06
2-Chloroethyl vinyl ether	20	20	20	NA	20	80	1.01	8.18E-06
Trichlorofluoromethane	20	20	20	NA	20	80	1.01	8.18E-06

VOST WORKSHEET
LKB/OYSTER BAY
OLD BETHPAGE LANDFILL GAS INCINERATOR
20-Feb-91

Test Number	9	10	11	12	Condensate	Total/Avg	(N l)	
Sample Volume (l)	19.92	19.92	19.99	19.97		79.8	79.72	
Meter Temperature (°C)	21	20	20	18		20		
Barometric Pressure (in. Hg)	29.83	29.85	29.86	29.92		29.87		
Flowrate (dscfm)	2611			2281		2446		
						Total	Concentration	Emissions
Target Compound	(ng)	(ng)	(ng)	(ng)	(ng)	(ng)	(ng/l)	(lbs/hr)
Chloromethane	20	20	20	20	20	100	1.25	1.15E-05
Vinyl Chloride	20	20	20	20	20	100	1.25	1.15E-05
Bromomethane	20	20	20	20	20	100	1.25	1.15E-05
Chloroethane	20	20	20	20	20	100	1.25	1.15E-05
1,1-Dichloroethene	20	20	20	20	20	100	1.25	1.15E-05
Acetone	20	20	20	20	20	100	1.25	1.15E-05
Carbon Disulfide	261	26971*	291	371	20	943	11.83	1.08E-04
Methylene Chloride	20	160	20	20	20	240	3.01	2.76E-05
1,2-Dichloroethene	20	20	20	20	20	100	1.25	1.15E-05
1,1 Dichloroethane	20	20	20	20	20	100	1.25	1.15E-05
2-Butanone	20	20	20	20	20	100	1.25	1.15E-05
Chloroform	20	20	20	20	20	100	1.25	1.15E-05
1,2-Dichloroethane	20	20	20	20	20	100	1.25	1.15E-05
1,1,1-Trichloroethane	20	20	20	20	20	100	1.25	1.15E-05
Carbon Tetrachloride	20	20	20	20	20	100	1.25	1.15E-05
Vinyl Acetate	20	20	20	20	20	100	1.25	1.15E-05
Benzene	20	20	20	20	20	100	1.25	1.15E-05
Trichloroethene	20	20	20	20	20	100	1.25	1.15E-05
1,2-Dichloropropane	20	20	20	20	20	100	1.25	1.15E-05
Bromodichloromethane	20	20	20	20	20	100	1.25	1.15E-05
cis-1,3-Dichloropropene	20	20	20	20	20	100	1.25	1.15E-05
trans-1,3-Dichloropropene	20	20	20	20	20	100	1.25	1.15E-05
1,1,2-Trichloroethane	20	20	20	20	20	100	1.25	1.15E-05
Dibromochloromethane	20	20	20	20	20	100	1.25	1.15E-05
Bromoform	20	20	20	20	20	100	1.25	1.15E-05
4-Methyl-2-pentanone	20	20	20	20	20	100	1.25	1.15E-05
Toluene	20	20	20	20	20	100	1.25	1.15E-05
2-Hexanone	20	20	20	20	20	100	1.25	1.15E-05
Tetrachloroethene	20	20	20	20	20	100	1.25	1.15E-05
Chlorobenzene	20	20	20	20	20	100	1.25	1.15E-05
Ethylbenzene	20	20	20	20	20	100	1.25	1.15E-05
Xylenes	20	20	20	20	20	100	1.25	1.15E-05
Styrene	20	20	20	20	20	100	1.25	1.15E-05
1,1,2,2-Tetrachloroethane	20	20	20	20	20	100	1.25	1.15E-05
Acrolein (2-Propenal)	200	200	200	200	200	1000	12.58	1.02E-04
Acrylonitrile (2-Propenenitrile)	200	200	200	200	200	1000	12.58	1.02E-04
1,2-Dichlorobenzene	20	20	20	20	20	100	1.26	1.02E-05
1,3-Dichlorobenzene	20	20	20	20	20	100	1.26	1.02E-05
1,4-Dichlorobenzene	20	20	20	20	20	100	1.26	1.02E-05
Dichlorodifluoromethane	20	20	20	20	20	100	1.26	1.02E-05
1,3-Dichloropropane	20	20	20	20	20	100	1.26	1.02E-05
Iodomethane	20	20	20	20	20	100	1.26	1.02E-05
3-Methylthiophene	20	20	20	20	20	100	1.26	1.02E-05
Thiophene	20	20	20	20	20	100	1.26	1.02E-05
1,1,2-Trichloro-1,2,2-trifluoroethane	20	20	20	20	20	100	1.26	1.02E-05
Benzaldehyde	20	20	20	20	20	100	1.26	1.02E-05
2-Chloroethyl vinyl ether	20	20	20	20	20	100	1.26	1.02E-05
Trichlorofluoromethane	20	20	20	20	20	100	1.26	1.02E-05

*not included in average

APPENDIX B

Volatile Organic Compound Emissions Field Data

VOST FIELD DATA SHEET

Firm Name	L.K.B.				
Plant Location	OYSTER BAY L.I.	Module No.	VOST	Test Duration	40 min
Test No.	V-1	Dry Gas Meter Y	1.00	Probe Heater Setting	INOP.
Sampling Location	STACK	Rotameter Yr		Test Start Time	08:16 HRS
Project No.	90003	Sampling Rate	1 l/min	Test End Time	08:56 HRS.
Date	2-20-91	Ambient Temp.	11°C	Leak Test Start	0/15
Tester	DBS	Baro. Press.	29.79 in Hg	Leak Test End	0/5

57284.48

Cartridge I.D. Tenax	Tenax/Charcoal	Minutes	Meter Temp.-~~°F~~	Rotameter Setting	Meter Vol. Liters	Temp. of Gas Leaving Cond. - ~~°F~~ °C	Pump Vac. In. Hg	Probe Temp.
707B	708A	0	17°C	45	590848	12°C	2	
#73	#70	5	17°C	44	5911 - -	12°C	2	
V-1A	V-1B	10	17°C	44	5914 - -	12°C	2	
		15	18°C	44	5916 - -	12°C	2	
		20	18°C	44	5919 - -	11°C	2	
		25	19°C	43	5922 - -	10°C	2	
		30	19°C	43	5924 - -	10°C	2	
		35	19°C	43	5926 - -	10°C	2	
		40	19°C	43	592848	10°C	2	

Condensate Sample:

Sample I.D. ______

Volume Collected (ml) ______

Comments: PROBE HEATER BLOWING FUSES!

VOST FIELD DATA SH

Firm Name LKB
Plant Location OYSTER BAY, L.I.
Test No. V-2
Sampling Location STACK
Project No. 90003
Date 2-20-91
Tester DBS

Module No. VOST
Dry Gas Meter Y 1.00
Rotameter Yr #43
Sampling Rate 1/2 l/min
Ambient Temp. 9°C
Baro. Press. 29.79 in Hg

Test Duration 40 min
Probe Heater Setting —
Test Start Time 09:20 HRS.
Test End Time 10:00
Leak Test Start 0/15 in.
Leak Test End 0/5 in.

594.77
3.3 l/min

STACK TEMP. 1527°F 09:28

Cartridge I.D. Tenax	Tenax/ Charcoal	Minutes	Meter Temp.	Rotameter Setting	Meter Vol. Liters	Temp. of Gas Leaving Cond.	Pump Vac. in. Hg	Probe Temp.
707B	708A	0	19°C	43	592977	11°C	2	*
#73	#70	5	19°C	43	593130	10°C	2	
V-2A	V-2B	10	19°C	43	593390	10°C	2	
		15	19°C	43	593650	10°C	2	
		20	20°C	43	593910	10°C	2	
		25	20°C	43	594200	9°C	2	
		30	20°C	43	594470	9°C	2	
		35	20°C	43	594730	10°C	2	
		40	21°C	43	594978	10°C	2	

Condensate Sample:

Sample I.D.

Volume Collected (ml)

Comments: * PROBE HEAT INOP. - PROBE FAR IN STACK & INSULATED

VOST FIELD DATA SH[illegible]

Firm Name LKB

Plant Location OYSTER BAY L.I.

Test No. V-3

Sampling Location STACK

Project No. 90003

Date 2-20-91

Tester DBS

Module No. VOST

Dry Gas Meter Y 1.00

Rotameter Yr #43

Sampling Rate ½ l/min

Ambient Temp. 6°C

Baro. Press. 29.81 in. Hg

Test Duration 40 min

Probe Heater Setting —

Test Start Time 10:15 HRS

Test End Time 10:55 HRS.

Leak Test Start 0/15

Leak Test End 0/5

STACK TEMP. 1604°F 10:25 HRS.

Cartridge I.D. Tenax	Tenax/Charcoal	Minutes	Meter Temp.	Rotameter Setting	Meter Vol. Liters	Temp. of Gas Leaving Cond. -	Pump Vac. In. Hg	Probe Temp.
707B	708A	0	20°C	43	595007	10°C	2	
#73	#70	5	20°C	43	595270	9°C	2	
V-3A	V-3B	10	20°C	43	595510	9°C	2	
		15	20°C	43	595750	9°C	2	
		20	21°C	43	596000	9°C	2	
		25	21°C	43	596250	9°C	2	
		30	22°C	43	596510	10°C	2	
		35	22°C	43	596750	10°C	3	
		40	22°C	43	597005	10°C	3	

Condensate Sample:

Sample I.D.

Volume Collected (ml)

Comments:

VOST FIELD DATA SH

Firm Name LKB

Plant Location OYSTER BAY LI

Test No. V-4

Sampling Location STACK

Project No. 90003

Date 2-20 91

Tester DBS

Module No. VOST

Dry Gas Meter Y 1.00

Rotameter Yr #43

Sampling Rate 1/2 l/min

Ambient Temp. 7°C

Baro. Press. 29.81

Test Duration 40 min

Probe Heater Setting ——

Test Start Time 11:15 HRS.

Test End Time 11:55 HRS.

Leak Test Start 0/.5

Leak Test End 0/.5

STACK TEMP 1531°F @ 11:20 HRS.

Cartridge Tenax	I.D. Tenax/Charcoal	Minutes	Meter Temp.	Rotameter Setting	Meter Vol. Liters	Temp. of Gas Leaving Cond. -	Pump Vac. in. Hg	Probe Temp.
707B	708A	0	23°C	43	597034	13°C	2	
#73	#70	5	23°C	43	597270	12°C	3	
V-4A	V-4B	10	23°C	43	597520	11°C	3	
		15	24°C	43	597770	11°C	3	
		20	24°C	43	598040	11°C	3	
		25	25°C	43	598290	12°C	3	
		30	25°C	43	598540	12°C	3	
		35	26°C	43	598790	12°C	3	
		40	26°C	43	599035	12°C	3	

Condensate Sample:

Sample I.D. V-4 COND

Volume Collected (ml) 10 ml

Comments:

VOST FIELD DATA S

Firm Name LKB
Plant Location OYSTER BAY L.I.
Test No. V-5
Sampling Location STACK
Project No. 90003
Date 2-20-91
Tester DBS

Module No. VOST
Dry Gas Meter Y 1.00
Rotameter Yr 43
Sampling Rate 1 l/min
Ambient Temp. 12°C
Baro. Press. 29.82

Test Duration 40 min
Probe Heater Setting —
Test Start Time 12:30 HRS
Test End Time 13:10 HRS.
Leak Test Start 0/15
Leak Test End 0/5

STACK TEMP. 1610°F @ 12:33 HRS.

Cartridge I.D. Tenax	Tenax/ Charcoal	Minutes	Meter Temp.	Rotameter Setting	Meter Vol. Liters	Temp. of Gas Leaving Cond. -	Pump Vac. In. Hg	Probe Temp.
707B	708A	0	25°C	43	599059	14°C	2	
#73	#70	5	25°C	43	599320	13°C	2	
V-5A	V-5B	10	24°C	43	599550	13°C	2	
		15	25°C	43	599810	12°C	2	
		20	24°C	43	600050	11°C	2	
		25	25°C	43	600300	11°C	3	
		30	25°C	43	600560	11°C	3	
		35	25°C	43	600830	11°C	3	
		40	25°C	43	601054	11°C	3	

Condensate Sample:

Sample I.D.

Volume Collected (ml)

Comments: FIELD BLANKS FB1 A+B TAKEN 12:57 HRS.

VOST FIELD DATA

Firm Name L.K.B.

Plant Location OYSTER BAY, L.I.

Test No. V-6

Sampling Location STACK

Project No. 90003

Date 2-20-91

Tester DBS

Module No. VOST

Dry Gas Meter Y 1.00

Rotameter Yr F4355

Sampling Rate ½ l/min

Ambient Temp. 11°C

Baro. Press. 29.78

Test Duration 40 min

Probe Heater Setting

Test Start Time 13:25 HRS.

Test End Time 14:05 HRS.

Leak Test Start 0/15 in.

Leak Test End 0/5 in

STACK TEMP. 1540°F @ 13:37 HRS.

Cartridge Tenax	I.D. Tenax/Charcoal	Minutes	Meter Temp.	Rotameter Setting	Meter Vol. Liters	Temp. of Gas Leaving Cond. -	Pump Vac. In. Hg	Probe Temp.
707B	708A	0	24°C	43	601080	10°C	3	
#73	#70	5	23°C	43	601330	10°C	3	
V-6A	V-6B	10	23°C	43	601580	10°C	3	
		15	22°C	43	601830	11°C	3	
		20	22°C	43	602080	10°C	3	
		25	22°C	43	602340	10°C	3	
		30	22°C	43	602570	10°C	3	
		35	22°C	43	602830	10°C	4	
		40	22°C	43	603080	9°C	4	

Condensate Sample:

Sample I.D.

Volume Collected (ml)

Comments: FB-1 CONDENSATE TAKEN 13:40 HRS.

VOST FIELD DATA S

Firm Name L.K.B.
Plant Location OYSTER BAY L.I.
Test No. V-7
Sampling Location STACK
Project No. 90003
Date 2-20-91
Tester DJS

Module No. VOST
Dry Gas Meter Y 1.00
Rotameter Yr 43SS
Sampling Rate 1 l/min
Ambient Temp. 11°C
Baro. Press. 29.78

Test Duration 40 min
Probe Heater Setting ——
Test Start Time 14:16 HRS.
Test End Time 14:56 HRS
Leak Test Start 0/15
Leak Test End 0/5

STACK TEMP. = 1580°F @ 14:20 HRS.

Cartridge I.D. Tenax	Tenax/Charcoal	Minutes	Meter Temp.	Rotameter Setting	Meter Vol. Liters	Temp. of Gas Leaving Cond.	Pump Vac. in. Hg	Probe Temp. °F
707A	708B	0	21°C	43	603114	10°C	3	—
#73	#70	5	21°C	43	603370	10°C	3	
V-7A	V-7B	10	21°C	43	603610	10°C	3	
		15	21°C	43	603860	10°C	3	
		20	21°C	43	604110	11°C	3	
		25	21°C	43	604360	11°C	3	
		30	22°C	43	604610	10°C	3	
		35	22°C	43	604860	10°C	3	
		40	22°C	43	605112	11°C	3	

Condensate Sample:

Sample I.D. ________

Volume Collected (ml) ________

Comments: ________

VOST FIELD DATA SH

Firm Name L.K.B.
Plant Location OYSTER BAY, L.I.
Test No. V-8
Sampling Location STACK
Project No. 90003
Date 2-20-91
Tester DBS

Module No. VOST
Dry Gas Meter Y 1.00
Rotameter Yr 4355
Sampling Rate ¼ l/min
Ambient Temp. 10°C
Baro. Press. 29.83

Test Duration 40 min
Probe Heater Setting —
Test Start Time 15:08 HRS
Test End Time 15:19 HRS
Leak Test Start 0/.5
Leak Test End 0/.5

Cartridge I.D. Tenax	Tenax/ Charcoal	Minutes	Meter Temp. - °F	Rotameter Setting	Meter Vol. Liters	Temp. of Gas Leaving Cond. - °F	Pump Vac. In. Hg	Probe Temp. °F
701A	708B	0	22°C	43	605140	11°C	2	
#73	#70	5	22°C	43	605400	11°C	2	
V-8A	V-8B	10	22°C	43	605660	11°C	2	
		~~15~~	10.8 MIN	END	605708			
		~~20~~						
		~~25~~						
		~~30~~						
		~~35~~						
		~~40~~						

Condensate Sample:
Sample I.D. V5-8 COND.
Volume Collected (ml) 10 ml

Comments: STOP TEST AT 15:19
—SHORT TEST—

VOST FIELD DATA S

Firm Name L.K.D.
Plant Location Oyster Bay, LI
Test No. V-9
Sampling Location STACK
Project No. 90003
Date 2-20-91
Tester DBS

Module No. VOST
Dry Gas Meter Y 1.00
Rotameter Yr 43
Sampling Rate 1 l/min
Ambient Temp. 10°C
Baro. Press. 29.83

Test Duration 40 min
Probe Heater Setting —
Test Start Time 15:38 HRS.
Test End Time 16:18 HRS.
Leak Test Start 0/.5
Leak Test End 0/.5

STACK TEMP 1649°F @ 15:50 HRS.

Cartridge Tenax	I.D. Tenax/Charcoal	Minutes	Meter Temp.	Rotameter Setting	Meter Vol. Liters	Temp. of Gas Leaving Cond. -	Pump Vac. in. Hg	Probe Temp.
707A	708A	0	21°C	43	605736	10°C	2	—
#73	#70	5	21°C	43	605990	9°C	2	
V-9A	V-9B	10	21°C	43	606250	9°C	2	
		15	21°C	43	606460	8°C	2	
		20	21°C	43	606740	8°C	2	
		25	21°C	43	606970	8°C	2	
		30	21°C	43	607230	8°C	2	
		35	21°C	43	607480	8°C	3	
		40	21°C	43	607728	8°C	3	

Condensate Sample:

Sample I.D.

Volume Collected (ml)

Comments:

VOST FIELD DATA S[illegible]

Firm Name L.K.B.

Plant Location OYSTER BAY, L.I.

Test No. V-10

Sampling Location STACK

Project No. 90003

Date 2-20-91

Tester DBS

Module No. VOST

Dry Gas Meter Y 1.00

Rotameter ~~Yr~~ 43 SS

Sampling Rate 1 l/min

Ambient Temp. 7°C

Baro. Press. 29.85

Test Duration 40 min

Probe Heater Setting

Test Start Time 16:31

Test End Time 17:11

Leak Test Start 0/15

Leak Test End 0/5

STACK TEMP = 1531°F @ 16:37 HRS.

Cartridge I.D. Tenax	Tenax/ Charcoal	Minutes	Meter Temp.	Rotameter Setting	Meter Vol. Liters	Temp. of Gas Leaving Cond. -	Pump Vac. In. Hg	Probe Temp.
707B	708A	0	21°C	43	607756	9°C	2	
#73	#70	5	20°C	43	608020	10°C	2	
V-9A	V-9B	10	20°C	43	608250	9°C	2	
		15	20°C	43	608510	8°C	2	
		20	20°C	43	608760	9°C	2	
		25	21°C	43	609000	8°C	3	
		30	20°C	43	609250	8°C	3	
		35	21°C	43	609500	7°C	3	
		40	21°C	43	609748	8°C	3	

Condensate Sample:

Sample I.D.

Volume Collected (ml)

Comments: FB-2A+B. (BLANKS) (+ COND.)
TAKEN @ 16:32

VOST FIELD DATA

Firm Name LKB

Plant Location Oyster Bay L.I. Module No. VOST Test Duration 40 min

Test No. V-11 Dry Gas Meter Y 1.00 Probe Heater Setting —

Sampling Location STACK Rotameter # 4355 Test Start Time 17:27 HRS.

Project No. 90003 Sampling Rate 1/2 l/min Test End Time 18:07 HRS.

Date 2-20-91 Ambient Temp. 9°C Leak Test Start 0/15

Tester DBS Baro. Press. 29.86 Leak Test End 0/7

STACK TEMP = 1510 @ 17:31 HRS.

Cartridge I.D. Tenax	Tenax/ Charcoal	Minutes	Meter Temp.	Rotameter Setting	Meter Vol. Liters	Temp. of Gas Leaving Cond. -	Pump Vac. In. Hg	Probe Temp.
707A	708B	0	20°C	43	609.777	8°C	2	
#73	#70	5	20°C	43	610030	7°C	2	
V-11A	V-11B	10	20°C	43	610280	8°C	2	
		15	20°C	43	610520	7°C	2	
		20	20°C	43	610770	8°C	2	
		25	20°C	43	611030	7°C	2	
		30	20°C	43	611260	7°C	2	
		35	20°C	43	611520	6°C	~~2~~ 3	
		40	20°C	43	611776	6°C	3	

Condensate Sample:

Sample I.D.

Volume Collected (ml)

Comments:

VOST FIELD DATA

Firm Name L.K.B.

Plant Location OYSTER BAY L.I.

Module No. VOST

Test Duration 40

Test No. V-12

Dry Gas Meter Y 1.00

Probe Heater Setting —

Sampling Location STACK

Rotameter ~~Yr~~ 435S

Test Start Time 18:22

Project No. 90003

Sampling Rate ~~1 l/min~~

Test End Time 19:02

Date 2-20-91

Ambient Temp. 8°C

Leak Test Start 0/.5

Tester DBS

Baro. Press. 29.92

Leak Test End 0/3

STACK TEMP. 1606°F @ 18:30 HRS.

Cartridge Tenax	I.D. Tenax/ Charcoal	Minutes	Meter Temp.	Rotameter Setting	Meter Vol. Liters	Temp. of Gas Leaving Cond. -	Pump Vac. In. Hg	Probe Temp.
707A	708B	0	20°C	43	611800	7°C	3	—
#73	#70	5	20°C	43	612050	7°C	3	
V-12A	V-12B	10	20°C	43	612300	7°C	3	
		15	18°C	43	612550	6°C	3	
		20	17°C	43	612800	6°C	3	
		25	17°C	43	613046	6°C	3	
		30	17°C	43	613300	6°C	3	
		35	18°C	43	613550	6°C	3	
		40	18°C	43	613797	7°C	3	

Condensate Sample:

Sample I.D. V9-12 (Cond.)

Volume Collected (ml)

Comments:

APPENDIX C

Volatile Organic Compound
Laboratory Data

RESEARCH TRIANGLE LABORATORIES

VOST GC/MS REPORT

prepared for

APCC, LTD.

by

RESEARCH TRIANGLE LABORATORIES, INC.

Barry A. Ruvio
Chemist

Thomas G. Conally
Laboratory Manager

RTL ID # 10225A

March 15, 1991

1612 Carpenter Fletcher Road • Durham, North Carolina 27713 • (919) 544-5775 • FAX: (919) 544-3770
A Member of the Andersen Technology Group

INTRODUCTION

Scope:

To analyze (VOST) Tenax/Charcoal cartridges for the target compound list (TCL) and tentatively identify the 10 greatest Non-TCL peaks by Desorb-Purge-Trap Desorb Gas Chromatography Mass Spectrometry (DPTD GC/MS). All specific TIC's are reported as per APCC's detailed listing (see Sample Results).

Method Summary:

Sample cartridges are analyzed by desorb-purge-trap-desorb gas chromatography/mass spectrometry (DPTD GC/MS). Daily analytical checks are performed on cartridge blanks and reagent water. The daily GC/MS performance test required for this method is described in SW 846, Method 8240. The key Abundance Criteria for 4-Bromo-fluorobenzene (BFB) must be met before any samples are analyzed. All standards, blanks and samples are spiked with a known amount of BFB to maintain a constant check of system performance.

Sample Desorption:

The DPTD GC/MS procedures are those described in SW 846 Method 5040. The spiked sample cartridge is placed in the thermal desorption apparatus (Nutech 8533) and thermally desorbed to 200 °C for 10 minutes. Consideration is given for individual analysis of cartridges. The desorbed components then pass into the bottom of a water column, where they are purged from the water and collected on the internal analytical sorbent trap. After the 10 minute desorption period, the analytical trap is dry purged for 2 minutes. Finally, the compounds on the analytical trap are thermally desorbed into the GC/MS system.

Five milliters from each condensate sample is placed in a sparger and purged directly to the trap. Analysis proceeds as stated for VOST samples.

Calculations:

All compounds detected that coincide with those of the Target Compound List (TCL) are calculated using equation #1 and response factors derived from in-house standards. All tentatively identified compounds are calculated, using equation #2 and a standard TIC response factor of one (1.0). Compounds quantified by equation #2 are qualified as being estimates.

Eqn #1: $$[X] = \frac{A_X \cdot [IS]}{A_{IS} \cdot RF}$$

Eqn #2: $$[X] = \frac{A_X \cdot [IS]}{A_{IS} \cdot 1.0}$$

Where:
$[X]$ = amount of compound, ng
$[IS]$ = amount of internal standard, ng
A_X = response of compound
A_{IS} = response of internal standard
RF = response factor

ANALYTICAL CONDITIONS

Equipment:

HP 5970 GC/MS/DS tuned to BFB criteria

GC Conditions:

Temp 1	:	0 °C
Time 1	:	4.0 minutes
Ramp Rate	:	6.0 °C/minutes
Temp 2	:	160 °C
Time 2	:	5.0 minutes

Column:

VOCOL (Supelco),
Length 60 m,
Film thickness 1.5 um,
Internal diameter 0.75 mm,
Construction of Borosilicate glass
with fused silica ends

Mass Spectrometer Conditions:

Run Time	:	25 minutes
Scan Range	:	35 - 260 AMU
Scan Delay	:	1.25 minutes
Ion Source Temp	:	200 °C
Electron Multiplier	:	2000 ± 200 EV
Separator Temp	:	225 °C

Sample Chronicle:

Client	APCC, Ltd.
RTL Project ID	10225A
Analysis Type	Condensate [VOST/Pair]
Date of Collection	02/20/91
Date Received	02/25/91
Date Authorized	02/25/91
Date Analyzed	03/13 - 14/91
Date Reported	03/15/91

Narrative:

In most of the VOST samples, interference from matrix effects caused lower recovery of the third internal surrogate. In all but 3 of these samples recoveries are still within QC requirements (50-150%). In the three outlying samples, we have recomputed the surrogate recovery based on the internal standard from the Method Blank. Any targets that may have been in these samples, probably experienced the same interference.

During desorption of V6 onto the trap, an instrument malfunction prevented complete collection of the sample. As a result, our internal standards were approximately 90% below expected values, and any target compounds or TICs are estimated.

RTL remains available to assist with questions or concerns regarding this report.

REFERENCES

Federal Register, 44, 69464, December 3, 1979

Protocol for the Collection and Analysis of Volatile POHCs Using VOST, EPA-600/8-84-007 available from ORD Publications, Center for Environmental Research Information, Cincinnati, Ohio 45268

NIOSH Manual of Analytical Methods, HEW Publication No. (NIOSH) 75-121, available from Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402

Supelco Bulletin 769, "Determination of Organic Vapors in the Industrial Atmosphere", 1977: Supelco, Inc., Bellefonte, PA 16823

Test Methods for Evaluation of Solid Waste, SW 846 Methods 0030, 8240, 5040, 5030

Compendium of Methods for the Determination of Toxic Organic Compounds in Air, PB87-168688, Battelle Columbus Laboratories, Columbus, Ohio

SAMPLE RESULTS

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-1	Analyzed:	03/13/91
File ID:	T7734	Reported:	03/15/91
Sample ID:	TB-1	Description:	Condensate

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	99
Toluene-d_8	99
4-Bromofluorobenzene	84

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	460	
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform	40	
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-1	Analyzed:	03/13/91
File ID:	T7734	Reported:	03/15/91
Sample ID:	TB-1	Description:	Condensate

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-2	Analyzed:	03/13/91
File ID:	T7735	Reported:	03/15/91
Sample ID:	FB-1	Description:	Condensate

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	96
Toluene-d_8	93
4-Bromofluorobenzene	83

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	440	
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform	37	
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-2	Analyzed:	03/13/91
File ID:	T7735	Reported:	03/15/91
Sample ID:	FB-1	Description:	Condensate

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-3	Analyzed:	03/13/91
File ID:	T7736	Reported:	03/15/91
Sample ID:	FB-2	Description:	Condensate

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	88
Toluene-d_8	92
4-Bromofluorobenzene	79

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	340	
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform	37	
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-3	Analyzed:	03/13/91
File ID:	T7736	Reported:	03/15/91
Sample ID:	FB-2	Description:	Condensate

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-4	Analyzed:	03/13/91
File ID:	T7737	Reported:	03/15/91
Sample ID:	V1-4	Description:	Condensate

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	94
Toluene-d_8	95
4-Bromofluorobenzene	81

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	360	
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform	25	
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20   **BQL: Below Quantitation Limit**

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-4	Analyzed:	03/13/91
File ID:	T7737	Reported:	03/15/91
Sample ID:	V1-4	Description:	Condensate

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-5	Analyzed:	03/13/91
File ID:	T7738	Reported:	03/15/91
Sample ID:	V5-8	Description:	Condensate

Surrogate	Percent Recovery
1,2-Dichloroethane-d_4	95
Toluene-d_8	92
4-Bromofluorobenzene	76

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	400	
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform	22	
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-5	Analyzed:	03/13/91
File ID:	T7738	Reported:	03/15/91
Sample ID:	V5-8	Description:	Condensate

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-6	Analyzed:	03/13/91
File ID:	T7739	Reported:	03/15/91
Sample ID:	V9-12	Description:	Condensate

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	96
Toluene-d_8	98
4-Bromofluorobenzene	80

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone	360	
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform	23	
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-6	Analyzed:	03/13/91
File ID:	T7739	Reported:	03/15/91
Sample ID:	V9-12	Description:	Condensate

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-19	Analyzed:	03/13/91
File ID:	T7740	Reported:	03/15/91
Sample ID:	VTB-1	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	85
Toluene-d_8	90
4-Bromofluorobenzene	67

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-19	Analyzed:	03/13/91
File ID:	T7740	Reported:	03/15/91
Sample ID:	VTB-1	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-20	Analyzed:	03/13/91
File ID:	T7741	Reported:	03/15/91
Sample ID:	VFB-1	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	85
Toluene-d_8	91
4-Bromofluorobenzene	66

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	29	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-20	Analyzed:	03/13/91
File ID:	T7741	Reported:	03/15/91
Sample ID:	VFB-1	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-21	Analyzed:	03/13/91
File ID:	T7742	Reported:	03/15/91
Sample ID:	VFB-2	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	85
Toluene-d_8	94
4-Bromofluorobenzene	67

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-21	Analyzed:	03/13/91
File ID:	T7742	Reported:	03/15/91
Sample ID:	VFB-2	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-7	Analyzed:	03/13/91
File ID:	T7743	Reported:	03/15/91
Sample ID:	V1	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	100
Toluene-d_8	84
4-Bromofluorobenzene	75

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	170	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform	32	
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	39	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene	36	
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-7	Analyzed:	03/13/91
File ID:	T7743	Reported:	03/15/91
Sample ID:	V1	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-8	Analyzed:	03/14/91
File ID:	T7747	Reported:	03/15/91
Sample ID:	V2	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	94
Toluene-d_8	79
4-Bromofluorobenzene	147

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	74	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-8	Analyzed:	03/14/91
File ID:	T7747	Reported:	03/15/91
Sample ID:	V2	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-9	Analyzed:	03/14/91
File ID:	T7748	Reported:	03/15/91
Sample ID:	V3	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	95
Toluene-d_8	80
4-Bromofluorobenzene	82

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	260	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-9	Analyzed:	03/14/91
File ID:	T7748	Reported:	03/15/91
Sample ID:	V3	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-10	Analyzed:	03/14/91
File ID:	T7749	Reported:	03/15/91
Sample ID:	V4	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	111
Toluene-d_8	88
4-Bromofluorobenzene	80

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	210	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-10	Analyzed:	03/14/91
File ID:	T7749	Reported:	03/15/91
Sample ID:	V4	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-11	Analyzed:	03/14/91
File ID:	T7750	Reported:	03/15/91
Sample ID:	V5	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	83
Toluene-d_8	82
4-Bromofluorobenzene	147

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-11	Analyzed:	03/14/91
File ID:	T7750	Reported:	03/15/91
Sample ID:	V5	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-12	Analyzed:	03/14/91
File ID:	T7752	Reported:	03/15/91
Sample ID:	V6	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	117
Toluene-d_8	90
4-Bromofluorobenzene	117

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide		BQL
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-12	Analyzed:	03/14/91
File ID:	T7752	Reported:	03/15/91
Sample ID:	V6	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-13	Analyzed:	03/14/91
File ID:	T7753	Reported:	03/15/91
Sample ID:	V7	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	95
Toluene-d_8	81
4-Bromofluorobenzene	71

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	190	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-13	Analyzed:	03/14/91
File ID:	T7753	Reported:	03/15/91
Sample ID:	V7	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-14	Analyzed:	03/14/91
File ID:	T7754	Reported:	03/15/91
Sample ID:	V8	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	99
Toluene-d_8	73
4-Bromofluorobenzene	74

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	130	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client: APCC, Ltd.
RTL ID: 10225A-14
File ID: T7754
Sample ID: V8

Received: 02/25/91
Analyzed: 03/14/91
Reported: 03/15/91
Description: VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-15	Analyzed:	03/14/91
File ID:	T7755	Reported:	03/15/91
Sample ID:	V9	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	92
Toluene-d_8	65
4-Bromofluorobenzene	70

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	290	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-15	Analyzed:	03/14/91
File ID:	T7755	Reported:	03/15/91
Sample ID:	V9	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-16	Analyzed:	03/14/91
File ID:	T7757	Reported:	03/15/91
Sample ID:	V10	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	102
Toluene-d_8	81
4-Bromofluorobenzene	125

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	27000 *	
75-09-2	Methylene Chloride	160	
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane	20	
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20 BQL: Below Quantitation Limit

* 27000 ng is beyond our calibration range of 20-1000 ng. In addition, the maximum loading capacity for our instrument is 10000 ng, therefore this value is considered an estimate.

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-16	Analyzed:	03/14/91
File ID:	T7757	Reported:	03/15/91
Sample ID:	V10	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-17	Analyzed:	03/14/91
File ID:	T7756	Reported:	03/15/91
Sample ID:	V11	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	96
Toluene-d_8	79
4-Bromofluorobenzene	143

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	320	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-17	Analyzed:	03/14/91
File ID:	T7756	Reported:	03/15/91
Sample ID:	V11	Description:	VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

APCC
AIR POLLUTION
CHARACTERIZATION
AND CONTROL LTD

RESEARCH TRIANGLE LABORATORIES, INC.

Client:	APCC, Ltd.	Received:	02/25/91
RTL ID:	10225A-18	Analyzed:	03/14/91
File ID:	T7758	Reported:	03/15/91
Sample ID:	V12	Description:	VOST Pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d_4	105
Toluene-d_8	75
4-Bromofluorobenzene	65

CAS Number	Target Compound	Results (ng)	
74-87-3	Chloromethane		BQL
75-01-4	Vinyl Chloride		BQL
74-83-9	Bromomethane		BQL
75-00-3	Chloroethane		BQL
75-69-4	Trichlorofluoromethane		BQL
75-35-4	1,1-Dichloroethene		BQL
67-64-1	Acetone		BQL
75-15-0	Carbon Disulfide	400	
75-09-2	Methylene Chloride		BQL
540-59-0	1,2-Dichloroethene		BQL
75-34-3	1,1-Dichloroethane		BQL
78-93-3	2-Butanone		BQL
67-66-3	Chloroform		BQL
107-06-2	1,2-Dichloroethane		BQL
71-55-6	1,1,1-Trichloroethane		BQL
56-23-5	Carbon Tetrachloride		BQL
108-05-4	Vinyl Acetate		BQL
71-43-2	Benzene		BQL
79-01-6	Trichloroethene		BQL
78-87-5	1,2-Dichloropropane		BQL
75-27-4	Bromodichloromethane		BQL
10061-01-5	*cis*-1,3-Dichloropropene		BQL
10061-02-6	*trans*-1,3-Dichloropropene		BQL
79-00-5	1,1,2-Trichloroethane		BQL
124-48-1	Dibromochloromethane		BQL
75-25-2	Bromoform		BQL
108-10-1	4-Methyl-2-pentanone		BQL
110-75-8	2-Chloroethyl Vinyl Ether		BQL
108-88-3	Toluene		BQL
591-78-6	2-Hexanone		BQL
127-18-4	Tetrachloroethene		BQL
108-90-7	Chlorobenzene		BQL
100-41-4	Ethylbenzene		BQL
1330-20-7	Xylene (total)		BQL
100-42-5	Styrene		BQL
79-34-5	1,1,2,2-Tetrachloroethane		BQL

Quantitation Limit (ng): 20

BQL: Below Quantitation Limit

APCC AIR POLLUTION CHARACTERIZATION AND CONTROL LTD

RESEARCH TRIANGLE LABORATORIES, INC.

Client: APCC, Ltd.
RTL ID: 10225A-18
File ID: T7758
Sample ID: V12

Received: 02/25/91
Analyzed: 03/14/91
Reported: 03/15/91
Description: VOST Pair

Tentatively Identified Compounds

Compound	Results (ng)	Detection Limits	Molecular Weight (AMU)
Acrolein (2-Propenal)	BDL	200 ng	56
Acrylonitrile (2-Propenenitrile)	BDL	200 ng	53
1,2-Dichlorobenzene	BDL	20 ng	146
1,3-Dichlorobenzene	BDL	20 ng	146
1,4-Dichlorobenzene	BDL	20 ng	146
Dichlorodifluoromethane	BDL	20 ng	120
1,3-Dichloropropane	BDL	20 ng	112
Iodomethane	BDL	20 ng	142
3-Methylthiophene	BDL	20 ng	98
Thiophene	BDL	20 ng	84
1,1,2-Trichloro-1,2,2-trifluoroethane	BDL	20 ng	186
Benzaldehyde	BDL	-	106

Comments:

APPENDIX D

Continuous Emission Monitoring Field Data

TABLE 2-3
CONTINUOUS EMISSION MONITORING SYSTEM
CALIBRATION DATA AND CORRECTION VALUES
FEBRUARY 20, 1991

CAL NO.	START TIME	STOP TIME	CAL LEVEL	THC ACTUAL	THC RESP.	SO2 ACTUAL	SO2 RESP.	NOx ACTUAL	NOx RESP.	CO ACTUAL	CO RESP	O2 ACTUAL	O2 RESP	CO2 ACTUAL	CO2 RESP
1	735	836	ZERO	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0
			SPAN	10	11	40	40	42	44	58	58	11.0	11.0	12.0	11.9
			VARIATION		-0.500		0.000		-1.000		0.000		0.000		0.050
2	1157	1223	ZERO	0	0	0	0	0	0	0	1	0.0	0.0	0.0	-0.1
			SPAN	99	100	40	40	42	42	232	233	11.0	11.1	12.0	11.8
			VARIATION		-0.500		0.000		0.000		-1.000		-0.050		0.150
		SET ONE	CORRECTION FACTOR		-0.500		0.000		-0.500		-0.500		-0.025		0.100
3	1619	1624	ZERO	0	0	0	0	0	1	0	0	0.0	-0.1	0.0	0.1
			SPAN	99	99.0	80	79	84	84	232	229	11.0	11.3	12.0	11.8
			VARIATION		-0.150		0.500		-0.500		1.500		-0.100		0.050
		SET TWO	CORRECTION FACTOR		-0.325		0.250		-0.500		0.500		-0.063		0.075
4	1903	1941	ZERO	0	1.0	0	1	0	0	0	3	0.0	0.1	0.0	0.0
			SPAN	10	10.0	40	39	42	42	58	59	11.0	10.9	12.0	12.0
			VARIATION		-0.500		0.000		0.000		-2.000		0.000		0.000
		SET THREE	CORRECTION FACTOR		-0.325		0.250		-0.250		-0.250		-0.050		0.025

SET ONE CALIBRATIONS

SET TWO CALIBRATIONS

SET THREE CALIBRATIONS

502
99

05 99 502 SO 2 PPM 07 1 TAG 2 TAG OUTLET FFS

*** LOG GRP 1 *** UNIT 53005 *** START AT 07 [illegible] *** ENDS AT [illegible]

PT DATA UNITS ST LEGEND PT DATA UNITS ST LEGEND PT DATA UNITS ST LEGEND

502
79

05 79 502 SO 2 PPM 07 1 TAG 2 TAG OUTLET FFS

*** LOG GRP 1 *** UNIT 53005 *** STARTS AT 07 40:53 *** ENDS AT 07 40:53 FEB [illegible]

PT DATA UNITS ST LEGEND

502 40

05 40 502 SO 2 PPM 07 2 TAG 2 TAG OUTLET FFS

05 A

0 2.5 5.0 7.5 10.0 12.5 15.0 17.5 20.0

*** LOG GRP 1 *** UNIT 53005 *** STARTS AT 07 33:41 *** ENDS AT [illegible]

PT DATA UNITS ST LEGEND PT DATA UNITS ST LEGEND PT DATA UNITS ST LEGEND

502 20

05 20 502 SO 2 PPM 07 2 TAG 2 TAG OUTLET FFS

*** PRINTER ON 07:34 10 FEB [illegible]
*** PRINTER OFF [illegible] FEB [illegible]

LKB 2-20-91 0735HRS

21K

SO2
39

SO2 NB
20

O
SO2

02
07
THC OUTLET

SO2

*** LOG RP 1 *** UNIT [illegible] *** STARTS AT [illegible] *** ENDS AT [illegible]

[illegible]

89
NOX

*** LOG RP 1 *** UNIT [illegible] *** STARTS AT [illegible]

TRC OUTLET

43 NOX
0 CO

*** LOG RP 1 *** UNIT [illegible] *** STARTS AT [illegible]

*** RESET AVERAGE [illegible]

*** RESET AVERAGE 07:56:08 [illegible]

*** RESET AVERAGE [illegible]

*** RESET AVERAGE 07:55:5[illegible]

21 NO

*** UNIT [illegible] *** STARTS [illegible]

*** LOG GRP 1 *** UNIT S3003 *** STARTS AT [illegible]

58 CO

*** LOG GRP 1 *** UNIT S3003 *** STARTS AT [illegible]

116 CO

*** LOG GRP 1 *** UNIT S3003 *** STARTS AT [illegible]

*** LOG GRP 1 *** UNIT S3003 *** STARTS AT [illegible]

194 CO

*** LOG GRP 1 *** UNIT S3003 *** STARTS AT [illegible] FEB [illegible]

290 CO

11% O2

*** LOG GRP 1 *** UNIT 53000 *** STARTS AT 09 14:13 *** ENDS AT

11% O2
12% CO2
50 THC

*** LOG GRP 1 *** UNIT 53000

10 PPM
THC

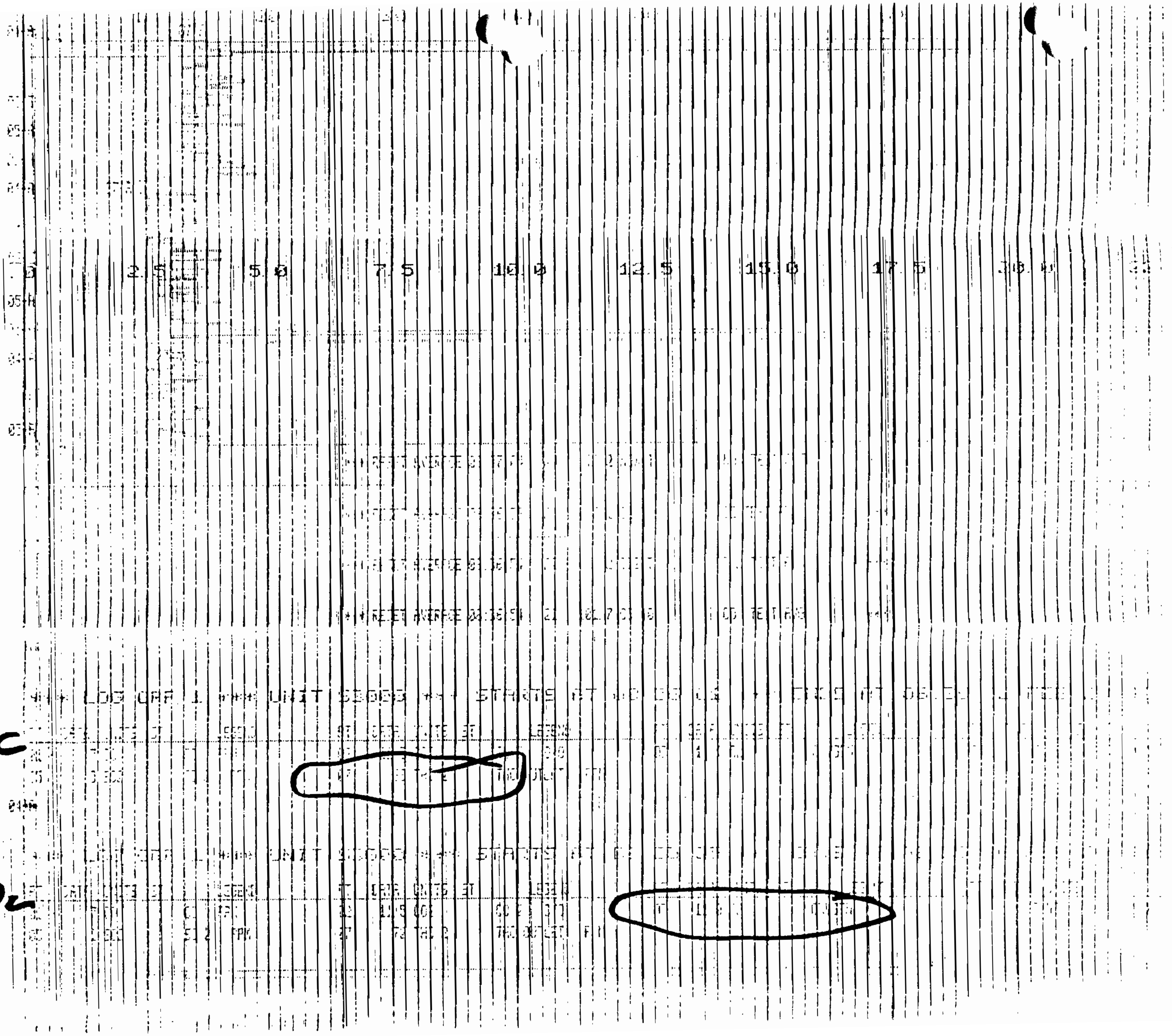
*** LOG GRP 1 *** UNIT 53000

PT	DATA	UNITS	ST		LEGEND	PT	DATA	UNITS	ST	LEGEND
01	117	CO		CO	PPM					
05	1.5	THC		50	PPM	07	12	THC 2		THC OUTLET PPM

116 CO

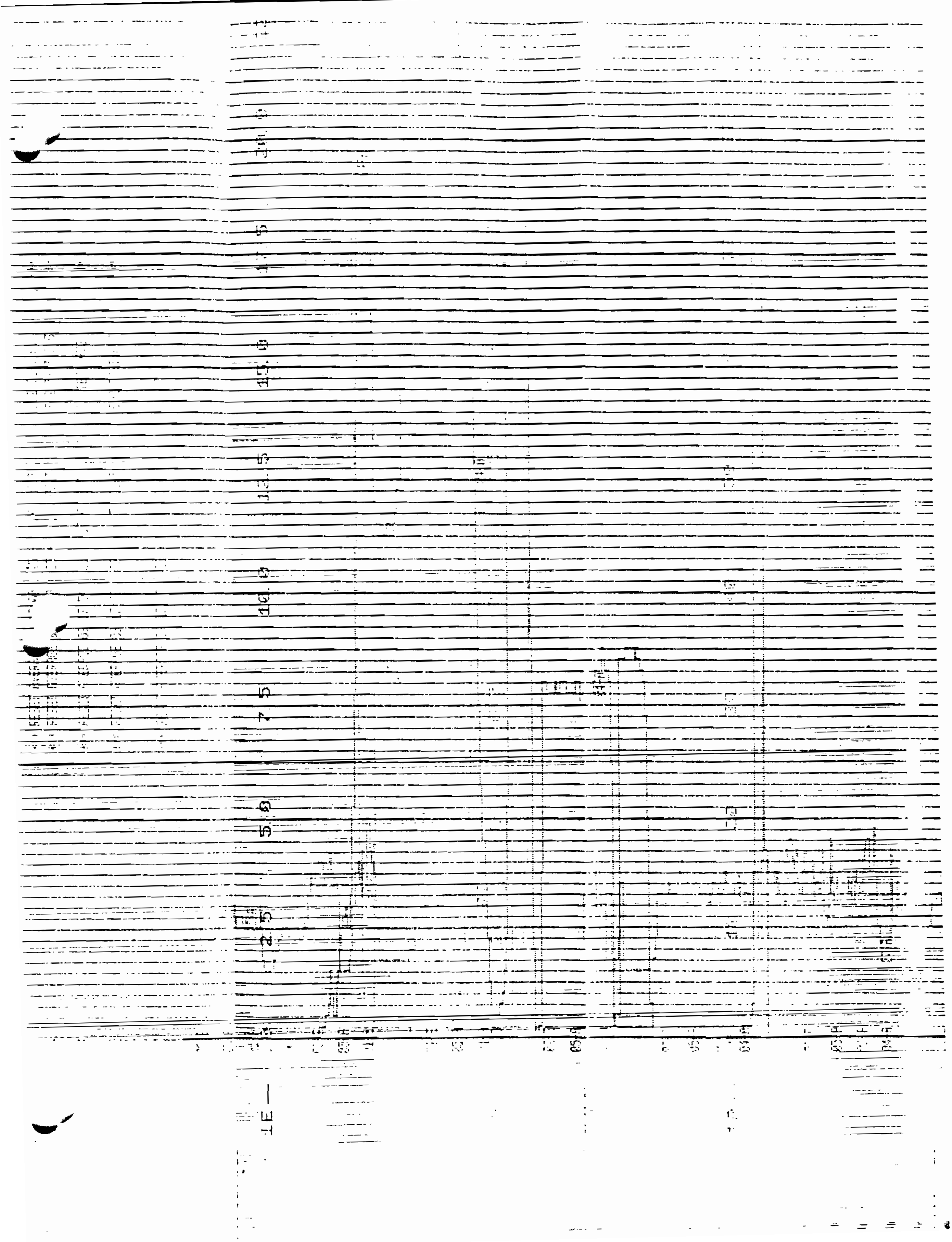
*** LOG GRP 1 *** UNIT 53000 *** STARTS AT

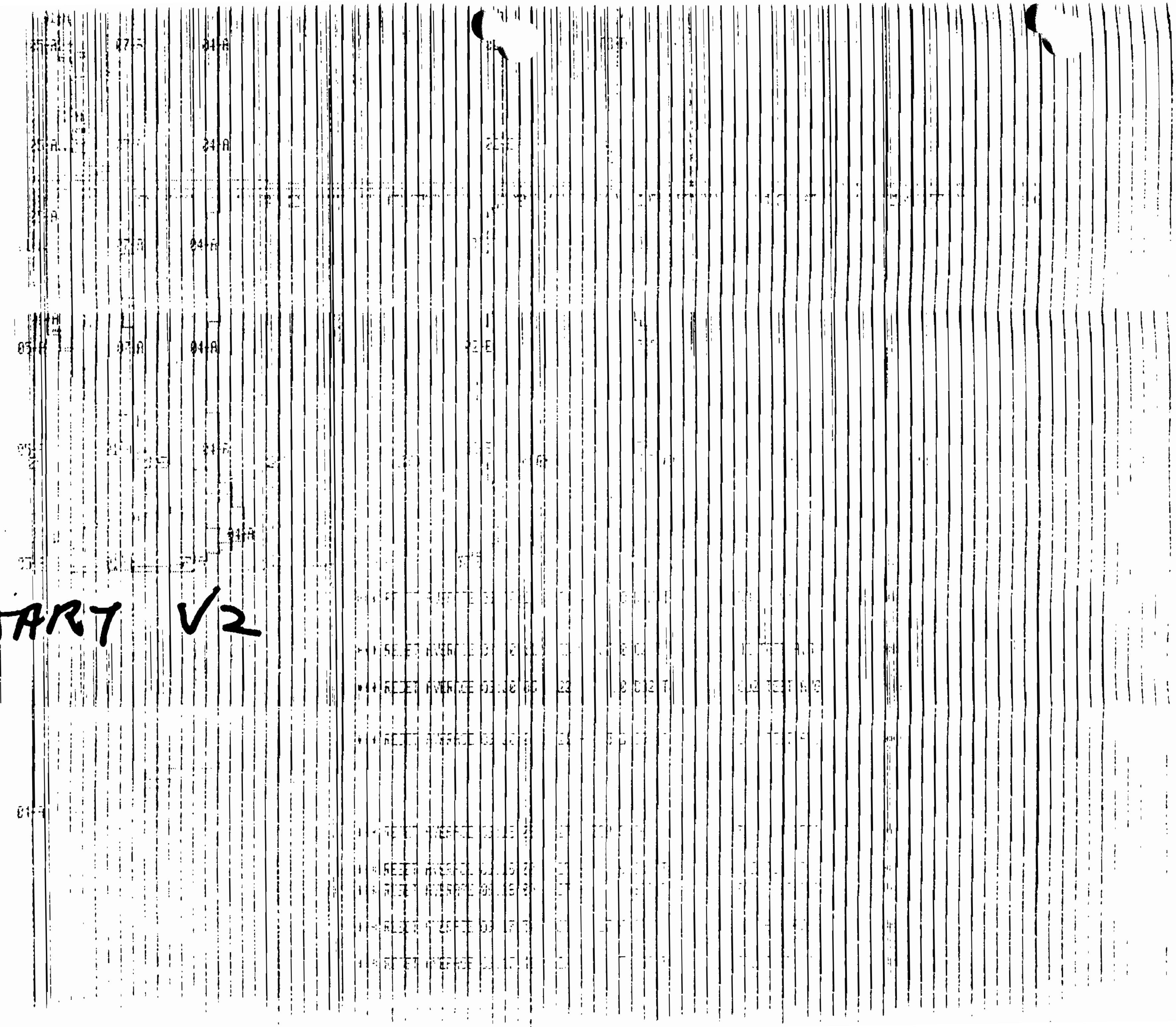
PT	DATA	UNITS	ST		LEGEND
01	117	CO			PPM


1E
0
2.5
5.0
7.5
10.0
12.5
15.0
17.5
*** REJECT AVERAGE
*** LOG OFF 1 *** UNIT 55000 *** STARTS AT

98 THC

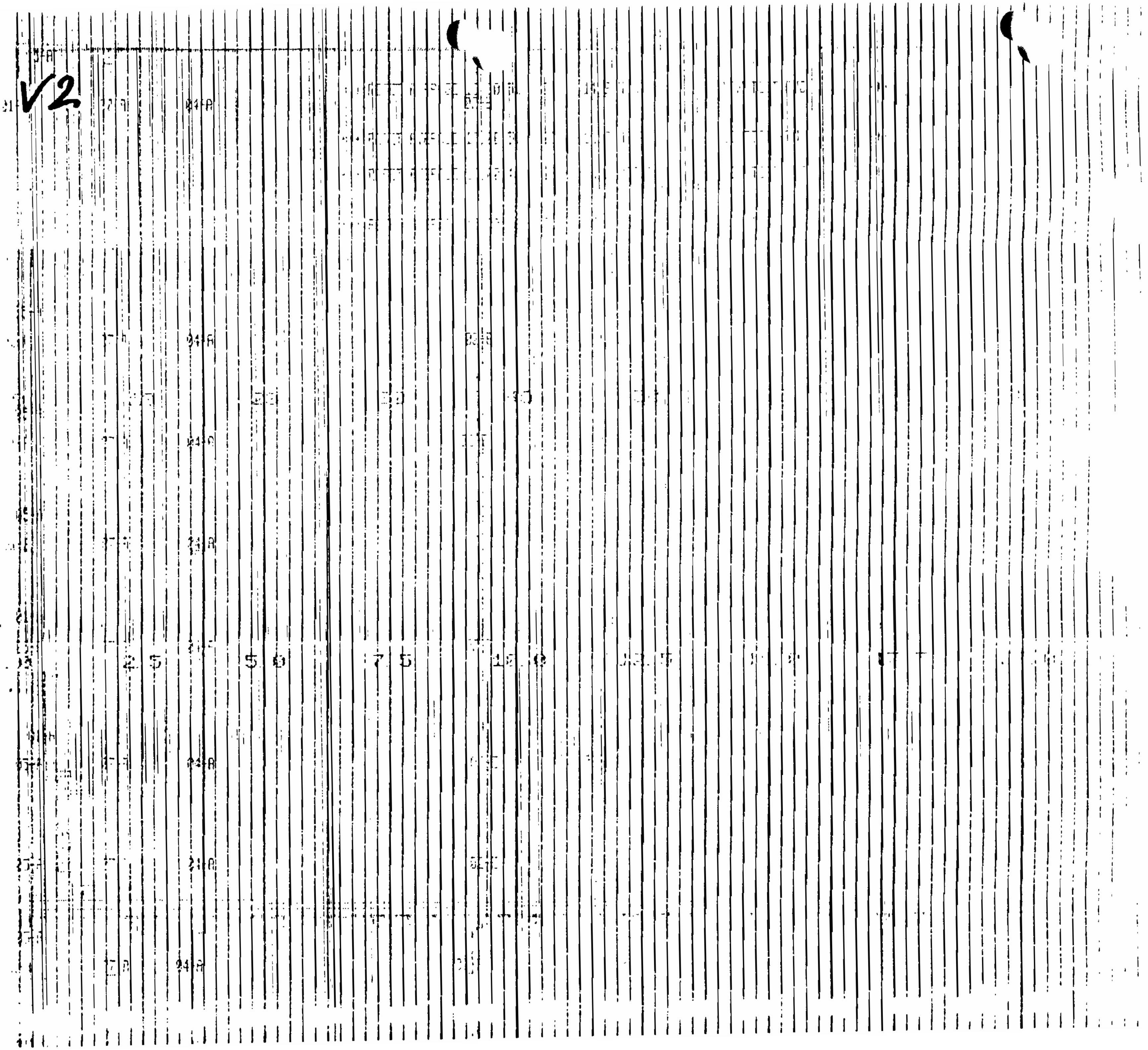
11% O2


1E
2.5
5.0
7.5
10.0
12.5
15.0
20.0



START V2

E-MD V2



99.6 SO_2

0 SO_2
NOX

0 CO
9 O_2

0 CO_2-tmo
29000

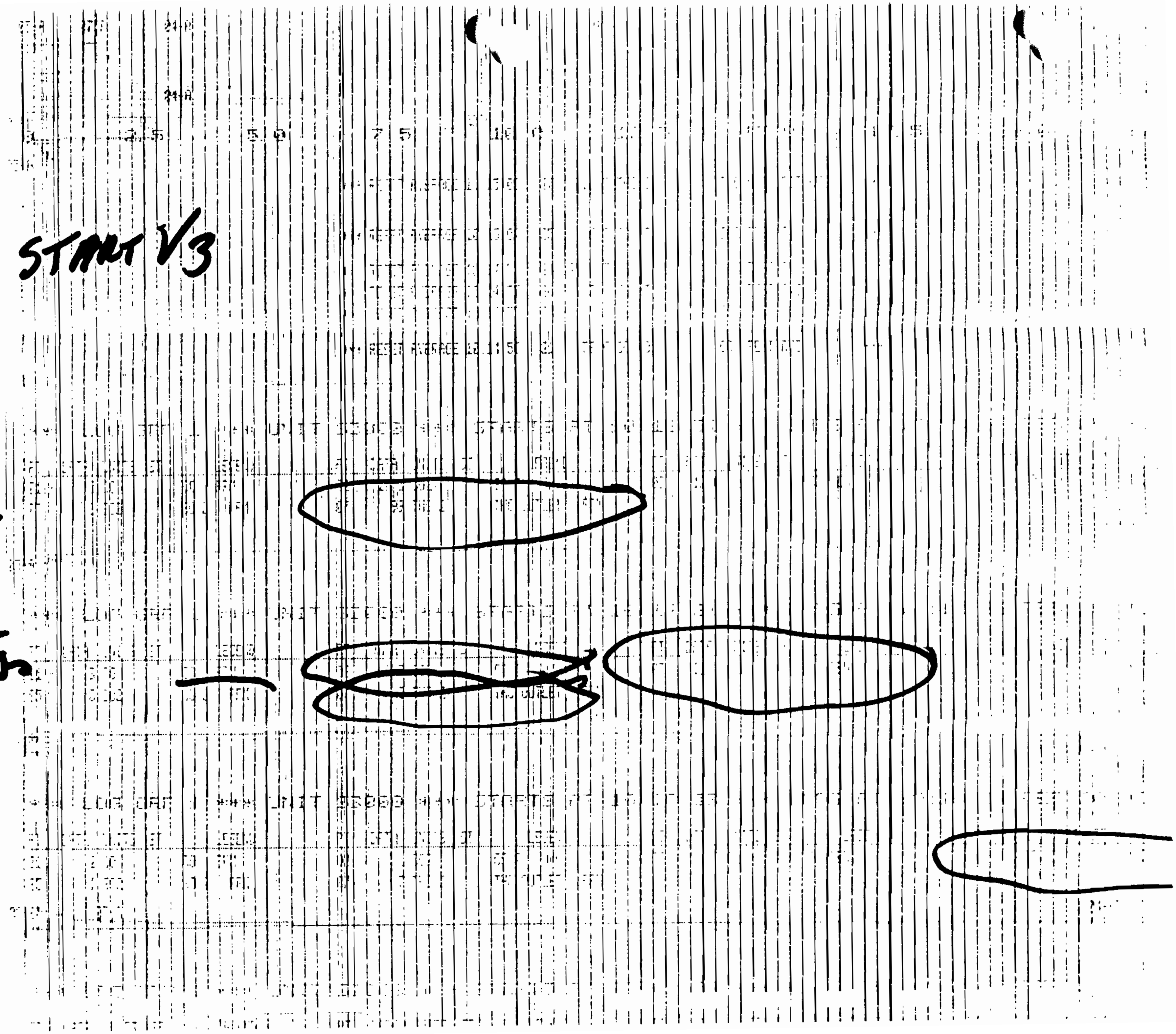
END V2

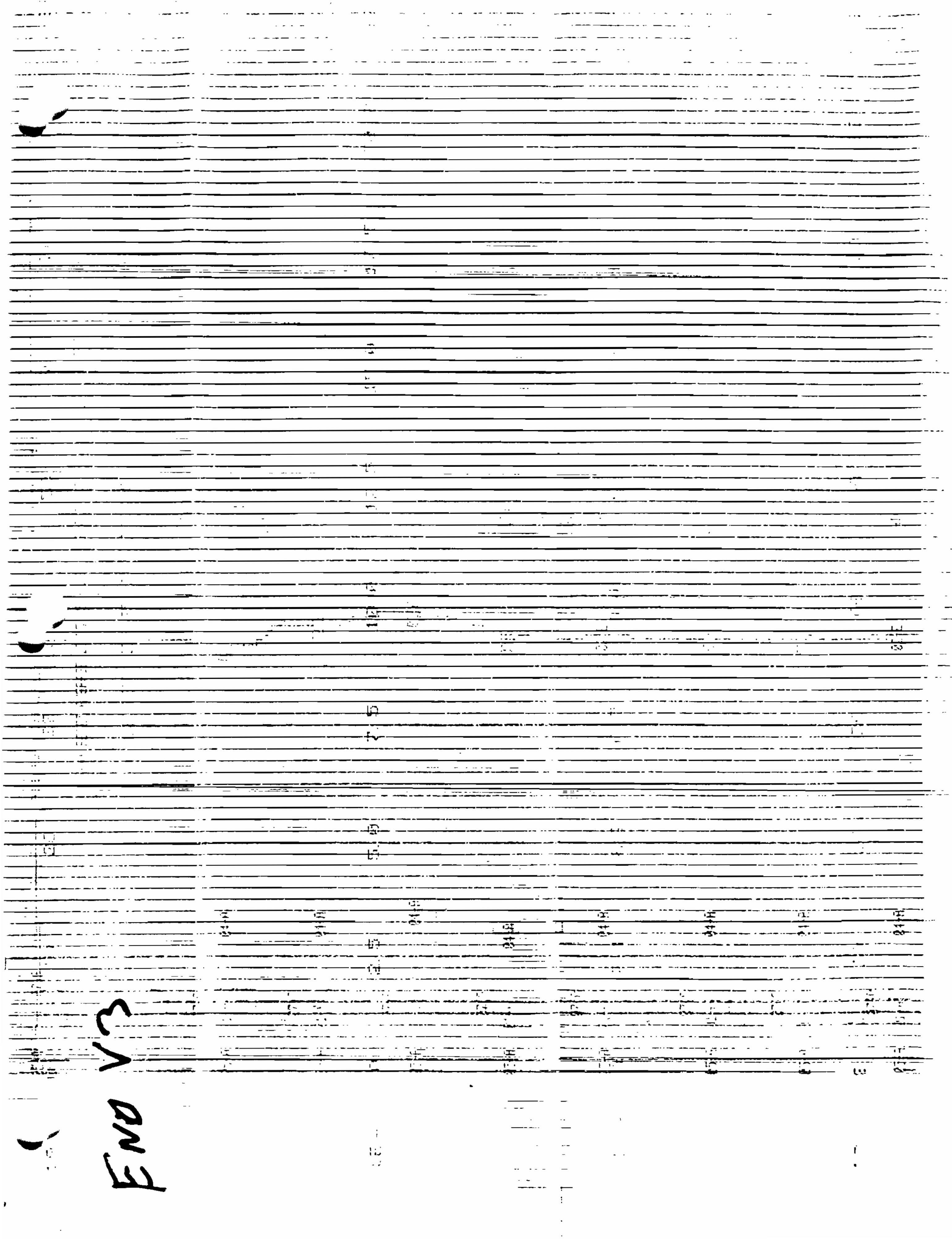
START V3

98.9
THC

0 % HC
11.8 % O_2
12.6 % CO_2

84
NOX





END V3

79 SO_2

64 NO_2

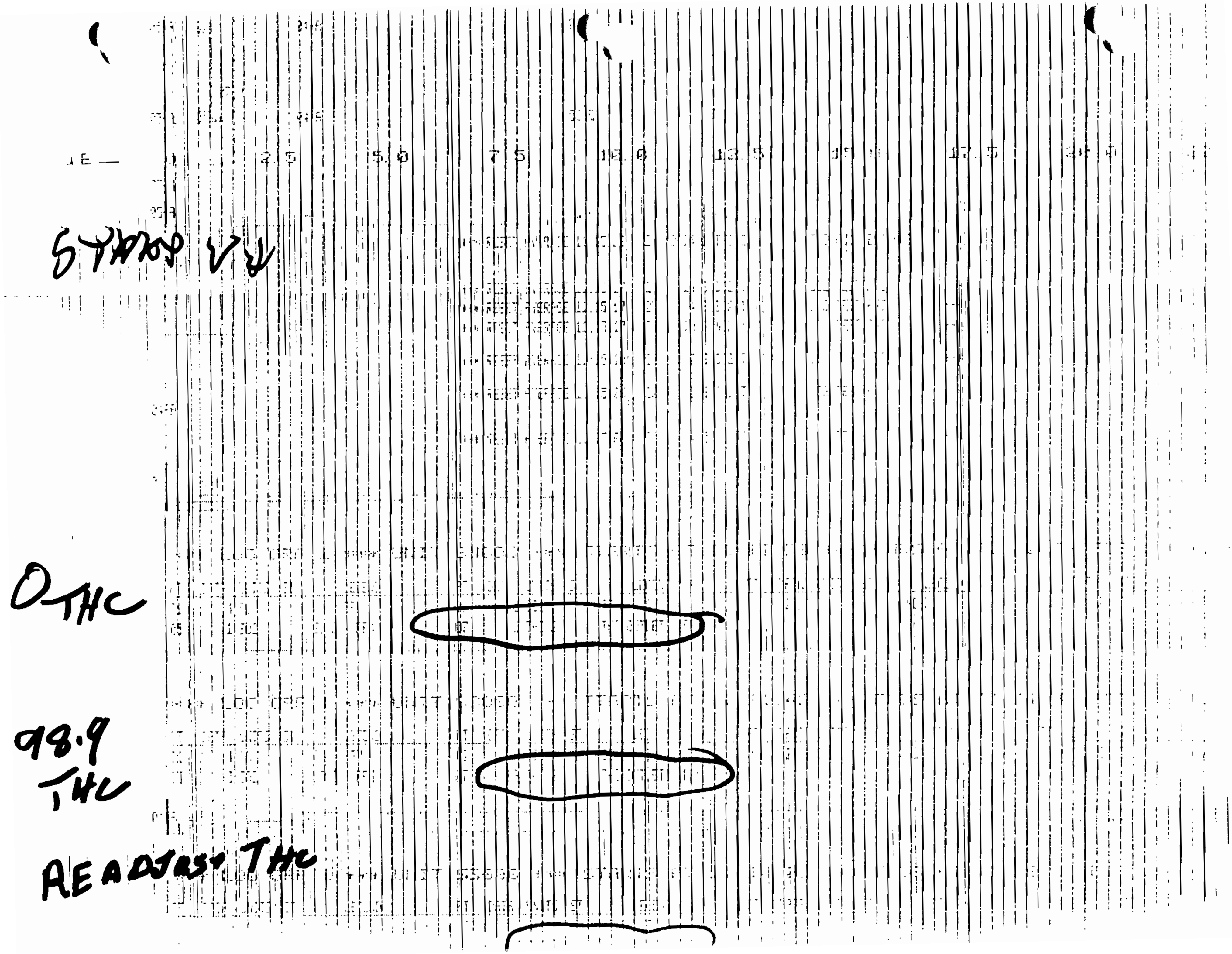
*** LOG GRP 1 *** UNIT 53003 *** STARTS AT 11 01

SO_2 O

*** LOG GRP 1 *** UNIT 53003 *** STARTS AT

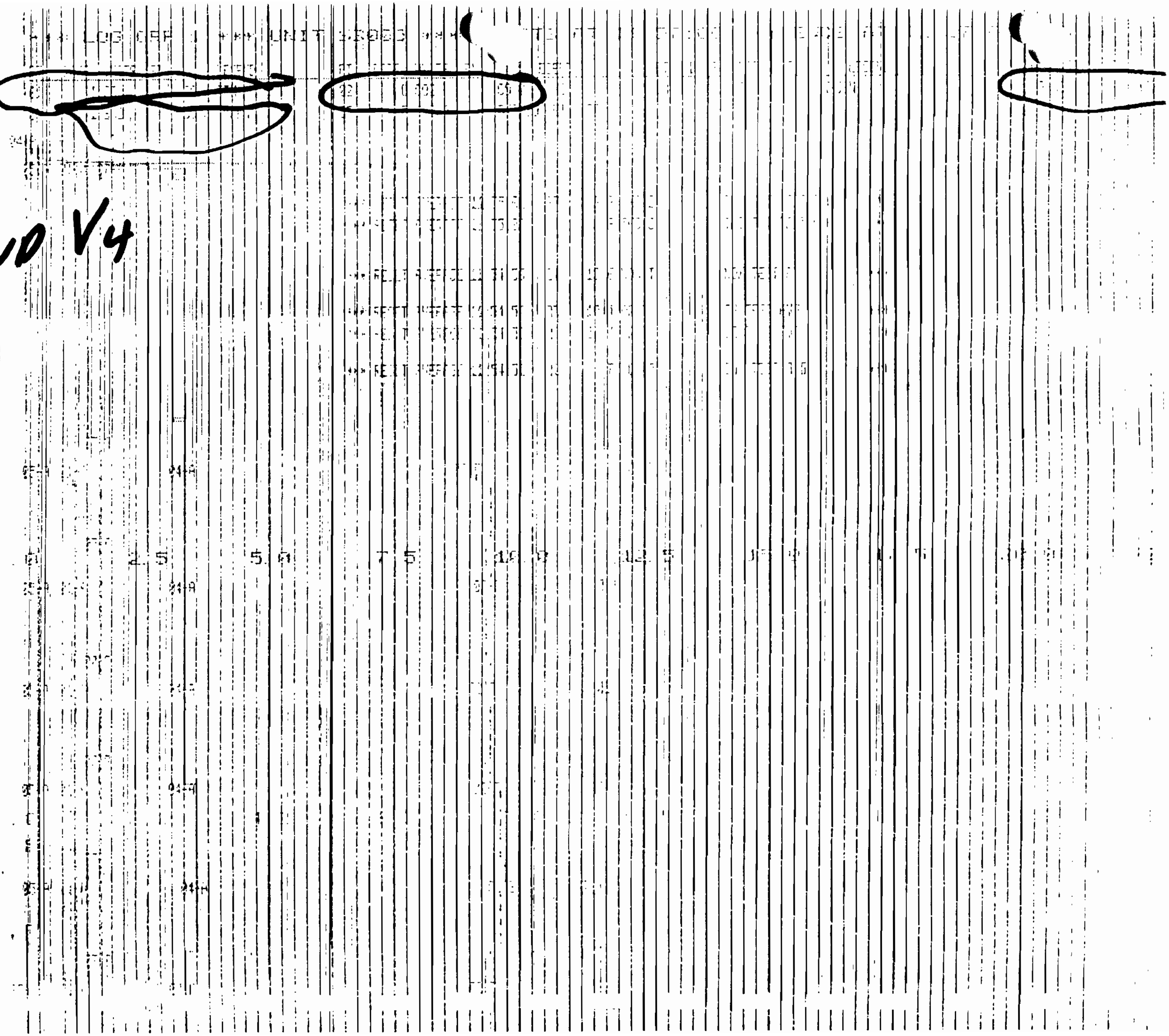
O CO
O_2 CO_2
NOX

232 CAK


2.5
5.0
7.5
10.0
12.5
17.5
STARTS VL
0 THC
98.9 THC
READJUST THC

0 ?

End V4



21 NOx

*** LOG OFF 1 *** UNIT 55003 *** STARTS AT 12:03:55 *** ENDS AT

ZERO SO2

*** LOG OFF 1 *** UNIT 55003 *** STARTS

N16 CO
NOx @ O2 + CO2

*** LOG OFF 1 *** UNIT 55003 *** STARTS AT 12:01:42 *** ENDS AT

232 CO

0 O2

40 SO_2

60 SO_2

79.6 SO_2

44 NO_x

63 NO_x

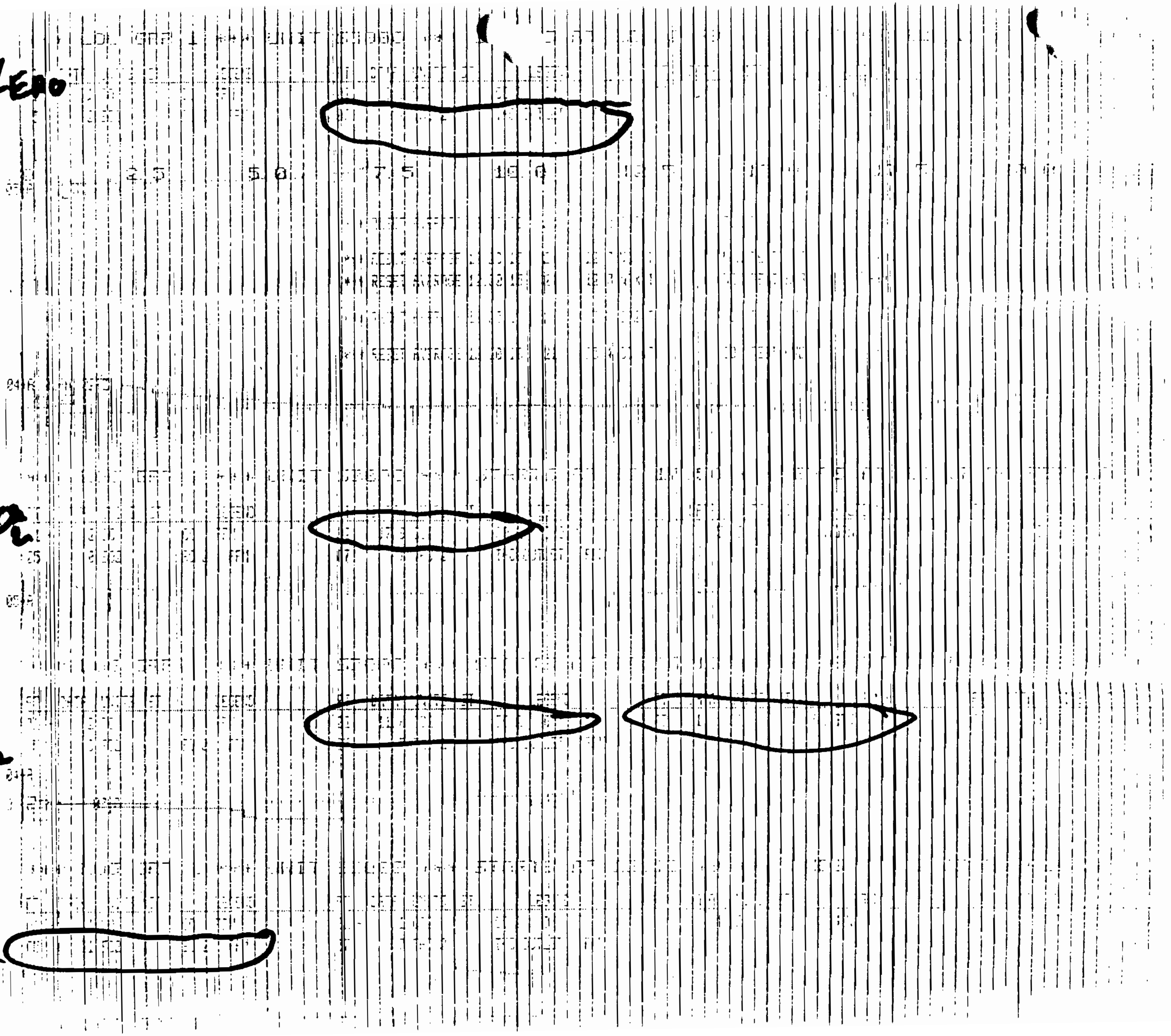
42 NO_x

THC ZERO

18% CO_2

11% O_2
12% CO_2

20 SO_2



START VS

*** RESET AVERAGE 13:14:35

*** RESET AVERAGE 13:14:30 21 17.3 03 O2 TEST AVG ***

*** RESET AVERAGE 13:14:25 21 5.9 CO2T CO2 TEST AVG ***

*** RESET AVERAGE 13:14:25 21 2.8 CO 40 CO TEST AVG ***

*** LOG GRP 1 *** UNIT 55000 *** STARTS AT 12:53:50 ***

PT DATA UNITS ST LEGEND PT DATA UNITS ST LEGEND PT DATA UNITS ST LEGEND

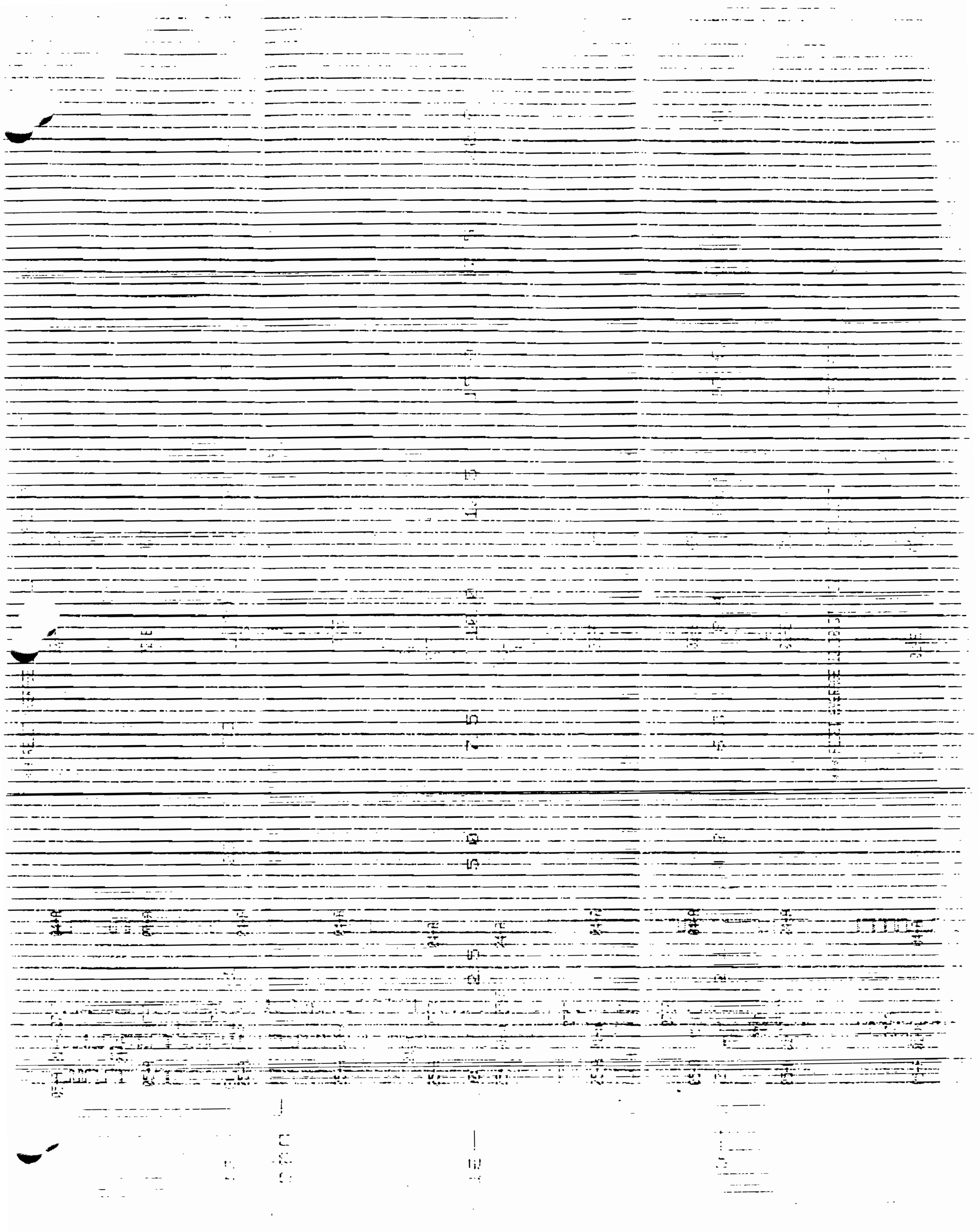
2.00 FH

2.503 FFH

99 THC

*** LOG GRP 1 *** UNIT 55000 *** STARTS AT

THC ZERO

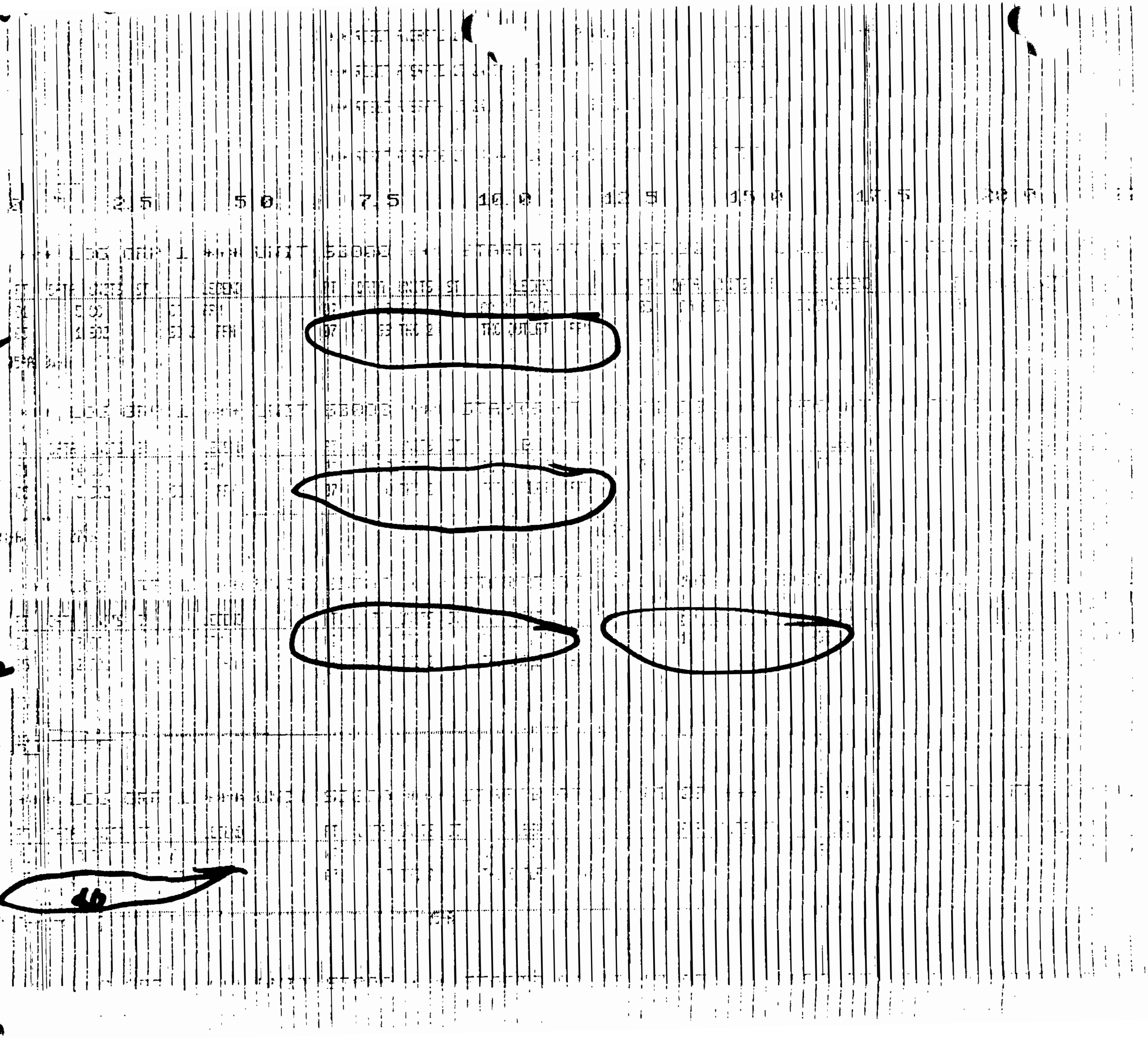


ZERO CO_2+O_2

232 CO
0 NOx

0 CO
SO_2

ENOVS

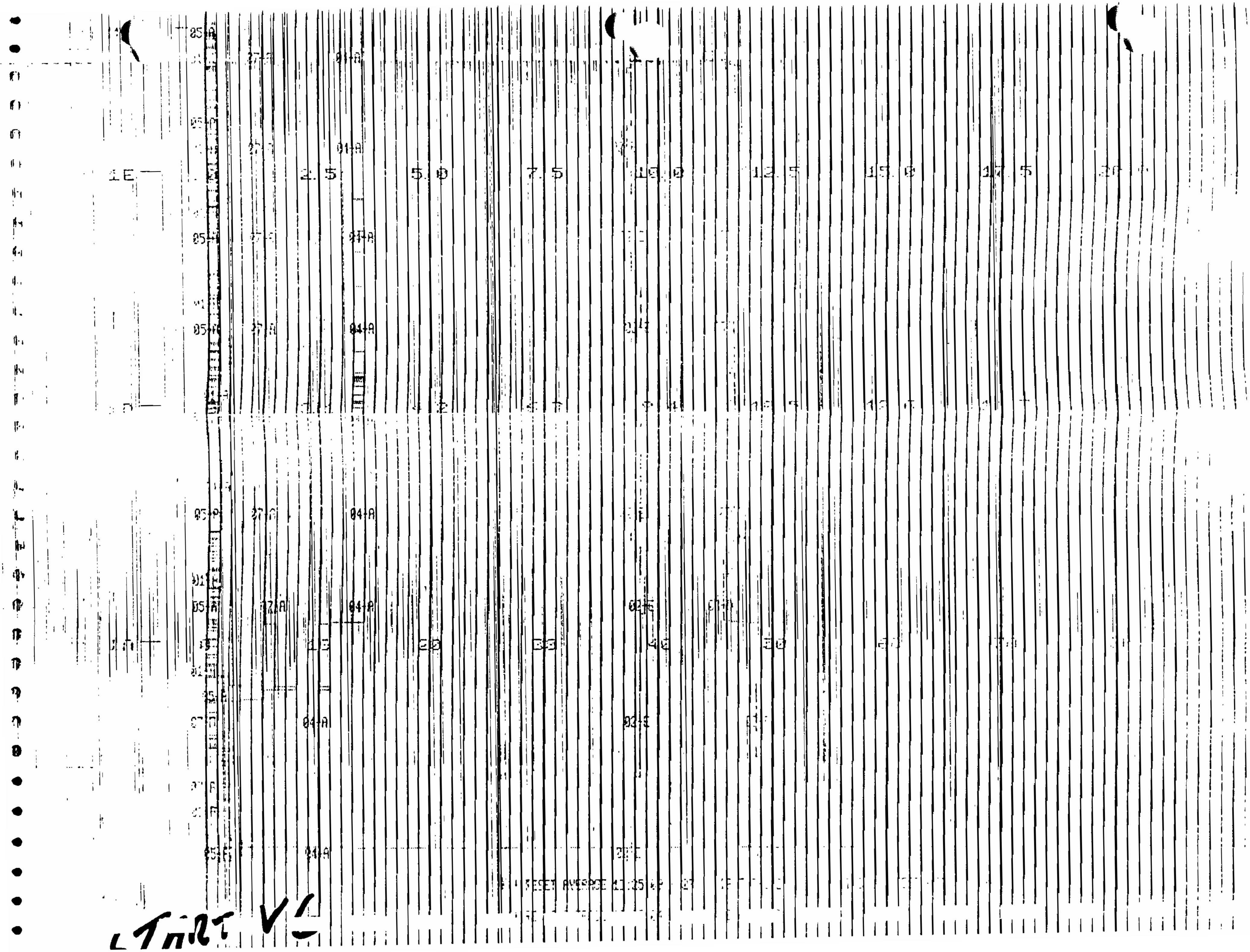


99 THC

0 THC

11% O_2
12% CO_2

79 SO_2



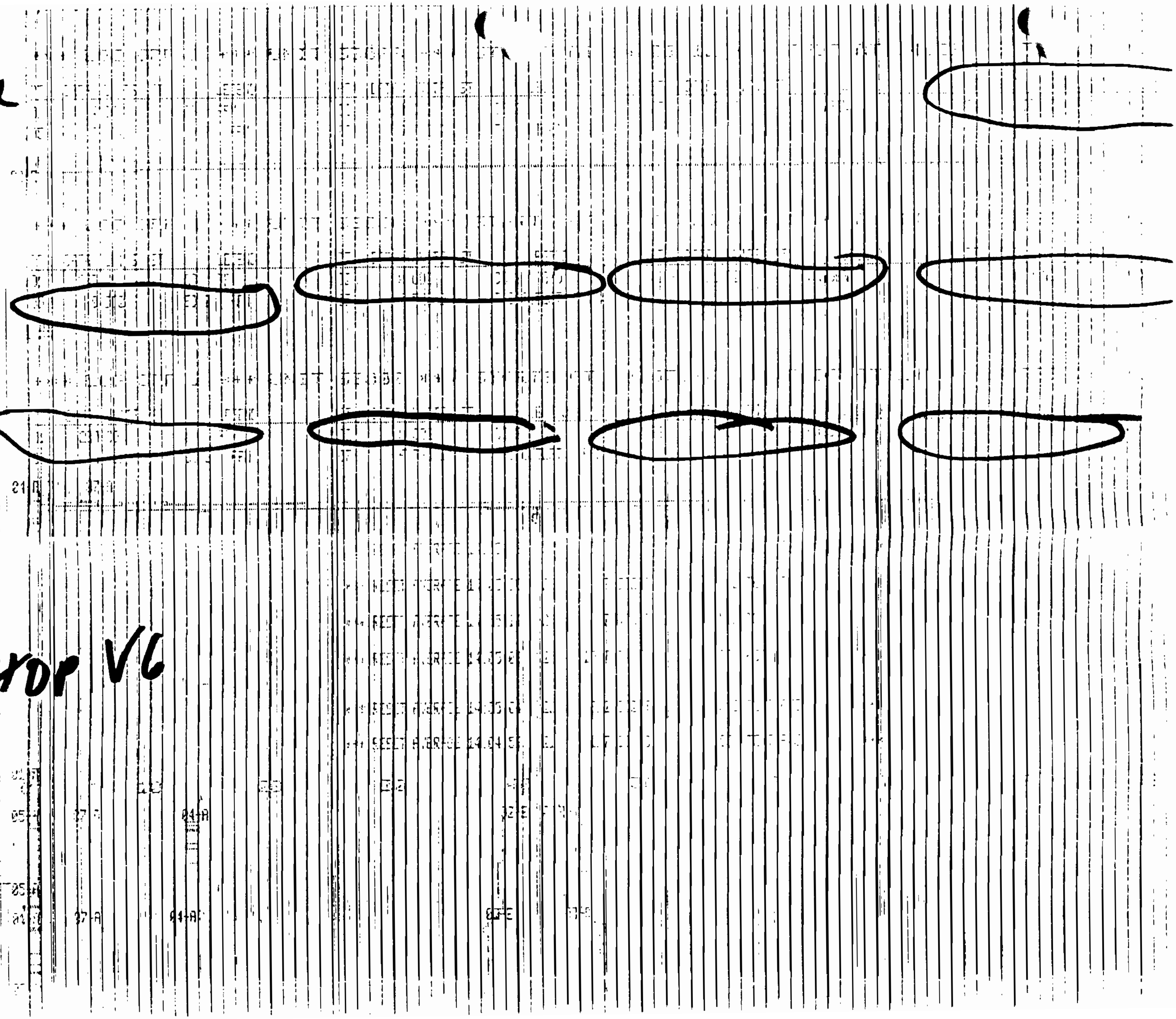
Start V

84 NOx

ZERO

252 CO

STOP VG

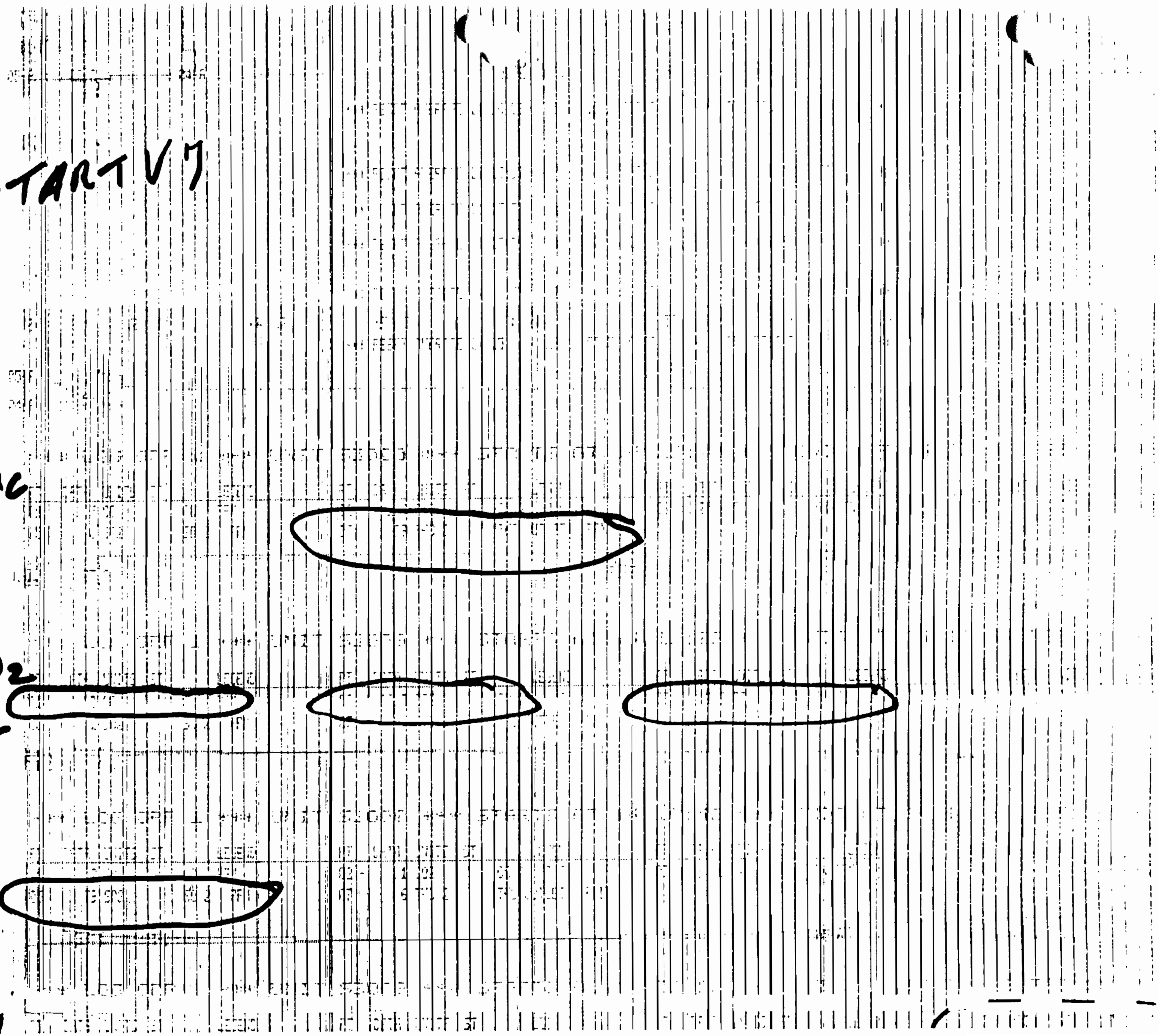


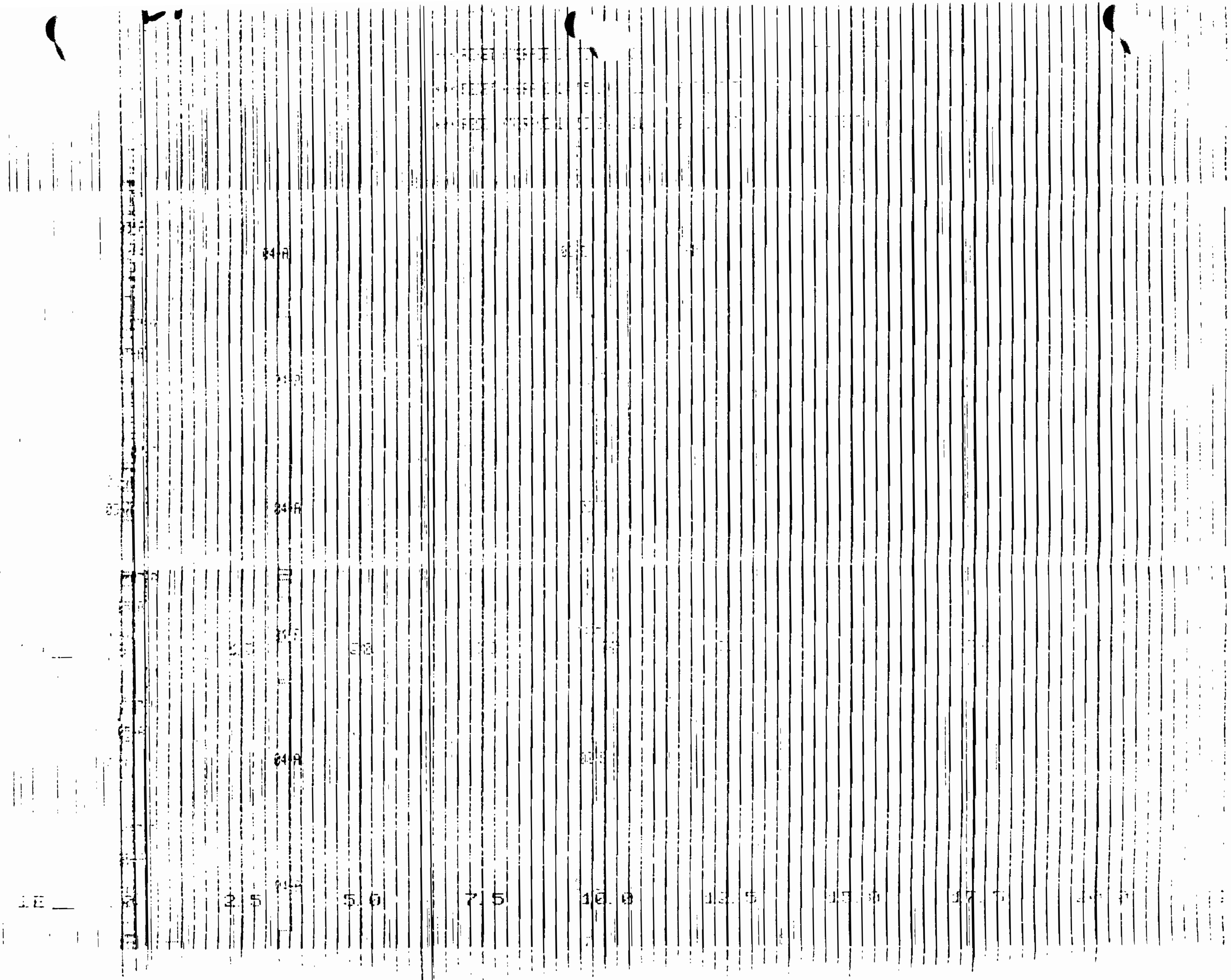
START V7

99 THC

0 CO
12% CO_2
11% O_2

80 SO_2




2.5
5.0
7.5
10.0

10x

*** LOG GRP 1 *** UNIT S3003 *** STARTS AT [illegible]

*** LOG GRP 1 *** UNIT [illegible] *** STARTS AT [illegible]

232 CO
99 THC

TH 2 TH OUTLET FFI

45:03:03

*** LOG GRP 1 *** UNIT S3003 *** STARTS AT 14:58:03 *** ENDS AT [illegible]

1.000

TH 2 TH OUTLET FFI

*** LOG GRP 1 *** UNIT S3003 *** STARTS AT 14:[illegible] *** ENDS AT [illegible]

OTHC

1E 0 2.5 5.0 7.5 10.0 12.5 [illegible]

END V1

START V8

*** LOG GRP 1 *** UNIT [illegible] *** STARTS AT [illegible]

129% CO_2
11% O_2

*** LOG GRP 1 *** UNIT [illegible] *** STARTS AT [illegible]

80 SO_2

PT	DATA	UNITS	ST	LEGEND	PT	DATA	UNITS	ST	LEGEND	PT	DATA	UNITS	ST	LEGEND
[illegible]	[illegible]			[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]			[illegible]

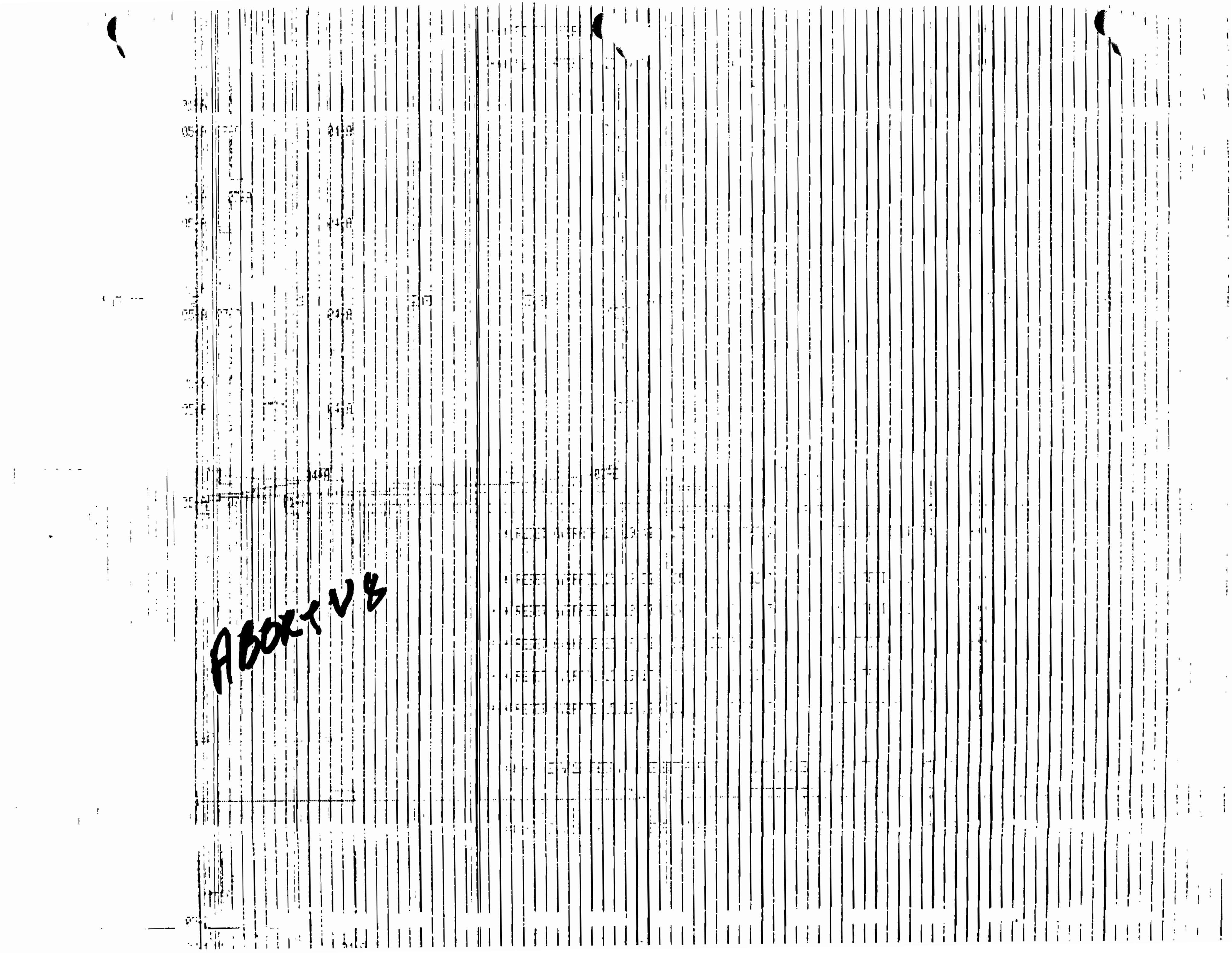
*** LOG GRP 1 *** UNIT [illegible] *** STARTS AT [illegible]

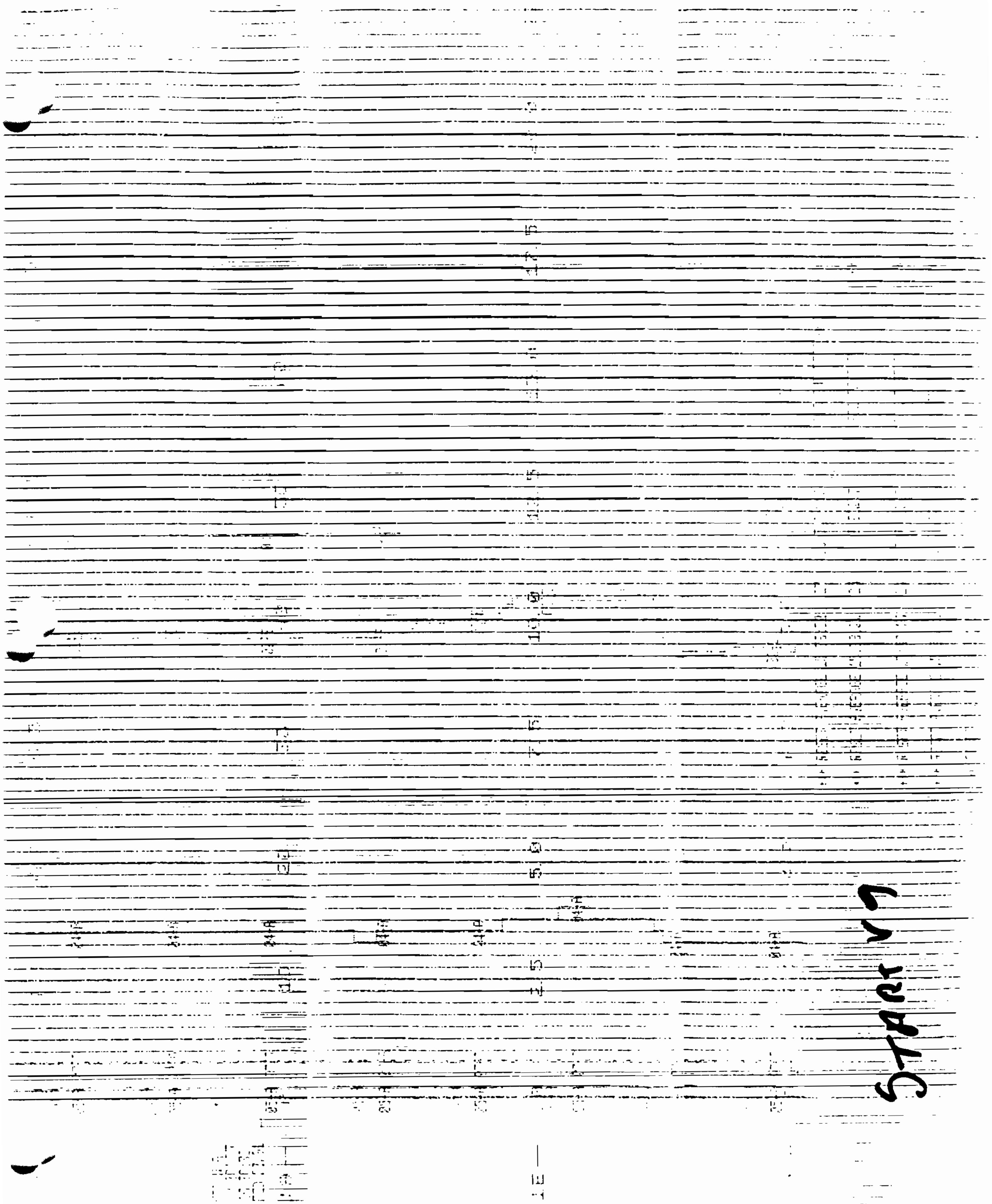
64 NOX

PT	DATA	UNITS	ST	LEGEND	PT	DATA	UNITS	ST	LEGEND
[illegible]	[illegible]			[illegible]	[illegible]	[illegible]			[illegible]
[illegible]	[illegible]			[illegible]	[illegible]	[illegible]			[illegible]

*** LOG GRP 1 *** UNIT [illegible] *** STARTS AT [illegible]

0 O_2
CO
CO_2

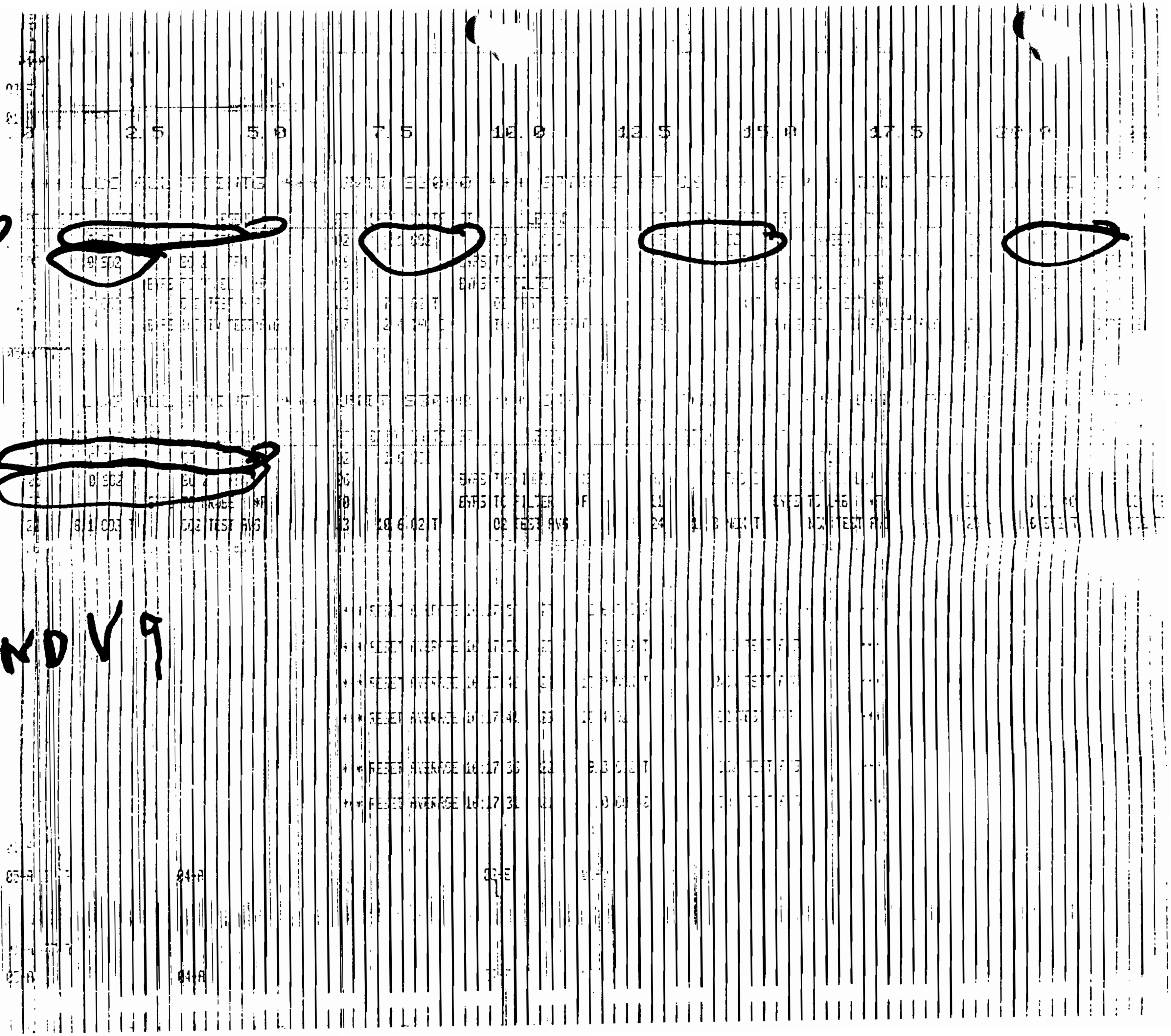

ABOXTV8


START V7

ZERO

ZERO
CO

END VA



11% O2
12% CO2

*** LOG FULL POINTS *** UNIT 5...

80 SO2

BYPS THC IN TEST AVG

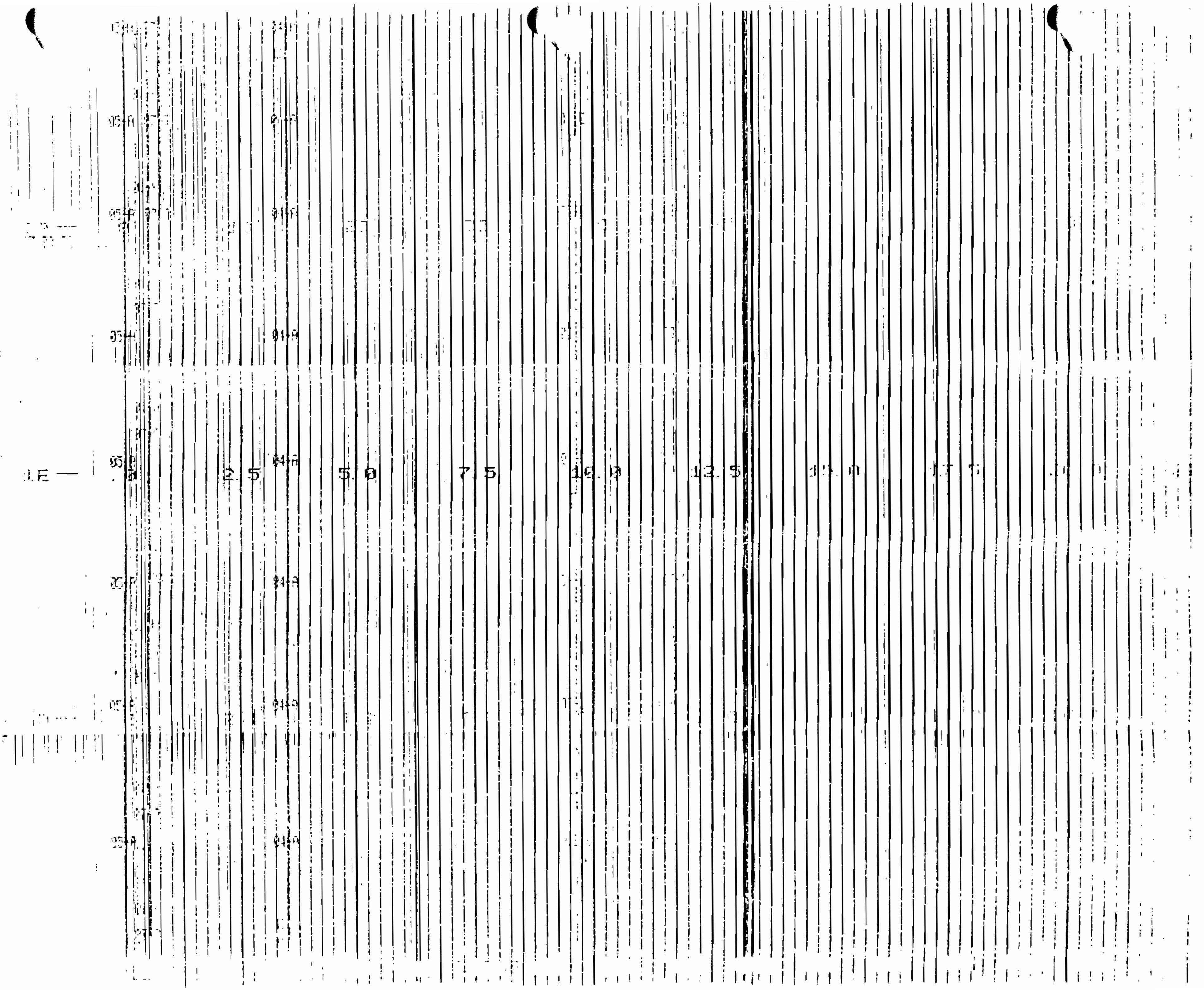
84 NOx

BYPS TO ARGEE
CO2 TEST AVG
BYPS THC IN TEST AVG
2.4 THC 2
THC OUT TEST AVG
BYPS STACK TEMP TEST AVG

232 CO

*** LOG FULL POINTS *** UNIT 5...

2.3 CO
BYPS THC INLET
BYPS TO ARGEE
BYPS TO FILTER
2.6 CO2 T
CO2 TEST AVG
2.7 O2 T
O2 TEST AVG
BYPS THC IN TEST AVG
2.4 THC 2
THC OUT TEST AVG
BYPS STACK TEMP TEST AVG


2.5
5.0
7.5
10.0
12.5

98.9 THC

99

232 CO

CO2 & O2

O CO

SO2 NOx

BYPS TO PROBE

BYPS TO FILTER

BYPS TO LMB

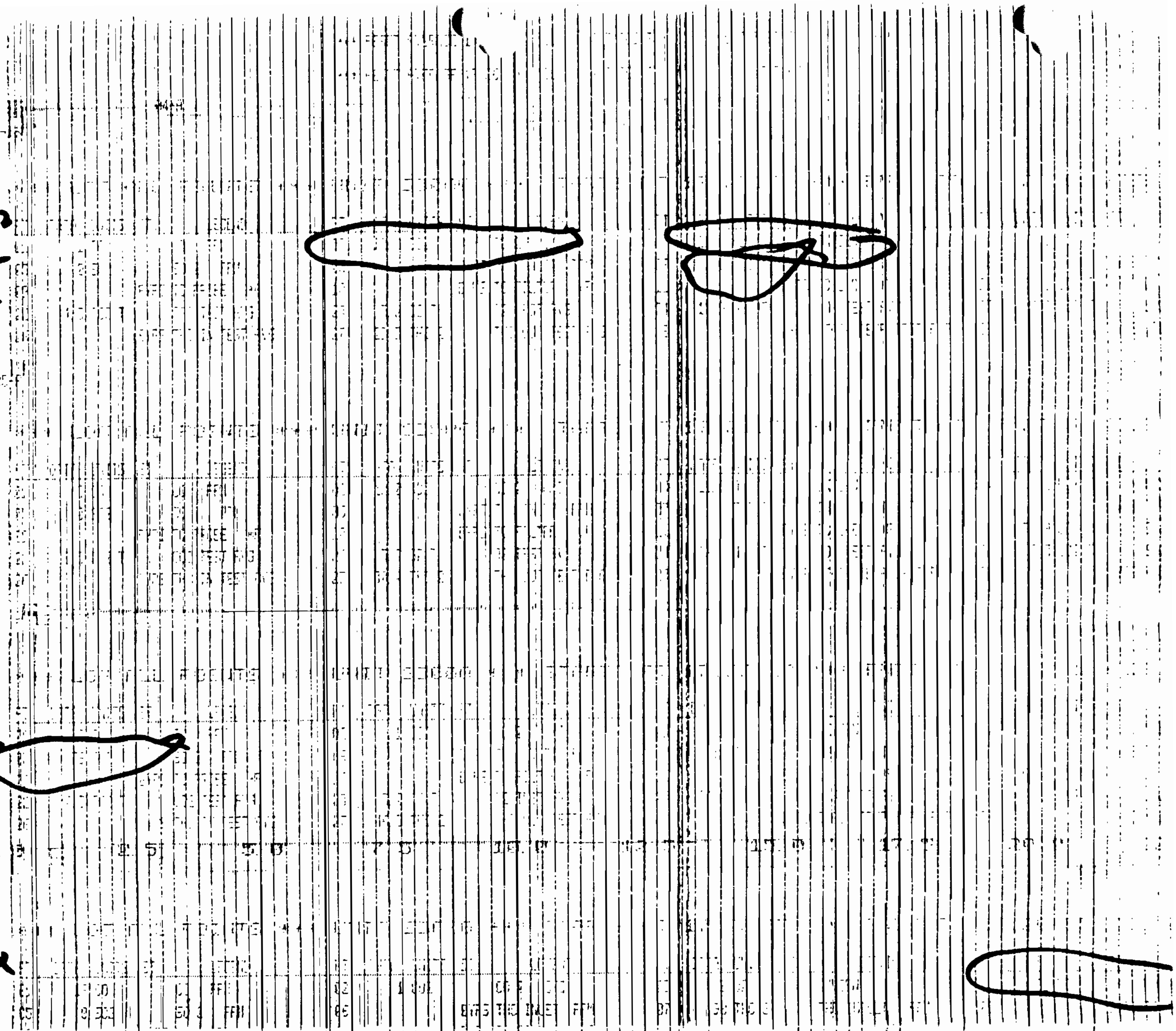
*** RESET AVERAGE 17:11:54 23 1.7 SO2 T SO2 TE T AVG

*** RESET AVERAGE 17:11:39 24 13.6 CON T

*** RESET AVERAGE 17:11:34 21

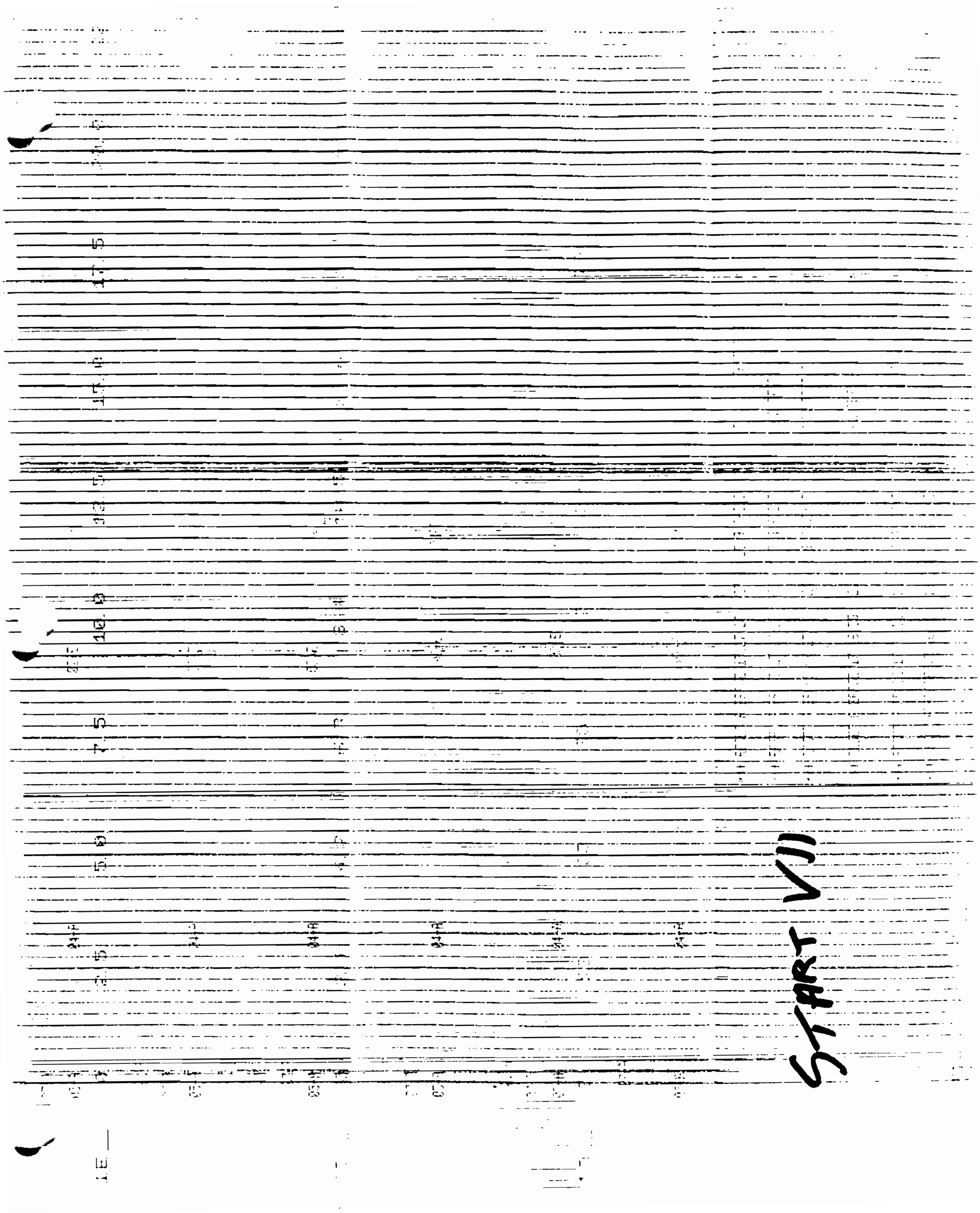
STOP V10

12% CO_2
11% O_2
0 THC

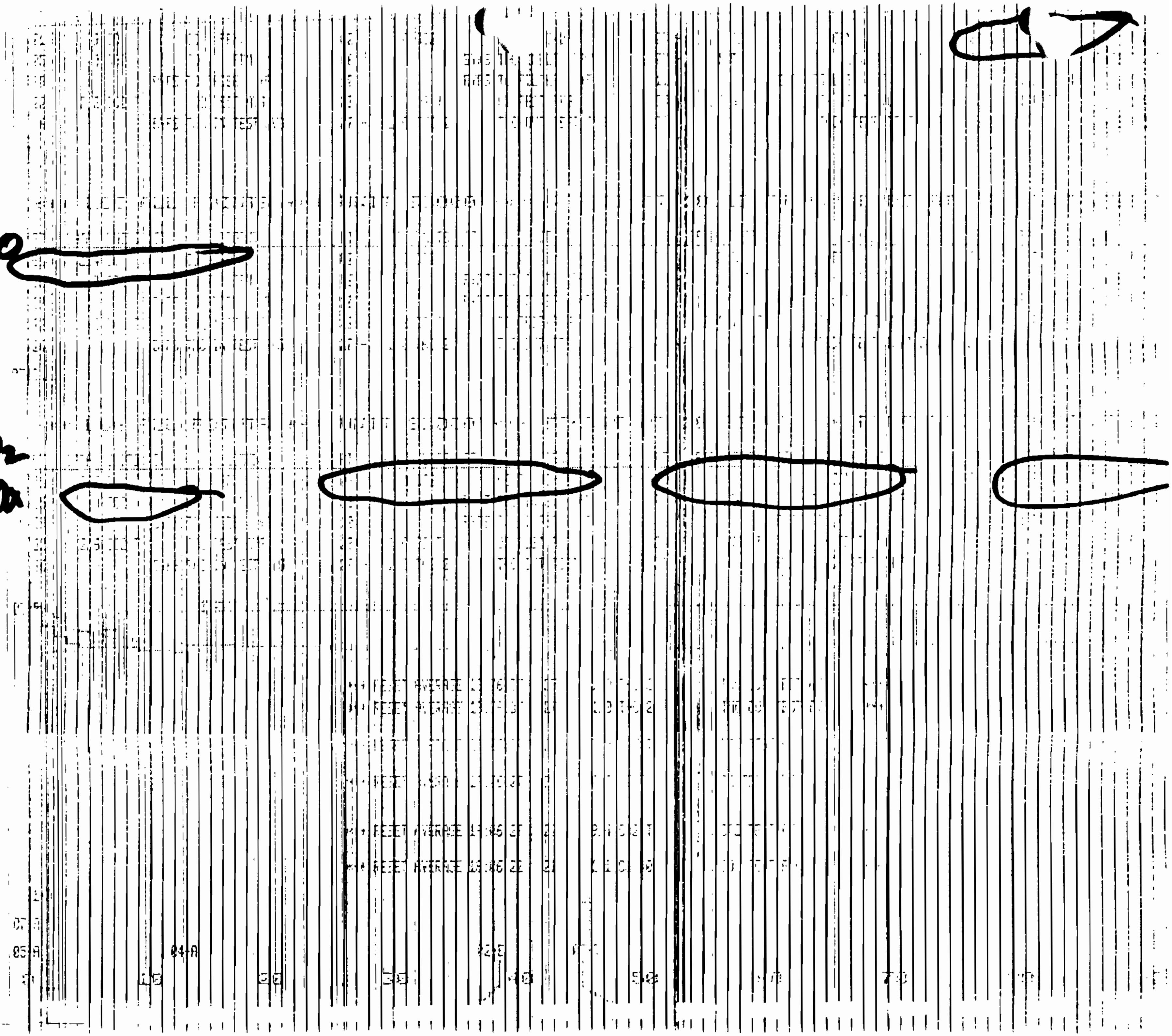


80 SO_2

84 NO_x

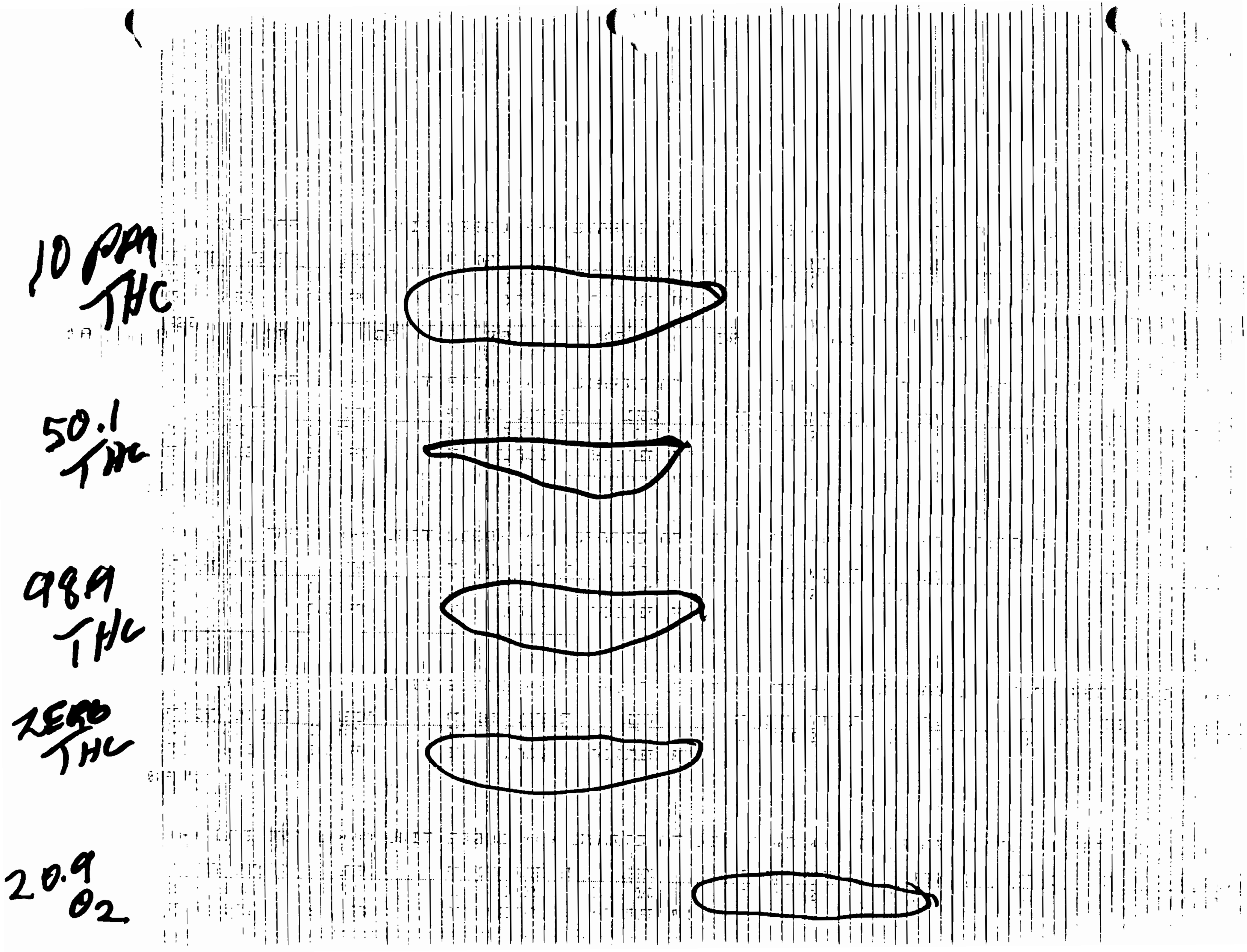

START VII

O3
NOx



232 CO

0 50% O2
Con
NOx


10 PPM THC
50.1 THC
98.9 THC
ZERO THC
20.9 O2

18.4

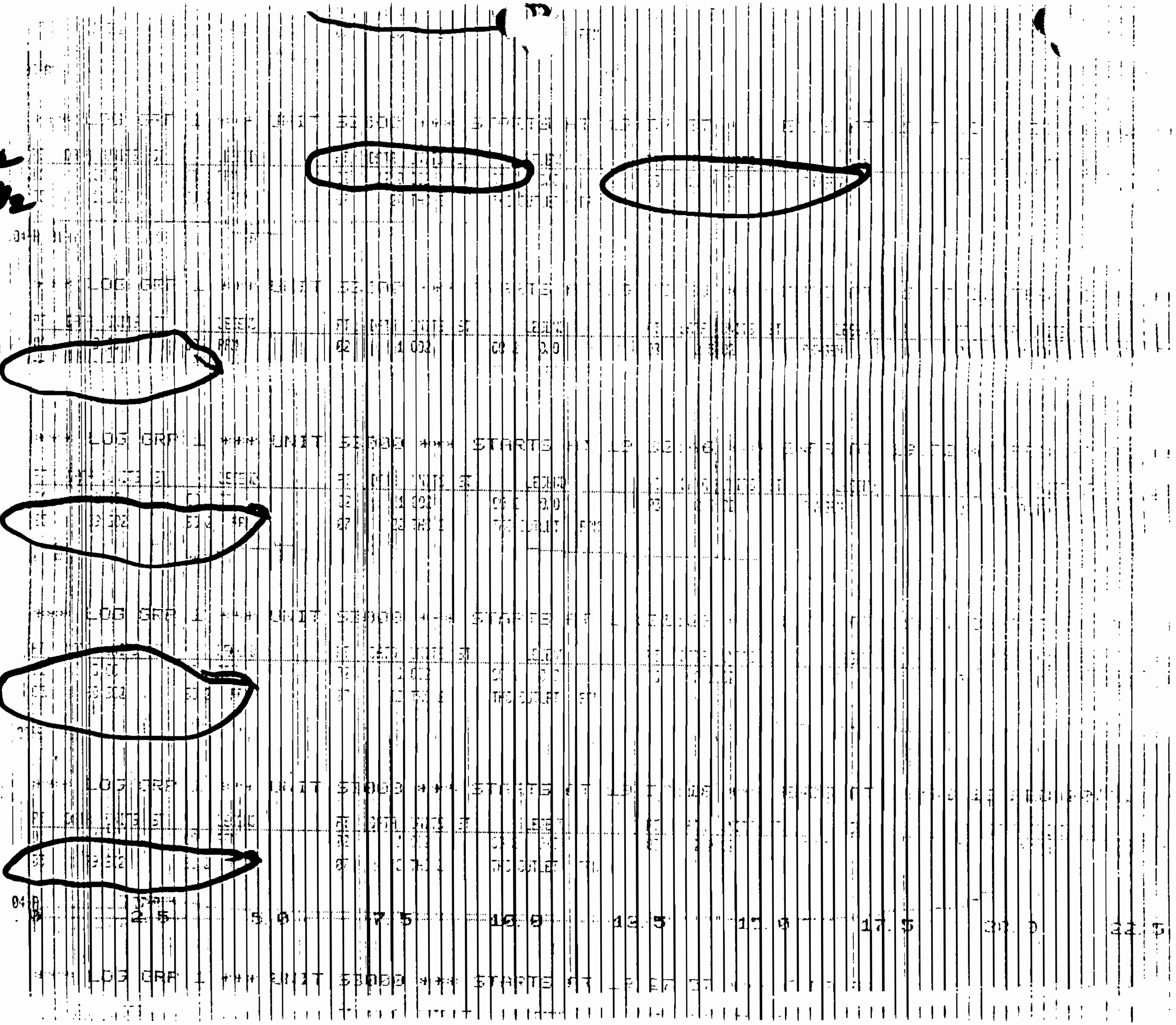
11% O_2
12% CO_2

19.9 SO_2

39.8 SO_2

59.7 SO_2

79.6 SO_2



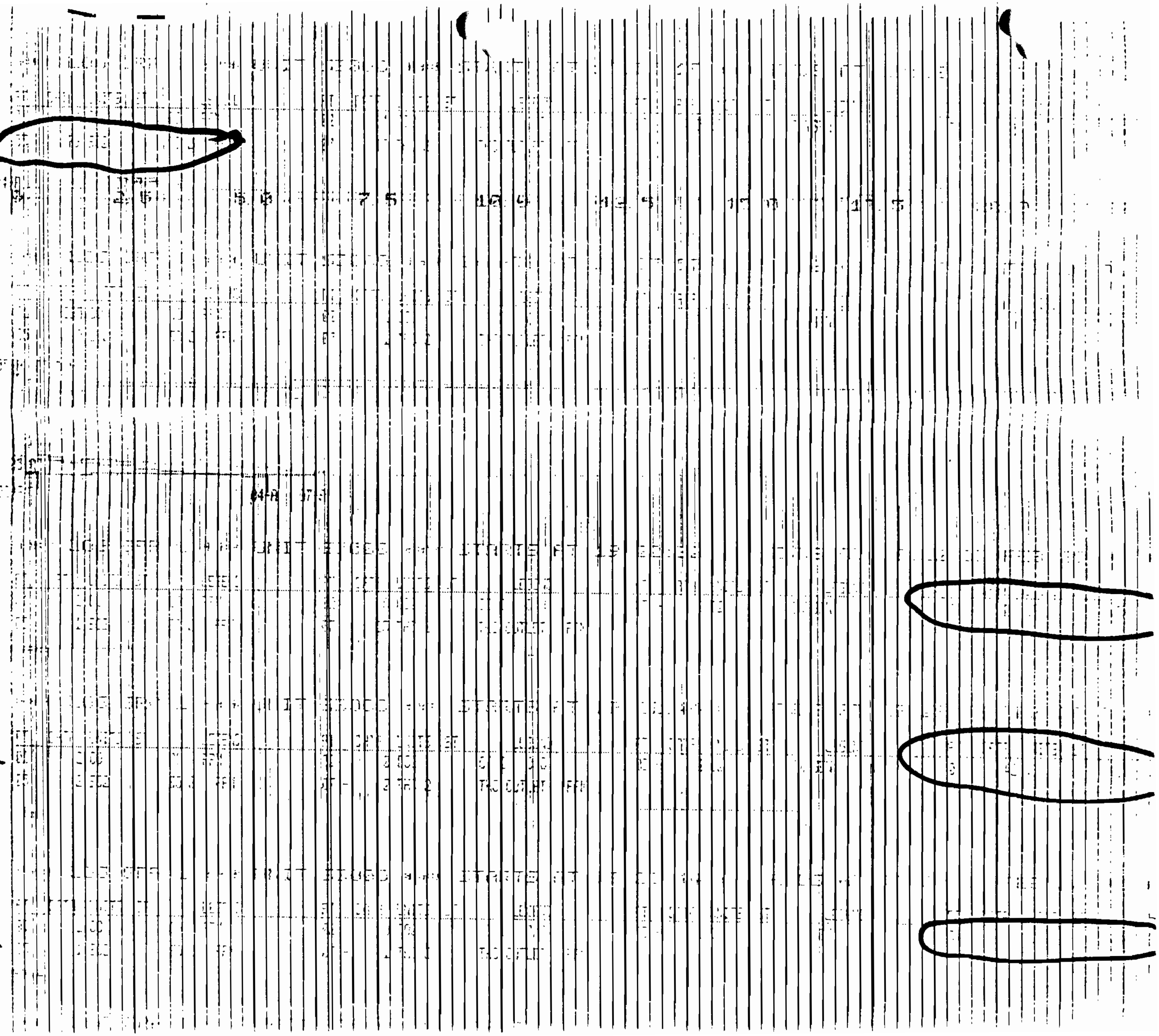
79.6
SO_2

Lk Ck
OK

21 NOx

42 NOx

63 NOx



63 NOx

84 NOx

ZERO CO

*** LOG BFR 1 *** UNIT S3000 *** STARTS AT 15:15:00 *** ENDS AT

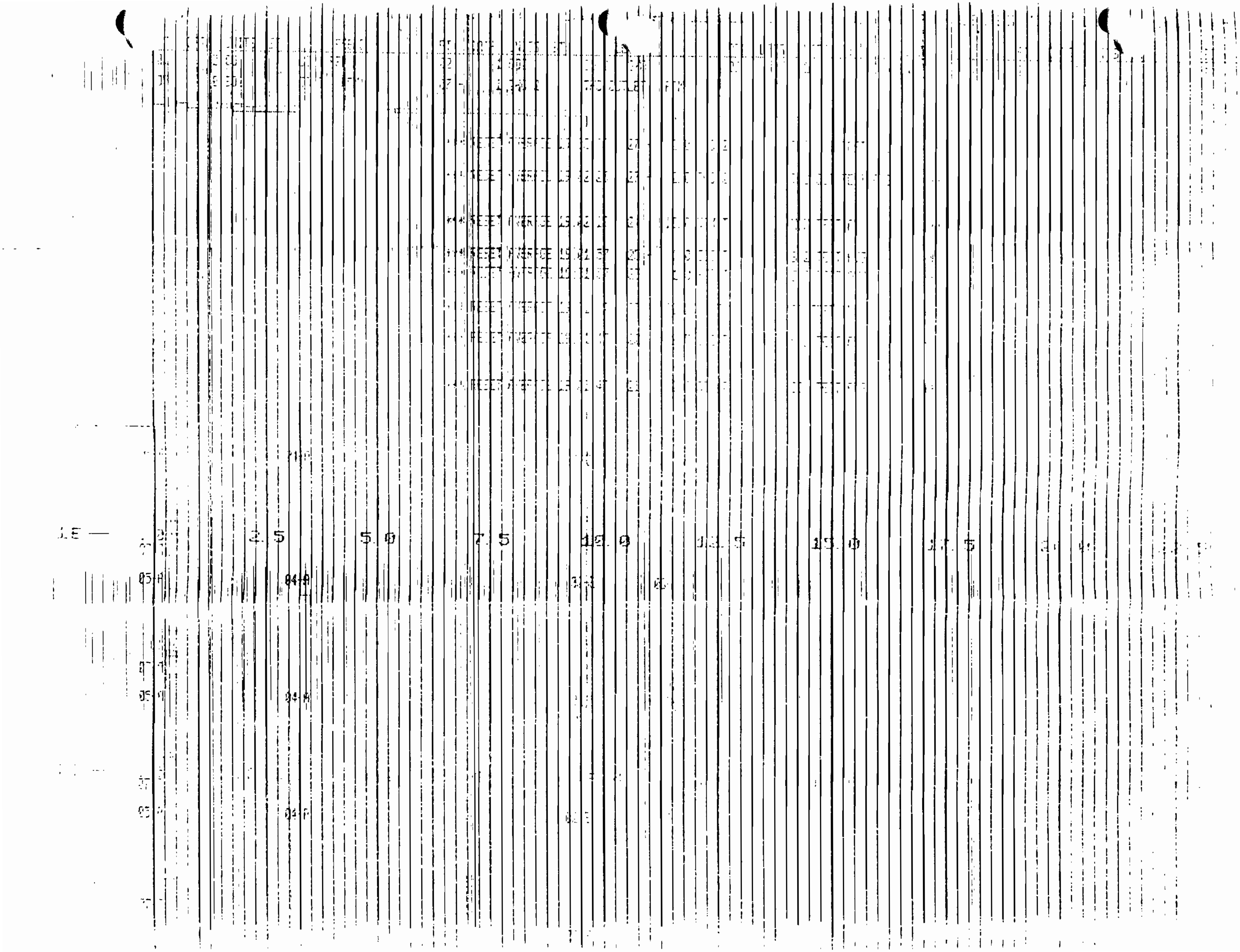
ATM DATA UNITS ST

TH OUTLET PPM

58 CO

*** LOG BFR 1 *** UNIT S3000 *** STARTS AT

116 CO


2.5
5.0
7.5
10.0
12.5
15.0
17.5

174 CO

232 CO

ZERO

240 CO

99.C THC

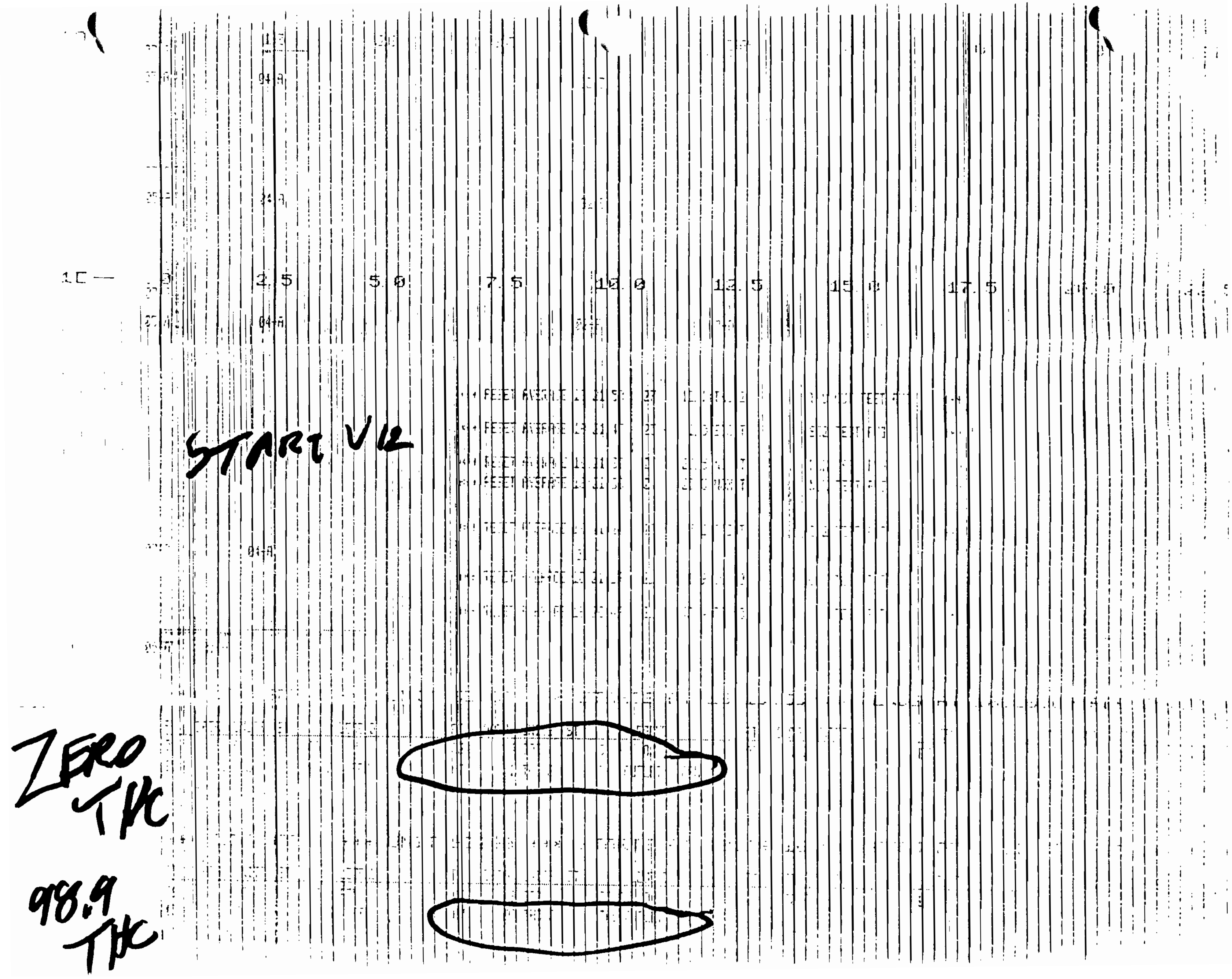
RE ADJST

ZERO THC

1290 CO_2
1190 O_2

✓ KB

✓ II HAS ENDED



2.5
5.0
7.5
10.0
12.5
15.0
17.5
START V12
ZERO THC
98.9 THC

APPENDIX E

Flow Measurement Field Data

R POLLUTION
CHARACTERIZATION
AND CONTROL, LTD.

EPA METHOD 2
VELOCITY TRAVERSE AND FLOWRATE DETERMINATION

PLANT LKB
DATE 7-20-91
LOCATION
STACK DIMENSIONS ______ AREA 15.4 ft^2
BAROMETRIC PRESSURE, Pb = 29.61 in. Hg
STACK STATIC PRESSURE, Pg = ± -.047 in. H_2O
STACK GAS MOLECULAR WEIGHT (Wet), M_w 28.9
STACK GAS MOISTURE CONTENT, % H_2O = 2.7%
PITOT NO. ______ Cp=
TESTER

% 08:20 425.

SCHEMATIC OF TRAVERSE POINT LOCATION
Cyclonic Flow Angle + θ Clockwise - θ Counterclockwise

PORT	POINT	ΔP Inch H_2O	$\sqrt{\Delta P}$	T_s (°F)	± θ	Pitots reversed for Negative Flow?	$\sqrt{\Delta P}$ · COS θ
N	1	.002		1588	-0- +10		
	2	.003		1588	-0- +10		
	3	.005			0 +12		
	4	.005			0 0		
	5	.006			0 +12		
	6	.005			0 +10		
	7	.004			0 +20		
	8	.001			0		
W	1	.001					
	2	.003					
	3	.006					
	4	.007					
	5	.009					
	6	.009		1602			
	7	.009					
	8	.008			+11		
	Average		.0691	T_s = 1595 °F	*		
				T_{sr} = 2055 °R			

*Avg. of absolute values including zeroes

Absolute Gas Temperature, $T_{sr} = T_s + 460°$ 2055
Absolute Gas Pressure, $P_s = P_b + P_g/13.6$ = 29.61
Gas Velocity, $V_s = (85.49)\ C_p\ (\sqrt{\Delta P} \cdot COS\theta)\ avg \sqrt{\frac{T_{sr}\ avg}{P_s\ M_w}}$ = 7.67 ft/sec 26.9

Actual Gas Flowrate, $Q_a = (V_s)(60)(A)$ = 7317 ACFM
Standard Gas Flowrate, $Q_{std} = Q_a \left(\frac{528°R}{T_{sr}}\right)\left(\frac{P_s}{29.92}\right)\left(\frac{100 - \%\ H_2O}{100}\right)$ = 1766 DSCFM

EPA METHOD 2 WORKSHEET

CLIENT: LKB / OYSTER BAY					DATE:	FEB. 20,1991
PERCENT H2O=		6%	SET #1		TIME:	08:20 HRS.
BARO. PRESSURE=		29.81	STACK AREA=		15.9	
STATIC PRESSURE=		-.043	PITOT COEFF.=		.84	
POINT	ΔP	√ΔP	Ts (°F)	± Ø	RADIANS	√ΔP*cos Ø
1	.002	.0447	1588	0°	-	-
2	.003	.0548	1588	10°	.1746	.0539
3	.005	.0707	1588	12°	.2095	.0692
4	.005	.0707	1588	0°	-	-
5	.006	.0775	1588	12°	.2095	.0758
6	.005	.0707	1588	0°	-	-
7	.004	.0632	1588	10°	.1746	.0623
8	.001	.0316	1588	20°	.3492	.0297
9	.001	.0316	1588	0°	-	-
10	.003	.0548	1588	0°	-	-
11	.006	.0775	1588	0°	-	-
12	.007	.0837	1588	0°	-	-
13	.009	.0949	1588	0°	-	-
14	.009	.0949	1602	0°	-	-
15	.009	.0949	1602	0°	-	-
16	.008	.0894	1602	11°	.1921	.0878
17		-			-	-
18		-			-	-
19		-			-	-
20		-			-	-
21		-			-	-
22		-			-	-
23		-			-	-
24		-			-	-
AVERAGE		.0691	1591°F			.0631

ABSOLUTE GAS TEMP.=	2051	°R
ABSOLUTE GAS PRESS.=	29.81	"Hg
GAS VELOCITY=	6.99	fps
ACTUAL FLOWRATE=	6671	acfm
STANDARD FLOWRATE=	1710	dscfm

AIR POLLUTION CHARACTERIZATION AND CONTROL, LTD.

EPA METHOD 2
VELOCITY TRAVERSE AND FLOWRATE DETERMINATION

PAGE ____ OF ____

#2

12:10 HRS.

PLANT L.K.D.
DATE 2-20-91
LOCATION
STACK DIMENSIONS ____ AREA 159 ft^2
BAROMETRIC PRESSURE, Pb = [illegible] in. Hg
STACK STATIC PRESSURE, Pg = ± – [illegible] in. H_2O
STACK GAS MOLECULAR WEIGHT (Wet), M_w 28.9
STACK GAS MOISTURE CONTENT, % H_2O = 1.70
PITOT NO. ____ Cp= ____
TESTER

SCHEMATIC OF TRAVERSE POINT LOCATION

Cyclonic Flow Angle + θ Clockwise, − θ Counterclockwise

PORT	POINT	ΔP Inch H_2O	$\sqrt{\Delta P}$	T_s (°F)	± θ	Pitots reversed for Negative Flow?	$\sqrt{\Delta P} \cdot \cos\theta$
S	1	— zero		—	+4		0
	2	.008		—	+1		.0894
	3	.010		1612	+3		[illegible]
	4	.010		1627	+5		.0996
	5	.011		1639	+12		.1037
	6	.012		1641	+9		[illegible]
	7	.011			+20		[illegible]
	8	.011		1613	+30		[illegible]
W	1	.004					
	2	.008					
	3	.011					
	4	.013		1605	+3		[illegible] .113
	5	.014		1620	+10		1165
	6	.014		1622	+10		.1165
	7	.012		1621	+10		1079
	8	.013		1620	0		1140
		Average	.0966	T_s =1622°F	*		.1049
				T_{sr} = 2082°R			

*Avg. of absolute values including zeroes

Absolute Gas Temperature, $T_{sr} = T_s + 460°$
Absolute Gas Pressure, $P_s = P_b + P_g/13.6$ = 29.60
Gas Velocity, $V_s = (85.49)\, C_p\, (\sqrt{\Delta P} \cdot \cos\theta)\,\text{avg} \sqrt{\dfrac{T_{sr}\ \text{avg}}{P_s\ M_w}}$ = 10.80 ft/sec
Actual Gas Flowrate, $Q_a = (V_s)(60)(A)$ = [illegible] ACFM 10,303
Standard Gas Flowrate, $Q_{std} = Q_a \left(\dfrac{528°R}{T_{sr}}\right)\left(\dfrac{P_s}{29.92}\right)\left(\dfrac{100 - \%\ H_2O}{100}\right)$ = 2446 DSCFM

1151

EPA METHOD 2 WORKSHEET

CLIENT: LKB / OYSTER BAY					DATE:	FEB. 20,1991
PERCENT H2O=		6%	SET #2		TIME:	12:10 HRS.
BARO. PRESSURE=		29.81	STACK AREA=		15.9	
STATIC PRESSURE=		-.043	PITOT COEFF.=		.84	
POINT	ΔP	√ΔP	Ts (°F)	± Ø	RADIANS	√ΔP*cos Ø
1	.001	.0316	1612	4°	.0698	.0315
2	.008	.0894	1612	1°	.0175	.0894
3	.010	.1000	1612	3°	.0524	.0999
4	.010	.1000	1627	5°	.0873	.0996
5	.011	.1049	1639	12°	.2095	.1026
6	.012	.1095	1641	9°	.1571	.1082
7	.011	.1049	1641	20°	.3492	.0986
8	.011	.1049	1613	30°	.5238	.0908
9	.004	.0632	1613	0°	-	-
10	.008	.0894	1613	0°	-	-
11	.011	.1049	1613	0°	-	-
12	.013	.1140	1605	3°	.0524	.1139
13	.014	.1183	1620	10°	.1746	.1165
14	.014	.1183	1622	10°	.1746	.1165
15	.012	.1095	1621	10°	.1746	.1079
16	.013	.1140	1620	0°	-	-
17		-			-	-
18		-			-	-
19		-			-	-
20		-			-	-
21		-			-	-
22		-			-	-
23		-			-	-
24		-			-	-
AVERAGE		.0986	1620°F			.0979

ABSOLUTE GAS TEMP.=	2080	°R
ABSOLUTE GAS PRESS.=	29.81	"Hg
GAS VELOCITY=	10.93	fps
ACTUAL FLOWRATE=	10427	acfm
STANDARD FLOWRATE=	2635	dscfm

APCC
AIR POLLUTION CHARACTERIZATION AND CONTROL, LTD.

EPA METHOD 2
VELOCITY TRAVERSE AND FLOWRATE DETERMINATION

PAGE ____ OF ____

SET 3 FLOWS
15:45 HRS.

PLANT L.K.B.
DATE 2-20
LOCATION
STACK DIMENSIONS ____ AREA ____ ft^2
BAROMETRIC PRESSURE, Pb = 29.83 in. Hg
STACK STATIC PRESSURE, Pg = ± -.028 in. H_2O
STACK GAS MOLECULAR WEIGHT (Wet), M_w 29
STACK GAS MOISTURE CONTENT, % H_2O = ~~20~~ 6%
PITOT NO. ____ Cp= .84
TESTER DJS

SCHEMATIC OF TRAVERSE POINT LOCATION
Cyclonic Flow Angle + θ Clockwise
- θ Counterclockwise

PORT	POINT	ΔP Inch H_2O	$\sqrt{\Delta P}$	Ts (°F)	± θ	Pitots reversed for Negative Flow?	$\sqrt{\Delta P}$ · COS θ
S	1	.002	.0447	—	+10°		.0440
	2	.008	.0894	1635	-10°		.0880
	3	.010	.1000	1651	-10°		.0985
	4	.011	.1049	1660	+10°		.1033
	5	.011	.1049	1662	+15°		.1013
	6	.011	.1049	1657	+10°		.1033
	7	.010	.1000	1659	+5°		.0996
	8	.010	.1000	1649	+10°		.0985
W	1	.008	.0894		+10°		.0880
	2	.010	.1000		+10°		.0985
	3	.011	.1049	1450	+5°		.1045
	4	.010	.1000	1553	+10°		.0985
	5	.011	.1049	1570	+5°		.1045
	6	.011	.1049	1562	+15°		.1013
	7	.013	.1140	1567	+20°		.1071
	8	.013	.1140	1576	+20°		.1071
	Average			T_s = 1604°F	*		.0966
				T_{sr} = 2064°R			

*Avg. of absolute values including zeroes

Absolute Gas Temperature, $T_{sr} = T_s + 460^\circ$
Absolute Gas Pressure, $P_s = P_b + P_g/13.6$ = 29.83
Gas Velocity, $V_s = (85.49)\ C_p\ (\sqrt{\Delta P}\cdot \cos\theta)\ \text{avg} \sqrt{\frac{T_{sr}\ \text{avg}}{P_s\ M_w}}$ = 16.1 ft/sec

Actual Gas Flowrate, $Q_a = (V_s)(60)(A)$ = 10 205 ACFM
Standard Gas Flowrate, $Q_{std} = Q_a \left(\frac{528^\circ R}{T_{sr}}\right)\left(\frac{P_s}{29.92}\right)\left(\frac{100 - \%\ H_2O}{100}\right)$ = 2 447 DSCFM

EPA METHOD 2 WORKSHEET

CLIENT: LKB / OYSTER BAY			DATE:	FEB. 20,1991
PERCENT H2O=	6%	SET #3	TIME:	15:45 HRS.
BARO. PRESSURE=	29.83	STACK AREA=	15.9	
STATIC PRESSURE=	-.028	PITOT COEFF.=	.84	

POINT	ΔP	√ΔP	Ts (°F)	±Ø	RADIANS	√ΔP*cos Ø
1	.002	.0447		10°	.1746	.0440
2	.008	.0894	1635	-10°	.1746	.0881
3	.010	.1000	1651	-10°	.1746	.0985
4	.011	.1049	1660	10°	.1746	.1033
5	.011	.1049	1662	15°	.2619	.1013
6	.011	.1049	1657	10°	.1746	.1033
7	.010	.1000	1659	5°	.0873	.0996
8	.010	.1000	1649	10°	.1746	.0985
9	.008	.0894	-	10°	.1746	.0881
10	.010	.1000	-	10°	.1746	.0985
11	.011	.1049	1450	5°	.0873	.1045
12	.010	.1000	1553	10°	.1746	.0985
13	.011	.1049	1570	5°	.0873	.1045
14	.011	.1049	1562	15°	.2619	.1013
15	.013	.1140	1567	20°	.3492	.1071
16	.013	.1140	1576	20°	.3492	.1071
17		-			-	-
18		-			-	-
19		-			-	-
20		-			-	-
21		-			-	-
22		-			-	-
23		-			-	-
24		-			-	-
AVERAGE		.0988	1604°F			.0966

ABSOLUTE GAS TEMP.=	2064	°R
ABSOLUTE GAS PRESS.=	29.83	"Hg
GAS VELOCITY=	10.7	fps
ACTUAL FLOWRATE=	10244	acfm
STANDARD FLOWRATE=	2611	dscfm

AIR POLLUTION CHARACTERIZATION AND CONTROL, LTD.

EPA METHOD 2
VELOCITY TRAVERSE AND FLOWRATE DETERMINATION

PAGE ____ OF ____

PLANT L.K.B.
DATE 2-20-91
LOCATION
STACK DIMENSIONS ____ AREA ____ ft^2
BAROMETRIC PRESSURE, Pb = 29.92 in. Hg
STACK STATIC PRESSURE, Pg = ± -.030 in. H_2O
STACK GAS MOLECULAR WEIGHT (Wet), M_w
STACK GAS MOISTURE CONTENT, % H_2O =
PITOT NO. ____ Cp=
TESTER

18.35 HRS.

SCHEMATIC OF TRAVERSE POINT LOCATION

Cyclonic Flow Angle + θ Clockwise − θ Counterclockwise

PORT	POINT	ΔP Inch H_2O	$\sqrt{\Delta P}$	T_s (°F)	± θ	Pitots reversed for Negative Flow?	$\sqrt{\Delta P}\cdot\cos\theta$
S	1	.002	.0447		+5°		.0446
	2	.005	.0707	—	+5°		.0704
	3	.007	.0837	—	+10°		.0824
	4	.009	.0949	1606	+10°		.0935
	5	.010	.1000	1602	+10°		.0985
	6	.010	.1000	1596	+10°		.0985
	7	.010	.1000	1590	+10°		.0985
	8	.011	.1049	1565	+10°		.1033
W	1	.002	.0447	—	+10°		.0440
	2	.004	.0632	1573	-5°		.0630
	3	.006	.0775	1598	+5°		.0772
	4	.006	.0775	1604	0		.0775
	5	.009	.0949	1605	+15°		.0917
	6	.009	.0949	1607	+10°		.0935
	7	.010	.1000	1608	+10°		.0985
	8	.011	.1049	1602	+5°		.1045
		Average		T_s = [illegible] °F	*		.0837
				T_{sr} = [illegible] °R			

*Avg. of absolute values including zeroes

Absolute Gas Temperature, $T_{sr} = T_s + 460^\circ$

Absolute Gas Pressure, $P_s = P_b + P_g/13.6$ = [illegible]

Gas Velocity, $V_s = (85.49)\ C_p\ (\sqrt{\Delta P}\cdot\cos\theta)\ \text{avg}\ \sqrt{\dfrac{T_{sr}\ \text{avg}}{P_s\ M_w}}$ = 47.25 ft/sec

Actual Gas Flowrate, $Q_a = (V_s)(60)(A)$ = [illegible] ACFM

Standard Gas Flowrate, $Q_{std} = Q_a \left(\dfrac{528^\circ R}{T_{sr}}\right)\left(\dfrac{P_s}{29.92}\right)\left(\dfrac{100 - \%\ H_2O}{100}\right)$ = [illegible] DSCFM

EPA METHOD 2 WORKSHEET

CLIENT: LKB / OYSTER BAY				DATE:	FEB. 20,1991
PERCENT H2O=	6%	SET #4		TIME:	18:35 HRS.
BARO. PRESSURE=	29.92	STACK AREA=		15.9	
STATIC PRESSURE=	-.030	PITOT COEFF.=		.84	

POINT	ΔP	√ΔP	Ts (°F)	±Ø	RADIANS	√ΔP*cos Ø
1	.002	.0447	1600	5°	.0873	.0446
2	.005	.0707	1600	5°	.0873	.0704
3	.007	.0837	1600	10°	.1746	.0824
4	.009	.0949	1606	10°	.1746	.0934
5	.010	.1000	1602	10°	.1746	.0985
6	.010	.1000	1596	10°	.1746	.0985
7	.010	.1000	1590	10°	.1746	.0985
8	.011	.1049	1565	10°	.1746	.1033
9	.002	.0447	1565	10°	.1746	.0440
10	.004	.0632	1573	-5°	.0873	.0630
11	.006	.0775	1598	5°	.0873	.0772
12	.006	.0775	1604	0°	-	-
13	.009	.0949	1605	15°	.2619	.0916
14	.009	.0949	1607	10°	.1746	.0934
15	.010	.1000	1608	10°	.1746	.0985
16	.011	.1049	1602	5°	.0873	.1045
17		-			-	-
18		-			-	-
19		-			-	-
20		-			-	-
21		-			-	-
22		-			-	-
23		-			-	-
24		-			-	-
AVERAGE		.0848	1595°F			.0841

ABSOLUTE GAS TEMP.=	2055	°R
ABSOLUTE GAS PRESS.=	29.92	"Hg
GAS VELOCITY=	9.31	fps
ACTUAL FLOWRATE=	8884	acfm
STANDARD FLOWRATE=	2281	dscfm

APPENDIX F

Landfill Gas Control
System Data

THERMAL OX[illegible]R OPERATION LOG

SITE: TOWN OF OYSTER BAY THERMAL OXIDIZER

DATE: 2/20/91

Time Hr/Min	Test/Run	Blower Vacuum (cfm)	Inlet Methane (%)	Inlet Oxygen (%)	Burner Temp (°F)	Burner Damper (% closed)	INITIALS/COMMENTS
0730		22/880	21%		1593'	93.2	Willi Borelli
0800		22/880	21%		1605'	93.1	Willi Borelli
0830		22/880	21%		1597	95.3	Willi Borelli
0900		22/880	21%		1604'	93.4	Willi Borelli
0930		22/880	21%		1596'	96.1	Willi Borelli
10:00		22/880	21%		1592'	97.9	Willi Borelli
1030		22/880	21%		1591'	96.6	Willi Borelli
11:00		22/880	21%		1604'	96.6	Willi Borelli
1130		22/880	20%		1603	96.5	Willi Borelli
1200		22/880	20%		1596'	95.3	Willi Borelli
1230		22/880	20%		1591'	93.5	Willi Borelli
1300		22/880	20%		1593	94.6	Willi Borelli
1330		22/880	20%		1604	93.7	Willi Borelli
1400		22/880	20%		1578	99.1	Willi Borelli
1430		22/880	20%		1606	96.4	Willi Borelli

THERMAL O[illegible]ER OPERATION LOG

SITE: TOWN OF OYSTER BAY THERMAL OXIDIZER

DATE: 2/20/91

Time Hr/Min	Test/Run	Blower Vacuum (cfm)	Inlet Methane (%)	Inlet Oxygen (%)	Burner Temp (°F)	Burner Damper (% closed)	INITIALS/COMMENTS
1500		22/880	20%		1599'	95.9	Willi Bonelli
1530		22/880	20%		1533'	100	Willi Bonelli
1600		22/880	20%		1593'	95.3	Willi Bonelli
1630		22/880	20%		1597'	100	Willi Bonelli
1700		22/880	20%		1593'	100	Willi Bonelli
1730		22/880	20%		1569'	100	Willi Bonelli
1800		22/880	20%		1559'	100	Willi Bonelli
1830		22/880	20%		1582'	100	Willi Bonelli
1900		22/880	20%		1581	100	Willi Bonelli

APPENDIX G

Calibrations and Gas Certifications

national
energy service company

18 Harrison Street, P.O. Box 31
Zanesville, OH 43702-0031
614/453-0375

a subsidiary of
National Gas & Oil Company

METER TEST DATA SHEET

Customer : Air Pollution Characterization & Control

Shipping Order No. : 3627

Meter Discription : Rockwell R-275 Test

Date : 18 May 1989

Serial Number : 4062155

TEST DATA

ACCURACY TEST

Test Point	Flow Rate CFH	Percent of Max. Cap.	Percent Accuracy	Differential Inches W.C.	Percent of Error -/+
1	275	100%	100.11	NA	+.11
2	206	75%	100.27	NA	+.27
3	137	50%	100.26	NA	+.26
4	69	25%	100.24	.06-.18	+.24
5	28	10%	99.97	.04-.15	-.03

Static Pressure Test

Test Pressure	Length of Test	Means of Testing
10 LB	5 minutes	Bubble Tank

The above data has been determined from tests performed with air at atmospheric pressure and ambient temperature.The tests were done using positive displacement proving devices,dimensionally traceable to the United States National Bureau of Standards.

Test Date: 18 May 89
Test By : [illegible signature]

CC. W/Meter
W/Invoice
Nesc Office

national
energy service company

18 Harrison Street, P.O. Box 31
Zanesville, OH 43702-0031
614/453-0375

a subsidiary of
National Gas & Oil Company

OUTTEST DATA SHEET
DIAPHRAGM METER

CUSTOMER: [illegible] Pollution Characterization [illegible]

SHIPPING ORDER NO.: 08577[illegible]

METER DESCRIPTION: RW 2[illegible]

DATE: March 26 1991

SERIAL NUMBER: 40621[illegible]

TEST DATA
ACCURACY TEST

TEST POINT	FLOW RATE CFH	PERCENT OF MAX. CAP.	PERCENT ACCURACY	DIFFERENTIAL INCHES W.C.	PERCENT OF ERROR -/+
1	275	100%	[illegible]	[illegible]	[illegible]
2	206	75%	[illegible]	[illegible]	[illegible]
[illegible]	137	50%	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	25%	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	10%	[illegible]	[illegible]	[illegible]

ACTUAL

WATER TEST PRESSURE	LENGTH OF TEST	METHOD OF TEST
[illegible]		[illegible]

THE ABOVE DATA HAS BEEN DETERMINED FROM TESTS PERFORMED WITH AIR AT ATMOSPHERIC PRESSURE AND AMBIENT TEMPERATURE. THE TESTS WERE DONE USING POSITIVE DISPLACEMENT PROVING DEVICES, DIMENSIONALLY TRACEABLE TO THE UNITED STATES NATIONAL BUREAU OF STANDARDS.

TEST DATE: [illegible]

TEST BY: [illegible]

CC.W/METER
W/INVOICE
NESC OFFICE

PROVER MASTER METER SIZE ____________ SERIAL # ____________

GASEOUS POLLUTANT MODULE CALIBRATION FORM

Date 6-8-90 Calibrated by EMK Module Number VOST (Pretest/Posttest)

Barometric Pressure, P_b = 29.80 in. Hg ~~Wet~~ test meter number DM55

WET TEST METER			ROTAMETER	DRY TEST METER				
PRESSURE DROP $(D_m)^a$ In. H_2O	GAS VOLUME $(V_w)^b$ Ft^3	AVERAGE GAS TEMP. (T_w) °F	(R_s) ℓ/min.	GAS VOLUME $(V_d)^b$ Ft^3	AVERAGE GAS TEMPERATURE T_d (°F)	TIME OF RUN $(\theta)^c$ min.	DGM CALIBRATION FACTOR $(Y_i)^d$	ROTAMETER CALIBRATION FACTOR $(Y_{ri})^e$
.01	5.15	78	2.0	5.20	75	70	0.99	
.01	5.12	78 -538	2.0	5.19	75 535	70.4	0.99	
.01	10.29	78 538	2.0	10.44	75 535	141.9	0.99	
						Average	0.99	

a D_m expressed as negative number.

b Volume passing through meter. (5 Revolution Minimum)

c The time it takes to complete the calibration run.

d With Y defined as the average ratio of volumes for the wet test meter and the dry gas meter,

$Y_i = Y_{ave} \pm 0.02Y$ and $Y_{ave} = 1.00 \pm 0.01$ for the calibration or $Y_i \pm 0.05$ Y for the post-test checks, thus,

$$Y_i = \frac{V_w\ (T_d + 460°F)\ (P_b + \{Dm/13.6\})}{V_d\ (t_w + 460°F)\ (P_b)} \quad \text{(Eq. 1)} \qquad Y_{ave} = \frac{Y_1 + Y_2 + Y_3}{3} = \quad \text{(Eq. 2)}$$

e With Y_r defined as the average ratio of volumetric measurement by wet test meter to rotameter. Tolerance $Y_r = 1 \pm 0.05$ for calibration and $Y \pm 0.1$ for the posttest checks.

$$Y_{r_i} = \frac{V_w\ (T_d + 460°F)\ [P_b + (D_m/13.6)]}{\theta\ (t_w + 460°F)\ (P_b)\ (R_s)(0.0353)} \quad \text{(Eq. 3)} \qquad Y = \frac{Y_1 + Y_2 + Y_3}{}$$

GASEOUS POLLUTANT MODULE CALIBRATION FORM

Date 2·27·91 Calibrated by DBS Module Number VOST (Pretest/Posttest)

Barometric Pressure, P_b = 29.35 in. Hg Wet test meter number DM115

WET TEST METER			ROTAMETER (R_s)	DRY TEST METER				
PRESSURE DROP (D_m)[a] In. H_2O	GAS VOLUME (V_w)[b] Ft^3	AVERAGE GAS TEMP. (T_w) °F	ℓ/min.	GAS VOLUME (V_d)[b] Ft^3	AVERAGE GAS TEMPERATURE T_d (°F)	TIME OF RUN (θ)[c] min.	DGM CALIBRATION FACTOR (Y_i)[d]	ROTAMETER CALIBRATION FACTOR (Y_{ri})[e]
0.0	1.004	67°	½ ℓ/min	1.033	70°	57.1	.98	
0.0	1.003	66°		1.032	71.5°	57.3	.98	
0.0	1.006	66°		1.039	71.5°	56.8	.98	
						Average	.98	

a D_m expressed as negative number.

b Volume passing through meter. (5 Revolution Minimum)

c The time it takes to complete the calibration run.

d With Y defined as the average ratio of volumes for the wet test meter and the dry gas meter,

$Y_i = Y_{ave} \pm 0.02Y$ and $Y_{ave} = 1.00 \pm 0.01$ for the calibration or $Y_i \pm 0.05$ Y for the post-test checks, thus,

$$Y_i = \frac{V_w\ (T_d + 460°F)\ (P_b + \{Dm/13.6\})}{V_d\ (t_w + 460°F)\ (P_b)} \quad \text{(Eq. 1)} \qquad Y_{ave} = \frac{Y_1 + Y_2 + Y_3}{3} = \quad \text{(Eq. 2)}$$

e With Y_r defined as the average ratio of volumetric measurement by wet test meter to rotameter. Tolerance $Y_r = 1 \pm 0.05$ for calibration and $Y \pm 0.1$ for the posttest checks.

$$Y_{r_i} = \frac{V_w\ (T_d + 460°F)\ [P_b + (D_m/13.6)]}{\theta\ (t_w + 460°F)\ (P_b)\ (R_s)(0.0353)} \quad \text{(Eq. 3)} \qquad Y_r = \frac{Y_1 + Y_2 + Y_3}{3}$$

(Eq. 4)

GASEOUS POLLUTANT MODULE CALIBRATION FORM

Date 1-25-91 Calibrated by DBS Module Number VOST (Pretest/Posttest)

Barometric Pressure, P_b = 29.73 in. Hg Wet test meter number DM-155

WET TEST METER			ROTAMETER	DRY TEST METER				
PRESSURE DROP $(D_m)^a$ In. H_2O	GAS VOLUME $(V_w)^b$ Ft^3	AVERAGE GAS TEMP. (T_w) °F	ROTAMETER (R_s) ℓ/min.	GAS VOLUME $(V_d)^b$ Ft^3	AVERAGE GAS TEMPERATURE T_d (°F)	TIME OF RUN $(\theta)^c$ min.	DGM CALIBRATION FACTOR $(Y_i)^d$	ROTAMETER CALIBRATION FACTOR $(Y_{ri})^e$
0.0	2.03	66°	150ss = 1.8 ℓ/m	2.11	73°	33.67	.98	
0.0	2.00	70°	150ss = "	2.04	73°	32.23	.99	
0.0	2.00	70°	150ss = "	2.06	73°	32.33	.98	
						Average	.98	

a D_m expressed as negative number.

b Volume passing through meter. (5 Revolution Minimum)

c The time it takes to complete the calibration run.

d With Y defined as the average ratio of volumes for the wet test meter and the dry gas meter,

$Y_i = Y_{ave} \pm 0.02Y$ and $Y_{ave} = 1.00 \pm 0.01$ for the calibration or $Y_i \pm 0.05$ Y for the posttest checks, thus,

$$Y_i = \frac{V_w\,(T_d + 460°F)\,(P_b + \{Dm/13.6\})}{V_d\,(t_w + 460°F)\,(P_b)} \quad \text{(Eq. 1)} \qquad Y_{ave} = \frac{Y_1 + Y_2 + Y_3}{3} = \quad \text{(Eq. 2)}$$

e With Y_r defined as the average ratio of volumetric measurement by wet test meter to rotameter. Tolerance Y_r = 1 ± 0.05 for calibration and Y ± 0.1 for the posttest checks.

$$Y_{r_i} = \frac{V_w\,(T_d + 460°F)\,[P_b + (D_m/13.6)]}{\theta\,(t_w + 460°F)\,(P_b)\,(R_s)(0.0353)} \quad \text{(Eq. 3)} \qquad Y_r = \frac{Y_1 + Y_2 + Y_3}{3} \quad \text{(Eq. 4)}$$

Scott Specialty Gases
a division of Scott Environmental Technology, Inc.
PLUMSTEADVILLE, PA 18949 PHONE: 215-766-8861 TWX: 510-665-9344

Shipped From: Scott So.Plainfield
Date Shipped 2/8/90
Our Project No: 0704400
Your P.O. No: 207
Page 4 of 4
Expiration Date: 8/8/91

CERTIFICATE OF ANALYSIS – EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. 1L-4186 Cylinder Pressure 2000 psig Certified Accuracy ±2 % NBS Traceable

COMPONENTS	CERTIFIED CONC	REFERENCE STD SRM/CRM NO.*	REFERENCE STD CYL. NO.	REFERENCE STD CONC.	GAS ANALYZER MAKE/MODEL/SERIAL NO.	GAS ANALYZER LAST CAL. DATE	GAS ANALYZER ANALYTICAL PRINCIPLE
Sulfur Dioxide	99.6 ppm	1694	AAL-5204	95.1 ppm	Miran 1A-1047	2/8/90	Infrared Spectrophotometry

BALANCE GAS Nitrogen

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

Component Sulfur Dioxide

First Analysis Date 2/1/90 Units ppm

Z 0	R 95.1	T 102
R 95.1	Z 0	T 102
Z 0	T 100	R 95.1
	Mean Test Assay	101

Second Analysis Date 2/8/90 Units ppm

Z 0	R 95.1	T 99.4
R 95.1	Z 0	T 97.5
Z 0	T 98.0	R 95.1
	Mean Test Assay	98.3

Component ______

Date ______ Units ______

Z	R	T
R	Z	T
Z	T	R
	Mean Test Assay	

Date ______ Units ______

Z	R	T
R	Z	T
Z	T	R
	Mean Test Assay	

Component ______

Date ______ Units ______

Z	R	T
R	Z	T
Z	T	R
	Mean Test Assay	

Date ______ Units ______

Z	R	T
R	Z	T
Z	T	R
	Mean Test Assay	

Chronology: Date 2/8/90
Assay 1

Analyst John O'Shea

Approved By: Adela Sy

Scott Specialty Gases
a division of Scott Environmental Technology, Inc.
PLUMSTEADVILLE, PA 18949 PHONE: 215-766-8861 TWX: 510-665-9344

Shipped From: Scott So.Plainfield
Date Shipped 2/8/90
Our Project No: 0704400
Your P.O. No: 207
Page 3 of 4
Expiration Date: 8/8/91

CERTIFICATE OF ANALYSIS – EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. 1L-1931 Cylinder Pressure 2000 psig Certified Accuracy ±1 % NBS Traceable

COMPONENTS	CERTIFIED CONC	REFERENCE STD: SRM/CRM NO.	REFERENCE STD: CYL. NO.	REFERENCE STD: CONC.	GAS ANALYZER: MAKE/MODEL/SERIAL NO.	GAS ANALYZER: LAST CAL. DATE	GAS ANALYZER: ANALYTICAL PRINCIPLE
Sulfur Dioxide	986 ppm	1662	AAL-19615	948 ppm	Miran 1A 1047	2/8/90	Infrared Spectrophotometry

BALANCE GAS Nitrogen

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

Component Sulfur Dioxide

First Analysis Date 2/1/90 Units ppm

Z 0	R 948	T 988
R 948	Z 0	T 986
Z 0	T 988	R 948

Mean Test Assay 987

Second Analysis Date 2/8/90 Units ppm

Z 0	R 948	T 983
R 948	Z 0	T 985
Z 0	T 986	R 948

Mean Test Assay 985

Component ______ Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______
Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______

Component ______ Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______
Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______

Chronology: Date 2/8/90
Assay 1

Analyst John O'Shea

Approved By: Adela Sy

Scott Specialty Gases — a division of Scott Environmental Technology, Inc.

PLUMSTEADVILLE, PA 18949 PHONE: 215-766-8861 TWX: 510-665-9344

Shipped From: Scott So. Plainfield
Date Shipped: 2/8/90
Our Project No: 0704400
Your P.O. No: 207
Page 2 of 4
Expiration Date: 8/8/91

CERTIFICATE OF ANALYSIS – EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. 1L-1788 Cylinder Pressure 2000 psig Certified Accuracy ±1 % NBS Traceable

		REFERENCE STD			GAS ANALYZER		
COMPONENTS	CERTIFIED CONC	SRM/CRM NO.	CYL. NO.	CONC.	MAKE/MODEL/SERIAL NO.	LAST CAL. DATE	ANALYTICAL PRINCIPLE
Nitric Oxide	105 ppm	1684	ALM-3675	97.28 ppm	Teco 10S/26404-225	11/10/89	Chemiluminescence

BALANCE GAS Nitrogen/Oxygen Free

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

Component: Nitric Oxide

First Analysis Date: 2/1/90 Units: ppm

Z	0	R	97.28	T	105
R	97.28	Z	0	T	105
Z	0	T	106	R	97.28

Mean Test Assay: 105

Second Analysis Date: 2/8/90 Units:

Z	0	R	97.28	T	105
R	97.28	Z	0	T	105
Z	0	T	105	R	97.28

Mean Test Assay: 105

Component: ______ Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______
Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______

Component: ______ Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______
Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______

Chronology: Date 2/8/90
Assay 1

Analyst: John O'Shea

Approved By: Adela Sy

Scott Specialty Gases
a division of Scott Environmental Technology, Inc.
PLUMSTEADVILLE, PA 18949 PHONE: 215-766-8861 TWX: 510-665-9344

Shipped From: Scott So.Plainfield
Date Shipped 2/8/90
Our Project No: 0704400
Your P.O. No: 207
Page 1 of 4
Expiration Date: 8/8/91

CERTIFICATE OF ANALYSIS—EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. 1L-3780 Cylinder Pressure 2000 psig Certified Accuracy ±1 % NBS Traceable

COMPONENTS	CERTIFIED CONC	REFERENCE STD: SRM/CRM NO.	REFERENCE STD: CYL. NO.	REFERENCE STD: CONC.	GAS ANALYZER: MAKE/MODEL/SERIAL NO.	GAS ANALYZER: LAST CAL. DATE	GAS ANALYZER: ANALYTICAL PRINCIPLE
Nitric Oxide	993 ppm	1687	AAL-19322	966 ppm	Teco 10S/26404-225	11/10/89	Chemiluminescence

BALANCE GAS Nitrogen/Oxygen Free

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

Component Nitric Oxide

First Analysis Date 2/1/90 Units ppm

Z 0	R 966	T 992
R 966	Z 0	T 992
Z 0	T 992	R 966

Mean Test Assay 992

Second Analysis Date 2/8/90 Units ppm

Z 0	R 966	T 996
R 966	Z 0	T 993
Z 0	T 993	R 966

Mean Test Assay 994

Chronology: Date 2/8/90
Assay 1

Analyst John O'Shea

Approved By: Adela Sy

Scott Specialty Gases

Electronics Group

2330 Hamilton Blvd., South Plainfield, N.J. 07080 Phone: (201) 754-7700 FAX: (201) 754-7303

53510000

AIR POLLUTION CHARACTER
CONTROL LTD.
816 OLD EAGLEVILLE RD
COVENTRY CT 06238

Date: October 17, 1989
QC No.: J179
Your P.O. No.: 183
Invoice No.: 0703122

ANALYTICAL REPORT

Cyl No. ALM-008127 ALM-008125 Analytical Accuracy

Component	Concentration
NITROGEN-UHP	99.9995%MIN.

Cyl No. Analytical Accuracy

Component	Concentration

Cyl No. Analytical Accuracy

Component	Concentration

Cyl No. Analytical Accuracy

Component	Concentration

Analyst Adela Sy

Approved By Addison Williams

RESULTS ARE IN VOLUME PERCENT UNLESS OTHERWISE INDICATED.

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

Electronics Group

2330 Hamilton Blvd., South Plainfield, N.J. 07080 Phone: (201) 754-7700 FAX: (201) 754-7303

33510000

AIR POLLUTION
CHARACTERIZATION & CNTRL
~~60~~ INDUSTRIAL PK RD WEST
TOLLAND CT 06084

Date: FEBRUARY 28, 1991
QC No.: 8-281 JOA
Your P.O. No.: 389RM
Invoice No.: 0709660

ANALYTICAL REPORT

Cyl No. ALM005190 ALM015553 Analytical Accuracy

Component	Concentration
AIR	HYDROCARBON FREE

Cyl No. 1L1594 AAL9203 Analytical Accuracy

Component	Concentration
NITROGEN	ZERO GAS

Cyl No. Analytical Accuracy

Component	Concentration

Cyl No. Analytical Accuracy

Component	Concentration

CERTIFIED

Pg 94
3-4-91

Analyst John O'Shea

Approved By Adela Sy

RESULTS ARE IN VOLUME PERCENT UNLESS OTHERWISE INDICATED

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

Scott Specialty Gases

Electronics Group

2330 Hamilton Blvd., South Plainfield, N.J. 07080 Phone: (201) 754-7700 FAX: (201) 754-7303

53510000

AIR POLLUTION CHARACTER
ATT:S.MILLS
CONTROL LTD.
816 OLD EAGLEVILLE RD.
COVENTRY CT 06238

Date: June 20, 1989
QC No.: F149JOS
Your P.O. No.: 130
Invoice No.: 01306

ANALYTICAL REPORT

Cyl No. LL-20467 Analytical Accuracy ____

Component	Concentration
METHANE	10.0PPM
NITROGEN	BALANCE

THIS MATERIAL TRACEABLE TO NBS
EXPIRATION DATE 5/13/91

Cyl No. LL-20479 Analytical Accuracy ____

Component	Concentration
METHANE	98.9PPM
NITROGEN	BALANCE

THIS MATERIAL TRACEABLE TO NBS
EXPIRATION DATE 5/13/91

Cyl No. BAL-763 Analytical Accuracy ____

Component	Concentration
METHANE	50.1PPM
NITROGEN	BALANCE

THIS MATERIAL TRACEABLE TO NBS
EXPIRATION DATE 5/13/91

Cyl No. 2L-1293 Analytical Accuracy ____

Component	Concentration
METHANE	501PPM
NITROGEN	BALANCE

THIS MATERIAL TRACEABLE TO NBS
EXPIRATION DATE 5/13/91

Analyst JOJ
John O'Shea

Approved By [signature]
Adela Sy

RESULTS ARE IN VOLUME PERCENT UNLESS OTHERWISE INDICATED.

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

ANALYTICAL REPORT — cont'd

Date: June 20, 1989
QC No.: F149 JOS
Your P.O. No.: 130
Invoice No.: 01306

53510000

AIR POLLUTION CHARACTER

Cyl No. 2L-1223 Analytical Accuracy

Component	Concentration
METHANE	1001PPM
NITROGEN	BALANCE
THIS MATERIAL TRACEABLE TO NBS	
EXPIRATION DATE 5/13/91	

Cyl No. Analytical Accuracy

Component	Concentration

Cyl No. BAL-3189 Analytical Accuracy

Component	Concentration
METHANE	5010PPM
NITROGEN	BALANCE
THIS MATERIAL TRACEABLE TO NBS	
EXPIRATION DATE 5/13/91	

Cyl No. Analytical Accuracy

Component	Concentration

Analyst JOS
John O'Shea

Approved By [signature]
Adela Sy

CERTIFIED REFERENCE MATERIALS EPA PROTOCOL GASES
ACCUBLEND CALIBRATION & SPECIALTY GAS MIXTURES PURE GASES
ACCESSORY PRODUCTS ANALYTICAL SERVICES

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

Scott Specialty Gases
Electronics Group
2330 Hamilton Blvd., South Plainfield, N.J. 07080 Phone: (201) 754-7700 FAX: (201) 754-7303

Date Shipped 5/14/90
Our Project No: 0705553
Your P.O. No: 256
Page 1 of 1
Expiration Date: 11/8/91

CERTIFICATE OF ANALYSIS—EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. 1L2793 Cylinder Pressure 2000 psig Certified Accuracy ±1 % NBS Traceable

		REFERENCE STD			GAS ANALYZER		
COMPONENTS	CERTIFIED CONC	SRM/CRM NO.	CYL. NO.	CONC.	MAKE/MODEL/SERIAL NO.	LAST CAL. DATE	ANALYTICAL PRINCIPLE
Carbon Monoxide	51.0	1678	AAL5973	47.2 ppm	Perkin Elmer S-2000	4/11/90	GC - FID
					SN-094331001115		

BALANCE GAS Nitrogen

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

Component Carbon Monoxide

First Analysis Date 5/1/90 Units ppm

Z	0	R	47.2	T	51.0
R	47.2	Z	0	T	51.0
Z	0	T	51.3	R	47.2

Mean Test Assay 51.1

Second Analysis Date 5/8/90 Units ppm

Z	0	R	47.2	T	50.9
R	47.2	Z	0	T	50.7
Z	0	T	50.8	R	47.2

Mean Test Assay 50.8

Component ______
Date ______ Units ______
Z ______ R ______ T ______
R ______ Z ______ T ______
Z ______ T ______ R ______
Mean Test Assay ______
Date ______ Units ______
Z ______ R ______ T ______
R ______ Z ______ T ______
Z ______ T ______ R ______
Mean Test Assay ______

Component ______
Date ______ Units ______
Z ______ R ______ T ______
R ______ Z ______ T ______
Z ______ T ______ R ______
Mean Test Assay ______
Date ______ Units ______
Z ______ R ______ T ______
R ______ Z ______ T ______
Z ______ T ______ R ______
Mean Test Assay ______

Analyst [signature]
Adela Sy

Approved By: [signature]
John O'Shea

Scott Specialty Gases
a division of Scott Environmental Technology, Inc.
PLUMSTEADVILLE, PA 18949 PHONE: 215-766-8861 TWX: 510-665-9344

Shipped From: Scott SP
Date Shipped 12/11/89
Our Project No: 0703663
Your P.O. No: 192
Page 2 of 2
Expiration Date: 6/5/91

CERTIFICATE OF ANALYSIS – EPA PROTOCOL GASES*

Certified Per Traceability Protocol No 1 Procedure No. G1 Cylinder No. AAL-15729 Cylinder Pressure 2000 psig Certified Accuracy ±1 % NBS Traceable

COMPONENTS	CERTIFIED CONC	REFERENCE STD: SRM/CRM NO.	REFERENCE STD: CYL. NO.	REFERENCE STD: CONC.	GAS ANALYZER: MAKE/MODEL/SERIAL NO.	GAS ANALYZER: LAST CAL. DATE	GAS ANALYZER: ANALYTICAL PRINCIPLE
Carbon Monoxide	105PPM	1679 c	FF20082	95.4PPM	Ecolyzer 2000	9/20/89	Electrochemical

BALANCE GAS Nitrogen

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

Component Carbon Monoxide

First Analysis Date 11/28/89 Units PPM

Z 0	R 95.4	T 105
R 95.4	Z 0	T 105
Z 0	T 105	R 95.4

Mean Test Assay 105

Second Analysis Date 12/5/89 Units PPM

Z 0	R 95.4	T 105
R 95.4	Z 0	T 104
Z 0	T 105	R 95.4

Mean Test Assay 105

Component ______

Date ______ Units ______

Z	R	T
R	Z	T
Z	T	R

Mean Test Assay ______

Date ______ Units ______

Z	R	T
R	Z	T
Z	T	R

Mean Test Assay ______

Component ______

Date ______ Units ______

Z	R	T
R	Z	T
Z	T	R

Mean Test Assay ______

Date ______ Units ______

Z	R	T
R	Z	T
Z	T	R

Mean Test Assay ______

Chronology: Date 12/5/89
Assay 105 PPM

Analyst [signature]
ADELA SY

Approved By: [signature]
DONALD DUDICS

Electronics Group
2330 Hamilton Blvd., South Plainfield, N.J. 07080 Phone: (201) 754-7700 FAX: (201) 754-7303

Date Shipped: April 13, 1990
Our Project No: 0705159
Your P.O. No: 238

Expiration Date:

CERTIFICATE OF ANALYSIS—EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. AAL19198 Cylinder Pressure 2000 psig Certified Accuracy ±1 % NBS Traceable

COMPONENTS	CERTIFIED CONC	REFERENCE STD SRM/CRM NO.	REFERENCE STD CYL. NO.	REFERENCE STD CONC.	GAS ANALYZER MAKE/MODEL/SERIAL NO.	GAS ANALYZER LAST CAL. DATE	GAS ANALYZER ANALYTICAL PRINCIPLE
Carbon Monoxide	290	2636	AAL8033	244 ppm	Perkin Elmer	1/8/90	GC - TCD
					Sigma 2000		
					SN-094331001115		

BALANCE GAS Nitrogen

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

Component: Carbon Monoxide

First Analysis Date 3/29/90 Units ppm

Z	0	R	244	T	292
R	244	Z	0	T	291
Z	0	T	291	R	244

Mean Test Assay 291

Second Analysis Date 4/5/90 Units ppm

Z	0	R	244	T	289
R	244	Z	0	T	290
Z	0	T	290	R	244

Mean Test Assay 290

Component ______ Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______
Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______

Component ______ Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______
Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______

Analyst Adela Sy

Approved By: John O'Shea

Scott Specialty Gases
Electronics Group
2330 Hamilton Blvd., South Plainfield, N.J. 07080 Phone: (201) 754-7700 FAX: (201) 754-7303

Date Shipped 10/4/90
Our Project No: 0707501
Your P.O. No: 318
Page 1 of 1
Expiration Date: 3/28/92

CERTIFICATE OF ANALYSIS—EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. ALM002022 Cylinder Pressure 2000 psig Certified Accuracy ±1 % NBS Traceable

COMPONENTS	CERTIFIED CONC	REFERENCE STD: SRM/CRM NO.	CYL. NO.	CONC.	GAS ANALYZER: MAKE/MODEL/SERIAL NO.	LAST CAL. DATE	ANALYTICAL PRINCIPLE
Carbon ~~Dioxide~~ Mono xide	906 ppm	1681	CAL8035	970.2 ppm	Ecolyzer/2000/1709	9/12/90	Electrochemical

BALANCE GAS Nitrogen

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

Component Carbon Monoxide

First Analysis Date 9/21/90 Units ppm

Z 0	R 970.2	T 903
R 970.2	Z 0	T 907
Z 0	T 904	R 970.2

Mean Test Assay 905

Second Analysis Date 9/28/90 Units ppm

Z 0	R 970.2	T 907
R 970.2	Z 0	T 909
Z 0	T 905	R 970.2

Mean Test Assay 907

Component ______ Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______
Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______

Component ______ Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______
Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______

Analyst Adela Sy Approved By: John O'Shea

Scott Specialty Gases

a division of Scott Environmental Technology, Inc.
PLUMSTEADVILLE, PA 18949 PHONE: 215-766-8861 TWX: 510-665-9344

Shipped From: Scott SO.PLAINFIE
Date Shipped 5/10/89
Our Project No: 00686
Your P.O. No: 4089-JSB-3
Page 2 of 5
Expiration Date: 11/10/90

CERTIFICATE OF ANALYSIS – EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. 1L1176 Cylinder Pressure 2000PSIG Certified Accuracy ±1 % NBS Traceable

COMPONENTS	CERTIFIED CONC	REFERENCE STD: SRM/CRM NO.	REFERENCE STD: CYL. NO.	REFERENCE STD: CONC.	GAS ANALYZER: MAKE/MODEL/SERIAL NO.	GAS ANALYZER: LAST CAL. DATE	GAS ANALYZER: ANALYTICAL PRINCIPLE
CARBON MONOXIDE	1036PPM	1681	CAL8043	970PPM	ECOLYZER	2/13/89	ELECTROCHEMICAL

BALANCE GAS NITROGEN

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

Component CARBON MONOXIDE

First Analysis Date 5/3/89 Units PPM

Z	0	R	970	T	1038
R	970	Z	0	T	1036
Z	0	T	1036	R	970

Mean Test Assay 1036

Second Analysis Date 5/10/89 Units PPM

Z	0	R	970	T	1035
R	970	Z	0	T	1035
Z	0	T	1035	R	970

Mean Test Assay 1035

Component ______ Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______
Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______

Component ______ Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______
Date ______ Units ______
Z ___ R ___ T ___
R ___ Z ___ T ___
Z ___ T ___ R ___
Mean Test Assay ______

Chronology: Date 5/10/89
Assay 1

Analyst [signature]
John O'Shea

Approved By: [signature]
John Knarr

SCOTT SPECIALTY GASES

2330 HAMILTON BLVD., SOUTH PLAINFIELD, NJ 07080 (201) 754-7700

53510000
AIR POLLUTION CHARACTERIZATION
AND CONTROL
60 Industrial Park Rd West
Tolland CT 06084

ATTN: MARK KRIZAR

Date January 30,1991

Cust. P.O. 382

Inv. No. 0709152

Q.C. No. A-281

CERTIFICATION

CYLINDER	COMPONENT	REQUESTED	ACTUAL
LL-20459	CARBON MONOXIDE	21 %	21.0 %
	NITROGEN	BALANCE	BALANCE
LL-20473	CARBON MONOXIDE	10 %	10.0 %
	NITROGEN	BALANCE	BALANCE

ANALYTICAL ACCURACY: +/- 0.02 % ABSOLUTE

All values reported in Mole percent unless otherwise noted.

Accuracy tolerance on all values greater than 100 ppm within ± 2% unless otherwise specified.

Addison Williams ANALYST

Donald Dudres SUPERVISOR

Scott Specialty Gases
Electronics Group

2330 Hamilton Blvd., South Plainfield, N.J. 07080 Phone: (201) 754-7700 FAX: (201) 754-7303

Date Shipped 3/11/91
Our Project No. 0709417
Your P.O. No:
Page 1 of 1
Expiration Date: 9/11/92

CERTIFICATE OF ANALYSIS—EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. 3.0.4-G1 Cylinder No. ALM 015542 Cylinder Pressure 2000 psig Certified Accuracy ±1 % NBS Traceable

COMPONENTS	CERTIFIED CONC	REFERENCE STD SRM/CRM NO.	REFERENCE STD CYL. NO.	REFERENCE STD CONC.	GAS ANALYZER MAKE/MODEL/SERIAL NO.	GAS ANALYZER LAST CAL. DATE	GAS ANALYZER ANALYTICAL PRINCIPLE
CARBON MONOXIDE	102 PPM	1679	ALM10480	96.67 PPM	PE/S-2000/094331991115	2/1/91	GC-FID

BALANCE GAS NITROGEN

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

Component CO
First Analysis Date 3/4/91 Units ppm

Z 0	R 96.67	T 100
R 96.67	Z 0	T 101
Z 0	T 101	R 96.67

Mean Test Assay 101

Second Analysis Date 3/11/91 Units ppm

Z 0	R 96.67	T 101
R 96.67	Z 0	T 102
Z 0	T 102	R 96.67

Mean Test Assay 102

Analyst Adela Sy

Approved By: John O'Shea

Electronics Group

2330 Hamilton Blvd., South Plainfield, N.J. 07080 Phone: (201) 754-7700 FAX: (201) 754-7303

Date Shipped: April 13, 1990
Our Project No: 0705159
Your P O No: 238

Expiration Date: 9/26/91

CERTIFICATE OF ANALYSIS—EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. 1L-3598 Cylinder Pressure 2000 psig Certified Accuracy ±1 % NBS Traceable

COMPONENTS	CERTIFIED CONC	REFERENCE STD SRM/CRM NO.	REFERENCE STD CYL. NO.	REFERENCE STD CONC.	GAS ANALYZER MAKE/MODEL/SERIAL NO.	GAS ANALYZER LAST CAL. DATE	GAS ANALYZER ANALYTICAL PRINCIPLE
Oxygen	5.01%	2658	AAL18568	10.08%	Varian 3700	2/2/90	GC - TCD
					SN-31608928		

BALANCE GAS Nitrogen

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

Component Oxygen

First Analysis Date 3/26/90 Units %

Z	0	R	10.08	T	5.02
R	10.08	Z	0	T	5.00
Z	0	T	5.00	R	10.08
				Mean Test Assay	5.01

Second Analysis Date ______ Units ______

Z ______ R ______ T ______
R ______ Z ______ T ______
Z ______ T ______ R ______
Mean Test Assay ______

Component ______
Date ______ Units ______
Z ______ R ______ T ______
R ______ Z ______ T ______
Z ______ T ______ R ______
Mean Test Assay ______
Date ______ Units ______
Z ______ R ______ T ______
R ______ Z ______ T ______
Z ______ T ______ R ______
Mean Test Assay ______

Component ______
Date ______ Units ______
Z ______ R ______ T ______
R ______ Z ______ T ______
Z ______ T ______ R ______
Mean Test Assay ______
Date ______ Units ______
Z ______ R ______ T ______
R ______ Z ______ T ______
Z ______ T ______ R ______
Mean Test Assay ______

Analyst Adela Sy

Approved By: John O'Shea

Scott Specialty Gases
a division of Scott Environmental Technology, Inc.
PLUMSTEADVILLE, PA 18949 · PHONE: 215-766-8861 TWX: 510-665-9344

Shipped From: Scott SO.PLAINFIL
Date Shipped 5/10/89
Our Project No: 00686
Your P.O. No: 41089-JSB-3
Page 5 of 5
Expiration Date: 10/24/90

CERTIFICATE OF ANALYSIS—EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. 1L3121 Cylinder Pressure 2000PSIG Certified Accuracy ±1 % NBS Traceable

		REFERENCE STD			GAS ANALYZER		
COMPONENTS	CERTIFIED CONC	SRM/CRM NO.	CYL. NO.	CONC.	MAKE/MODEL/SERIAL NO.	LAST CAL. DATE	ANALYTICAL PRINCIPLE
OXYGEN	11.0%	2658	AAL16568	10.08%	VARIAN 3700	4/4/89	TCD
CARBON DIOXIDE	11.9%	1675	ALM1314	14.02%	VARIAN 3700	3/3/89	TCD

BALANCE GAS NITROGEN

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

Component OXYGEN
First Analysis Date 4/24/89 Units PERCENT

Z	0	R	10.08	T	11.0
R	10.08	Z	0	T	11.0
Z	0	T	11.0	R	10.08

Mean Test Assay 11.0

Second Analysis Date ____ Units ____
Z ____ R ____ T ____
R ____ Z ____ T ____
Z ____ T ____ R ____
Mean Test Assay ____

Component CARBON DIOXIDE
Date 4/24/89 Units PERCENT

Z	0	R	14.02	T	11.9
R	14.02	Z	0	T	11.9
Z	0	T	11.9	R	14.02

Mean Test Assay 11.9

Date ____ Units ____
Z ____ R ____ T ____
R ____ Z ____ T ____
Z ____ T ____ R ____
Mean Test Assay ____

Component ____
Date ____ Units ____
Z ____ R ____ T ____
R ____ Z ____ T ____
Z ____ T ____ R ____
Mean Test Assay ____

Date ____ Units ____
Z ____ R ____ T ____
R ____ Z ____ T ____
Z ____ T ____ R ____
Mean Test Assay ____

Chronology: Date 4/24/89
Assay 1

Analyst ____
John O'Shea

Approved By: John Knarr
John Knarr

Electronics Group

2330 Hamilton Blvd., South Plainfield, N.J. 07080 Phone: (201) 754-7700 FAX: (201) 754-7303

Date Shipped: 6/25/90
Our Project No: 0706173
Your P.O. No: 282
Page 1 of 1
Expiration Date: 12/14/91

CERTIFICATE OF ANALYSIS—EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. ALM009713 Cylinder Pressure 2000 psig Certified Accuracy ±1 % NBS Traceable

		REFERENCE STD			GAS ANALYZER		
COMPONENTS	CERTIFIED CONC	SRM/CRM NO.	CYL. NO.	CONC.	MAKE/MODEL/SERIAL NO.	LAST CAL. DATE	ANALYTICAL PRINCIPLE
Oxygen	19.0%	2659	AAL18592	20.66%	Varian 3700 SN-31608928	6/14/90	GC - TCD

BALANCE GAS Nitrogen

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

Component: Oxygen
First Analysis Date: 6/14/90 Units: %

Z	0	R	20.66	T	19.1
R	20.66	Z	0	T	19.0
Z	0	T	19.0	R	20.66

Mean Test Assay: 19.0

Second Analysis Date ____ Units ____

Z		R		T	
R		Z		T	
Z		T		R	

Mean Test Assay ____

Analyst: Adela Sy

Approved By: John O'Shea

Scott Specialty Gases
a division of Scott Environmental Technology, Inc.
PLUMSTEADVILLE, PA 18949 PHONE: 215-766-8861 TWX: 510-665-9344

Shipped From: Scott SP
Date Shipped 12/11/89
Our Project No: 0703663
Your P.O. No: 192
Page 1 of 2
Expiration Date: 5/28/91

CERTIFICATE OF ANALYSIS – EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. ALM-00 6775 Cylinder Pressure 2000 psig Certified Accuracy ±1 % NBS Traceable

COMPONENTS	CERTIFIED CONC	REFERENCE STD: SRM/CRM NO.	REFERENCE STD: CYL. NO.	REFERENCE STD: CONC.	GAS ANALYZER: MAKE/MODEL/SERIAL NO.	GAS ANALYZER: LAST CAL. DATE	GAS ANALYZER: ANALYTICAL PRINCIPLE
Carbon Dioxide	11.9%	1675	ALM1314	14.02%	Varian 3700	11/21/89	GC-TCD
Oxygen	11.0%	2658	ALM18568	10.08%	Varian 3700	10/16/89	GC-TCD

BALANCE GAS Nitrogen

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

Component Carbon Dioxide
First Analysis Date 11/28/89 Units %

Z	0	R	14.02	T	11.9
R	14.02	Z	0	T	11.9
Z	0	T	11.9	R	14.02

Mean Test Assay 11.9

Second Analysis Date ____ Units ____

Z		R		T	
R		Z		T	
Z		T		R	

Mean Test Assay ____

Component Oxygen
Date 11/28/89 Units %

Z	0	R	10.08	T	11.0
R	10.08	Z	0	T	10.9
Z	0	T	11.0	R	10.08

Mean Test Assay 11.0

Date ____ Units ____

Z		R		T	
R		Z		T	
Z		T		R	

Mean Test Assay ____

Component ____
Date ____ Units ____

Z		R		T	
R		Z		T	
Z		T		R	

Mean Test Assay ____

Date ____ Units ____

Z		R		T	
R		Z		T	
Z		T		R	

Mean Test Assay ____

Chronology: Date 11/28/89
Assay 11.9% CO2/ 11.0% O2

Analyst ADELA SY

Approved By: DONALD DUDICS

Scott Specialty Gases
Electronics Group
2330 Hamilton Blvd., South Plainfield, N.J. 07080 Phone: (201) 754-7700 FAX: (201) 754-7303

Date Shipped 10/25/90
Our Project No: 0707768
Your P.O. No: 327
Page 1 of 1
Expiration Date: 4/17/92

CERTIFICATE OF ANALYSIS—EPA PROTOCOL GASES*

Certified Per Traceability Protocol No. 1 Procedure No. G1 Cylinder No. ALM009742 Cylinder Pressure 2000 psig Certified Accuracy ±1 % NBS Traceable

		REFERENCE STD			GAS ANALYZER		
COMPONENTS	CERTIFIED CONC	SRM/CRM NO.	CYL. NO.	CONC.	MAKE/MODEL/SERIAL NO.	LAST CAL. DATE	ANALYTICAL PRINCIPLE
Carbon Dioxide	12.0%	2658	AAL18568	14.02%	Varian 3700/31608928	9/2/90	GC - TCD
Oxygen	11.0%	1675	ALM1314	10.08%	Varian 3700/31608928	9/14/90	GC - TCD

BALANCE GAS Nitrogen

ANALYZER READINGS: Z = Zero Gas T = Test Gas R = Reference Gas

Component Carbon Dioxide
First Analysis Date 10/17/90 Units %

Z	0	R	14.02	T	12.0
R	14.02	Z	0	T	12.0
Z	0	T	12.0	R	14.02

Mean Test Assay 12.0

Second Analysis Date ____ Units ____

Z		R		T	
R		Z		T	
Z		T		R	

Mean Test Assay ____

Component Oxygen
Date 10/17/90 Units %

Z	0	R	10.08	T	11.1
R	10.08	Z	0	T	11.0
Z	0	T	11.0	R	10.08

Mean Test Assay 11.0

Date ____ Units ____

Z		R		T	
R		Z		T	
Z		T		R	

Mean Test Assay ____

Component ____
Date ____ Units ____

Z		R		T	
R		Z		T	
Z		T		R	

Mean Test Assay ____

Date ____ Units ____

Z		R		T	
R		Z		T	
Z		T		R	

Mean Test Assay ____

Analyst [signature] Adela Sy

Approved By: [signature] John O'Shea

SCOTT SPECIALTY GASES
2330 HAMILTON BLVD., SOUTH PLAINFIELD, NJ 07080 (201) 754-7700

53510000

Air Pollution Character
Control LTD.
816 Old Eagleville Rd.
Coventry, CT 06238

Attn: Receiving Dept.

Date December 20, 1989

Cust. P.O. 197

Inv. No. 0704001

Q.C. No. L199

CERTIFICATION

CYLINDER NO.	COMPONENT	ACTUAL
See Below	Air	Hydrocarbon Free
	Oxygen content: 20 to 21%	
	Maximum Impurities:	
	THC	LT 0.1ppm
	Carbon Monoxide	LT 0.5ppm
	Carbon Dioxide	LT 1ppm
	Water	LT 5ppm

The cylinders listed below are for the analysis above:

BLM-000999 BLM-000988 IL-3765

All values reported in Mole percent unless otherwise noted.

Accuracy tolerance on all values greater than 100 ppm within ± 2% unless otherwise specified.

Addison Williams — ANALYST

Donald Dudics — SUPERVISOR

SCOTT SPECIALTY GASES

2330 HAMILTON BLVD., SOUTH PLAINFIELD, NJ 07080 (201) 754-7700

53510000
AIR POLLUTION CHARACTERIZATION
AND CONTROL
60 Industrial Park Rd West
Tolland CT 06084
ATT: MARK KRIZAR

Date January 16,1991

Cust. P.O. 381

Inv. No. 0709081

Q.C. No. A-161

CERTIFICATION

CYLINDER	COMPONENT	REQUESTED	ACTUAL
ALM-015751	NITROGEN	UHP	99.9995% mi
ALM-015761	AIR THC as Methane	HCF	HCF LT 0.1 ppm
LL-20411 LL-20405 BAL-3484	HYDROGEN	UHP	99.999% min

All values reported in Mole percent unless otherwise noted.

Accuracy tolerance on all values greater than 100 ppm within ± 2% unless otherwise specified.

A. Williams
Addison Williams ANALYST

Adela A. Sy SUPERVISOR

SCOTT SPECIALTY GASES

2330 HAMILTON BLVD., SOUTH PLAINFIELD, NJ 07080 (201) 754-7700

COPY

53510000
AIR POLLUTION CHARACTERIZATION
AND CONTROL
60 Industrial Park Rd West
Tolland CT 06084
ATT: MARK KRIZAR

Date January 16,1991

Cust. P.O. 381

Inv. No. 0709081

Q.C. No. A-161

CYLINDER	COMPONENT	REQUESTED	ACTUAL
ALM-015751	NITROGEN	UHP	99.9995% min
ALM-015761	AIR THC as Methane	HCF	HCF LT 0.1 ppm
LL-20411 LL-20405 BAL-3484	HYDROGEN	UHP	99.999% min

All values reported in Mole percent unless otherwise noted.

Accuracy tolerance on all values greater than 100 ppm within ± 2% unless otherwise specified.

A. Williams

ANALYST
Addison Williams

SUPERVISOR
Adela A.Sy

Scott Specialty Gases

Electronics Group

2330 Hamilton Blvd., South Plainfield, N.J. 07080 Phone: (201) 754-7700 FAX: (201) 754-7303

33510000

AIR POLLUTION
CHARACTERIZATION & CNTRL
60 INDUSTRIAL PK RD WEST
TOLLAND CT 06084

Date: FEBRUARY 8, 1991
QC No.: B-081 JOA
Your P.O. No.: 384A
Invoice No.: 0709415

ANALYTICAL REPORT

Cyl No. ALM015444 ALM015469 Analytical Accuracy

Component	Concentration
AIR	HYDROCARBON FREE

Cyl No. Analytical Accuracy

Component	Concentration

Cyl No. Analytical Accuracy

Component	Concentration

Cyl No. Analytical Accuracy

Component	Concentration

Analyst John O'Shea

Approved By Adela Sy

RESULTS ARE IN VOLUME PERCENT UNLESS OTHERWISE INDICATED.

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

CERTIFIED REFERENCE MATERIALS EPA PROTOCOL GASES
ACUBLEND© CALIBRATION & SPECIALTY GAS MIXTURES PURE GASES
ACCESSORY PRODUCTS CUSTOM ANALYTICAL SERVICES

PLUMSTEADVILLE, PENNSYLVANIA / TROY, MICHIGAN / SAN BERNARDINO, CALIFORNIA / HOUSTON, TEXAS
WHEELING, ILLINOIS / FREMONT, CALIFORNIA / WAKEFIELD, MASSACHUSETTS / LONGMONT, COLORADO

Scott Specialty Gases

Electronics Group

2330 Hamilton Blvd., South Plainfield, N.J. 07080 Phone: (201) 754-7700 FAX: (201) 754-7303

AIR POLLUTION
CHARACTERIZATION & CONTROL
60 Industrial Park Rd. West
Tolland, CT 06084

3/21/90

PG

Date: October 2, 1990
QC No.: I-280
Your P.O. No.: 318
Invoice No.: 0707501

ANALYTICAL REPORT

Cyl No. ALM-002593 OK
Analytical Accuracy

Component	Concentration
AIR ---------- Hydrocarbon Free	
THC as Methane --- less than 0.1 ppm	

Cyl No.
Analytical Accuracy

Component	Concentration

Cyl No. IL-3682 OK
Analytical Accuracy

Component	Concentration
NITROGEN ---- ZERO-- 99.998 % min .	

Cyl No.
Analytical Accuracy

Component	Concentration

Analyst Adela A. Sy

Approved By John O'Shea

RESULTS ARE IN VOLUME PERCENT UNLESS OTHERWISE INDICATED.

Scott Specialty Gases
Electronics Group
2330 Hamilton Blvd., South Plainfield, N.J. 07080 Phone: (201) 754-7700 FAX: (201) 754-7303

. POLLUTION CHARACTERIZATION & CONTROL
Industrial Park Rd. West
'land, CT 06084

11/15/91
pc

Date: 14 November 1990
QC No.: K-140
Your P.O. No.: 376
Invoice No.: 0708351

ANALYTICAL REPORT

Cyl No. ALM-002000 Analytical Accuracy

Component	Concentration
AIR- --------- Hydrocarbon Free	
THC ----- less than 0.1 ppm	
ack	

Cyl No. Analytical Accuracy

Component	Concentration

Cyl No. AAL 20903 Analytical Accuracy

Component	Concentration
NITROGEN---N_2---- Zero - 99.998% min.	

Cyl No. Analytical Accuracy

Component	Concentration

Analyst
Addison Williams

Approved By
Adela Sy

RESULTS ARE IN VOLUME PERCENT UNLESS OTHERWISE INDICATED.

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

Scott Specialty Gases

Electronics Group

2330 Hamilton Blvd., South Plainfield, N.J. 07080 Phone: (201) 754-7700 FAX: (201) 754-7303

R POLLUTION CHARACTERIZATION & CONTROL
Industrial Park Rd. West
lland,CT 06084
tn: Mark Krizar

Date: 14 November 1990
QC No.: K-140
Your P.O. No.: 376
Invoice No.: 0708351

ANALYTICAL REPORT

Cyl No. ALM-002000 Analytical Accuracy

Component	Concentration
AIR- --------- Hydrocarbon Free	
THC ----- less than 0.1 ppm	

Cyl No. AAL 20903 Analytical Accuracy

Component	Concentration
NITROGEN--------- Zero - 99.998% min.	

Cyl No. Analytical Accuracy

Component	Concentration

Cyl No. Analytical Accuracy

Component	Concentration

Analyst Addison Williams

Approved By Adela Sy

RESULTS ARE IN VOLUME PERCENT UNLESS OTHERWISE INDICATED.

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

CERTIFIED REFERENCE MATERIALS EPA PROTOCOL GASES
ACCUBLEND CALIBRATION & SPECIALTY GAS MIXTURES PURE GASES
CUSTOM ANALYTICAL SERVICES

PLUMSTEADVILLE, PENNSYLVANIA / TROY, MICHIGAN / SAN BERNARDINO, CALIFORNIA / HOUSTON, TEXAS
WHEELING, ILLINOIS / FREMONT, CALIFORNIA / WAKEFIELD, MASSACHUSETTS / LONGMONT, COLORADO

Scott Specialty Gases
Electronics Group

2330 Hamilton Blvd., South Plainfield, N.J. 07080 Phone: (201) 754-7700 FAX: (201) 754-7303

AIR POLLUTION
CHARACTERIZATION & CONTROL
60 Industrial Park Rd. West
Tolland, CT 06084

Date: October 2,1990
QC No.: I-280
Your P.O. No.: 318
Invoice No.: 0707501

ANALYTICAL REPORT

Cyl No. ALM-002593 Analytical Accuracy ______

Component	Concentration
AIR ---------- Hydrocarbon Free	
THC as Methane --- less than 0.1 ppm	

Cyl No. ______ Analytical Accuracy ______

Component	Concentration

Cyl No. IL-3682 Analytical Accuracy ______

Component	Concentration
NITROGEN ---- ZERO-- 99.998 % min .	

Cyl No. ______ Analytical Accuracy ______

Component	Concentration

Analyst [signature]
Adela A. Sy

Approved By [signature]
John O'Shea

RESULTS ARE IN VOLUME PERCENT UNLESS OTHERWISE INDICATED.

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

Scott Specialty Gases

RECEIVED MAR 1991

Electronics Group

2330 Hamilton Blvd., South Plainfield, N.J. 07080 Phone: (201) 754-7700 FAX: (201) 754-7303

53510000

AIR POLLUTION
CHARACTERIZATION & CNTRL
60 INDUSTRIAL PK RD WEST
TOLLAND CT 06084

Date: FEBRUARY 28, 1991
QC No.: B-281 JOA
Your P.O. No.: 389RM
Invoice No.: 0709660

ANALYTICAL REPORT

Cyl No.: ALM005190 ALM015589 Analytical Accuracy:

Component	Concentration
AIR	HYDROCARBON FREE

Cyl No.: 1L1594 AAL9203 Analytical Accuracy:

Component	Concentration
NITROGEN	ZERO GAS

Cyl No.: Analytical Accuracy:

Component	Concentration

Cyl No.: Analytical Accuracy:

Component	Concentration

Analyst John O'Shea

Approved By Adela Sy

RESULTS ARE IN VOLUME PERCENT UNLESS OTHERWISE INDICATED.

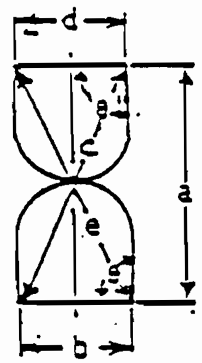
The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

S-TYPE PITOT GEOMETRIC CALIBRATION
PART 2 - PITOT ALIGNMENT

Probe Identification #601 Pitot Identification #601
Technical Specialist DBS HEAT CHECK O.K. DBS 10-8
Date 10-8-90 LEAK CHECK, O.K DBS 10-8

A.

Transverse Tube Axis



a 1.157
b 0.377
c 1.195
d 0.374
e 1.186

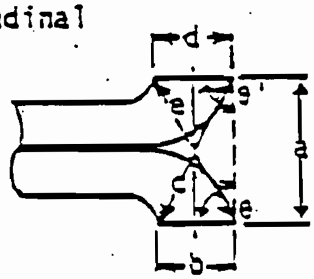
$$\frac{a^2 + b^2 - c^2}{2ab} = \cos\theta$$

$$\frac{a^2 + d^2 - e^2}{2ad} = \cos\theta'$$

θ 86.5 $(80^\circ < \theta < 100^\circ)$
θ' 85.23 $(80^\circ < \theta' < 100^\circ)$

B.

Longitudinal Tube Axis



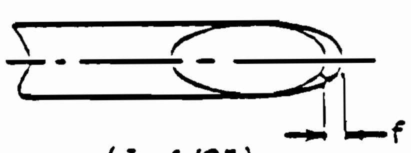
a 1.157
b 0.519
c 1.286
d 0.513
e 1.219

$$\frac{a^2 + b^2 - c^2}{2ab} = \cos\theta$$

$$\frac{a^2 + d^2 - e^2}{2ad} = \cos\theta'$$

θ 92.1 $(85^\circ < \theta < 95^\circ)$
θ' 84.4 $(85^\circ < \theta' < 95^\circ)$

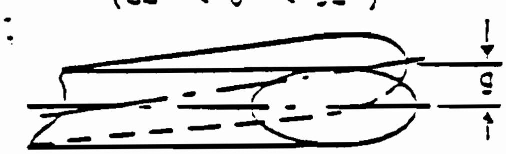
C.



f 0.080

(f < 1/8")

D.



g 0.C

(g < 1/32")

NOTE: values in parentheses are EPA Method 2 specifications.

PROBE THERMOCOUPLE CALIBRATION

		Tolerances
Expected Stack Temperature (T_s)	______ °R	
Mercury Thermometer (T_{ref})	______ °R	($T_s \pm 10\%$)
Thermocouple Readout	______ °R	($T_{ref} \pm 1.5\%$)
Probe Identification	______	

S-TYPE PITOT GEOMETRIC CALIBRATION

PART 2 - PITOT ALIGNMENT

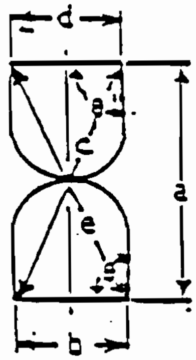
Probe Identification #601 Pitot Identification #601

Technical Specialist DBS HEAT CHECK, O.K. DBS 10-

Date 10-8-90 LEAK CHECK, O.K. DBS 10-

A.

Transverse Tube Axis



a 1.157
b 0.377
c 1.195
d 0.374
e 1.176

θ 86.5
θ' 85.23

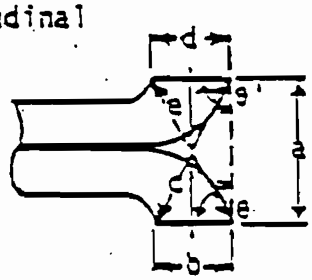
$$\frac{a^2 + b^2 - c^2}{2ab} = \cos\theta$$

$$\frac{a^2 + d^2 - e^2}{2ad} = \cos\theta'$$

$(80^\circ < \theta < 100^\circ)$
$(80^\circ < \theta' < 100^\circ)$

B.

Longitudinal Tube Axis



a 1.157
b 0.519
c 1.286
d 0.513
e 1.219

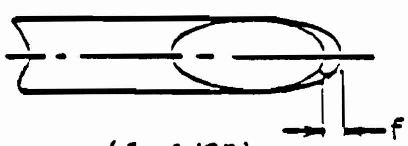
θ 92.1
θ' 84.4

$$\frac{a^2 + b^2 - c^2}{2ab} = \cos\theta$$

$$\frac{a^2 + d^2 - e^2}{2ad} = \cos\theta'$$

$(85^\circ < \theta < 95^\circ)$
$(85^\circ < \theta' < 95^\circ)$

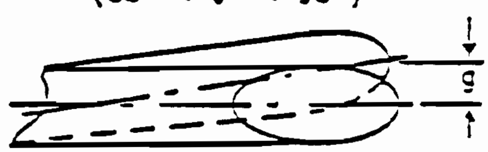
C.



f 0.020

(f < 1/8")

D.



g 0.0

(g < 1/32")

NOTE: values in parentheses are EPA Method 2 specifications.

PROBE THERMOCOUPLE CALIBRATION

		Tolerances
Expected Stack Temperature (T_s)	______ °R	
Mercury Thermometer (T_{ref})	______ °R	(T_s ± 10%)
Thermocouple Readout	______ °R	(T_{ref} ± 1.5%)
Probe Identification	______	

Technician Date

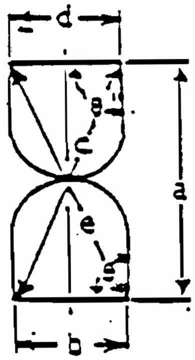
Procedure No. T/S-811
Revision No. 1
Date December 9, 1980
Page ______ of ______

S-TYPE PITOT GEOMETRIC CALIBRATION
PART 2 - PITOT ALIGNMENT

Probe Identification #202   Pitot Identification #202
Technical Specialist DBS   HEAT CHECK O.K.
Date 10/18/90   LEAK CHECK O.K.

A.

Transverse Tube Axis



a 1.061
b 0.378
c 1.127
d 0.373
e 1.136

θ 90.11
θ' 92

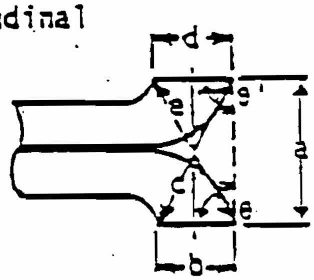
$$\frac{a^2 + b^2 - c^2}{2ab} = \cos\theta$$

$$\frac{a^2 + d^2 - e^2}{2ad} = \cos\theta'$$

$(80^\circ < \theta < 100^\circ)$
$(80^\circ < \theta' < 100^\circ)$

B.

Longitudinal Tube Axis



a 1.061
b 0.535
c 1.205
d 0.544
e 1.181

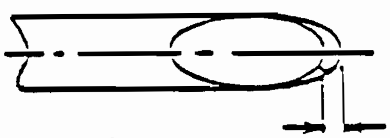
θ 92.04
θ' 88.6

$$\frac{a^2 + b^2 - c^2}{2ab} = \cos\theta$$

$$\frac{a^2 + d^2 - e^2}{2ad} = \cos\theta'$$

$(85^\circ < \theta < 95^\circ)$
$(85^\circ < \theta' < 95^\circ)$

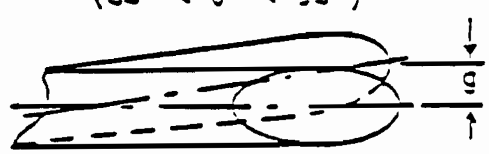
C.



$(f < 1/8")$

f 0.044

D.



$(g < 1/32")$

g 0

NOTE: values in parentheses are EPA Method 2 specifications.

PROBE THERMOCOUPLE CALIBRATION

		Tolerances
Expected Stack Temperature (T_s)	______ °R	
Mercury Thermometer (T_{ref})	______ °R	($T_s \pm 10\%$)
Thermocouple Readout	______ °R	($T_{ref} \pm 1.5\%$)

Probe Identification ______________

Technician ______________ Date

S-TYPE PITOT GEOMETRIC CALIBRATION

PART 2 - PITOT ALIGNMENT

Probe Identification #602 Pitot Identification #602

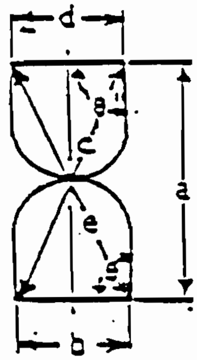
Technical Specialist DBS

Date 10/18/90

HEAT CHECK OK.
LEAK CHECK O.K.

A.

Transverse Tube Axis



a 1.061
b 0.378
c 1.127
d 0.373
e 1.136

$$\frac{a^2 + b^2 - c^2}{2ab} = \cos\theta$$

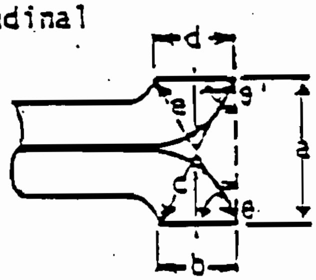
$$\frac{a^2 + d^2 - e^2}{2ad} = \cos\theta'$$

θ 90.11 $(80^\circ < \theta < 100^\circ)$

θ' 92 $(80^\circ < \theta' < 100^\circ)$

B.

Longitudinal Tube Axis



a 1.061
b 0.535
c 1.205
d 0.544
e 1.181

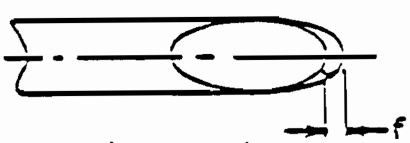
$$\frac{a^2 + b^2 - c^2}{2ab} = \cos\theta$$

$$\frac{a^2 + d^2 - e^2}{2ad} = \cos\theta'$$

θ 92.04 $(85^\circ < \theta < 95^\circ)$

θ' 86.6 $(85^\circ < \theta' < 95^\circ)$

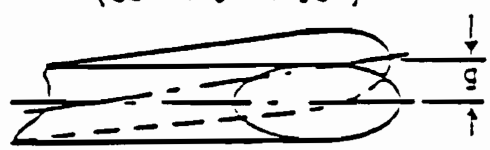
C.



f 0.044

(f < 1/8")

D.



g 0.0

(g < 1/32")

NOTE: values in parentheses are EPA Method 2 specifications.

PROBE THERMOCOUPLE CALIBRATION

			Tolerances
Expected Stack Temperature (T_s)	____	°R	
Mercury Thermometer (T_{ref})	____	°R	(T_s ± 10%)
Thermocouple Readout	____	°R	(T_{ref} ± 1.5%)

Probe Identification ____________

Technician ____________ Date ____________

APPENDIX H

Chain of Custody

CHAIN OF CUSTODY

Plant LKB

Plant Location OYSTER BAY, N.Y.

Unit Tested THERMAL OXIDIZER

Project No. 90003

Types of Samples VOST

Run Number	Date Sampled	Container Code	Description	Date of Recovery	Time of Recovery	Location of Recovery	Signature	Title
1	2-20-91	V-1A	TENAX	2-20-91	09:05	STACK		
1	"	V-1B	TENAX/CHARC	"	"	"		
2	"	V-2A	TENAX	"	10:05	"		
2	"	V-2B	TENAX/CHAR.	"	"	"		
3	"	V-3A	TENAX	"	11:00	"		
3	"	V-3B	TENAX/CHAR	"	"	"		
	"	V-4A	TENAX	"	12:00	"		
4	"	V-4B	TENAX/CHAR.	"	"	"		
5	"	V-5A	TENAX	"	13:15	"		
5	"	V-5B	TENAX/CHAR	"	"	"		
6	"	V-6A	TENAX	"	14:10	"		
6	"	V-6B	TENAX/CHAR.	"	"	"	[illegible]	ENV. TEC-

RECIPIENTS OF SAMPLES, other than recovery person(s):

Signature ______________ Title ______________ Date & Time ______________

LABORATORY PERSON(S) RECEIVING SAMPLES:

Signature ______________ Title ______________ Date & Time ______________

Rev. 1 1/19/82

CHAIN OF CUSTODY

Plant L.K.B.   Plant Location OYSTER BAY, N.Y.

Unit Tested THERMAL OXIDIZER   Project No. 90003

Types of Samples VOST

Run Number	Date Sampled	Container Code	Description	Date of Recovery	Time of Recovery	Location of Recovery	Signature	Title
7	2-20-91	V-7A	TENAX	2-20-91	15:05	STACK		
7	"	V-7B	TENAX/CHAR.	"	"	"		
8	"	V-8A	TENAX	"	15:25	"		
8	"	V-8B	TENAX/CHAR.	"	"	"		
9	"	V-9A	TENAX	"	16:25	"		
9	"	V-9B	TENAX/CHAR.	"	"	"		
	"	V-10A	TENAX	"	17:20	"		
10	"	V-10B	TENAX/CHAR.	"	"	"		
11	"	V-11A	TENAX	"	18:15	"		
11	"	V-11B	TENAX/CHAR.	"	"	"		
12	"	V-12A	TENAX	"	19:30	"		
12	"	V-12B	TENAX/CHAR.	"	"	"	[illegible]	ENV. TEC.

RECIPIENTS OF SAMPLES, other than recovery person(s):

Signature ______________________ Title ____________ Date & Time ____________

LABORATORY PERSON(S) RECEIVING SAMPLES:

Signature ______________________ Title ____________ Date & Time ____________

CHAIN OF CUSTODY

Plant L.K.B. Plant Location OYSTER BAY, N.Y.

Unit Tested THERMAL OXIDIZER Project No. 90003

Types of Samples VOST - CONDENSATE + BLANKS

Run Number	Date Sampled	Container Code	Description	Date of Recovery	Time of Recovery	Location of Recovery	Signature	Title
1→4	2-20-91	V1-4C	CONDENSATE	2-20-91	12:00	STACK		
5→8	2-20-91	V5-8C	CONDENSATE	2-20-91	15:25	STACK		
9→12	2-20-91	V9-12C	CONDENSATE	2-20-91	19:30	STACK		
BLANK	2-20-91	FB-1A	FIELD BLANK	2-20-91	12:57	STACK		
BLANK	2-20-91	FB-1B	FIELD BLANK	2-20-91	"	"		
BLANK	2-20-91	FB-1C	COND. BLANK	2-20-91	13:40	STACK		
BLANK	2-20-91	FB-2A	FIELD BLANK	2-20-91	16:32	STACK		
BLANK	2-20-91	FB-2B	"	"	"	"		
BLANK	2-20-91	FB-2C	COND. BLANK	"	"	"		
BLANK	2-21-91	TB-1A	TRIP BLANK	2-21-91	17:00	LAB		
BLANK	2-21-91	TB-1B	TRIP BLANK	2-21-91	"	"		
BLANK	2-21-91	TB-1C	COND. BLANK	2-21-91	"	"		
							[signature]	ENV. TEC

RECIPIENTS OF SAMPLES, other than recovery person(s):

Signature ______________ Title ______________ Date & Time ______________

LABORATORY PERSON(S) RECEIVING SAMPLES:

Signature ______________ Title ______________ Date & Time ______________