

1993 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**

MAY 1994

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AND ADJACENT AREAS

Submitted to:

TOWN OF OYSTER BAY
DEPARTMENT OF PUBLIC WORKS
SYOSSET, NEW YORK

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MAY 1994

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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 and capped landfill, 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 periodically operated New York State Department of Environmental Conservation (NYSDEC) approved 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 5, 1993 and July 20, 1993 by passage of TBR No. 19-93 and 502-93, 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 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 systems 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 location 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.

In 1990-91, four quarterly rounds of ambient air and subsurface gas sampling were performed. An interpretive report prepared by LKB entitled Evaluation of Ambient Volatile Organic Compounds in Air and Soils concluded that, based on the test results generated that the landfill does not have a significant adverse impact on the ambient air.

This report was submitted to NYSDEC in early 1992 with a recommendation to reduce the testing frequency from quarterly to annually on the basis of these findings. The NYSDEC denied the Town's recommendation and directed the Town to continue quarterly testing. The only quarterly test (second year of monitoring, first quarterly test) was conducted on October 26-27, 1992. The results of this test confirm the findings of previous testing.

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. This report was released for agency review shortly after inconsistencies in the applicable guideline values were resolved with NYSDEC.

The Consent Decree provided for an automatic reduction in the quarterly testing frequency of the thermal oxidizer stack emissions after the initial year on monitoring to annually. This annual testing of the stack emissions took place on November 10, 1992. The results of the testing indicated that the thermal oxidizer emissions were well below the acceptable ambient guideline concentrations (AGC's) as stipulated by the NYSDEC.

In 1993, three quarterly rounds of ambient air and subsurface soil gas sampling were performed. Results of these quarterly samplings, which were conducted on March 1-2, May 26-27, and August 23-24, 1993, confirm the findings of previous testing. Soil gas pressure readings indicated that most pressure probes were under negative or zero pressure at the time of these quarterly samplings except for one result obtained on the August 23, 1993 sampling which exhibited a slight positive pressure. It should be noted that due to poor gas quality at the thermal oxidizer, annual thermal oxidizer stack emissions sampling was not performed on this equipment in 1993. Thermal oxidizer testing is scheduled to resume in the spring of 1994 after certain process improvements are accomplished.

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 - Second Year of Monitoring, Second, Third and Fourth Quarter Reports (Appendix C) - and Evaluation of Ambient Volatile Organic Compounds in Air and Soils and Soil Gas Pressure Reading for 1992-1993 - Second Year of Monitoring, Annual Summary (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 was 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. In January 1993, capping operations at the landfill were completed. The Town deactivated the buried header and re-installed the above-ground header system which continues to obviate the migration of landfill gas in this portion of the site.
- 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 received a permit in June 1992.

- 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, Town of Oyster Bay Landfill/Fireman's Training Center Subsurface Gas Sampling Program Work Scope, 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 1992, the County and Town 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 provided 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. The three landfill gas vents (LGV-5A, 5B, 7A) were installed in November, 1992. Installation of a skid mounted blower and water separator package were completed in the spring of 1993.

In summary, the County and Town have concluded that the recently completed improvements to the Town's facilities control the potential for gas migration along the common border of the NCFTC/OBSWDC. With the completion of work currently undergoing pilot testing and design by the County, all subsurface landfill gas along the common border of the NCFTC/OBSWDC should be effectively controlled.

SECTION 2

SAMPLING

2.1 General

Sampling was performed by the following organizations:

- Town of Oyster Bay (TOB);
- Lockwood, Kessler & Bartlett, Inc. (LKB);
- RTP Environmental Associates, Inc. (RTP).

RTP was 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. As noted in Section 1.3, annual thermal oxidizer stack emissions sampling was not performed on this equipment in 1993 due to the poor gas quality at the thermal oxidizer.

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).

The 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 (these instruments contain water traps which prevent 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 which measure 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 1992 Annual Report Summarizing the Results of Landfill Gas Monitoring Programs at the Old Bethpage Solid Waste Disposal Complex and Adjacent Areas (LKB, May, 1993). This report developed sampling programs in potentially hazardous areas on the NCFTC grounds, and areas on-site and off-site of the OBSWDC.

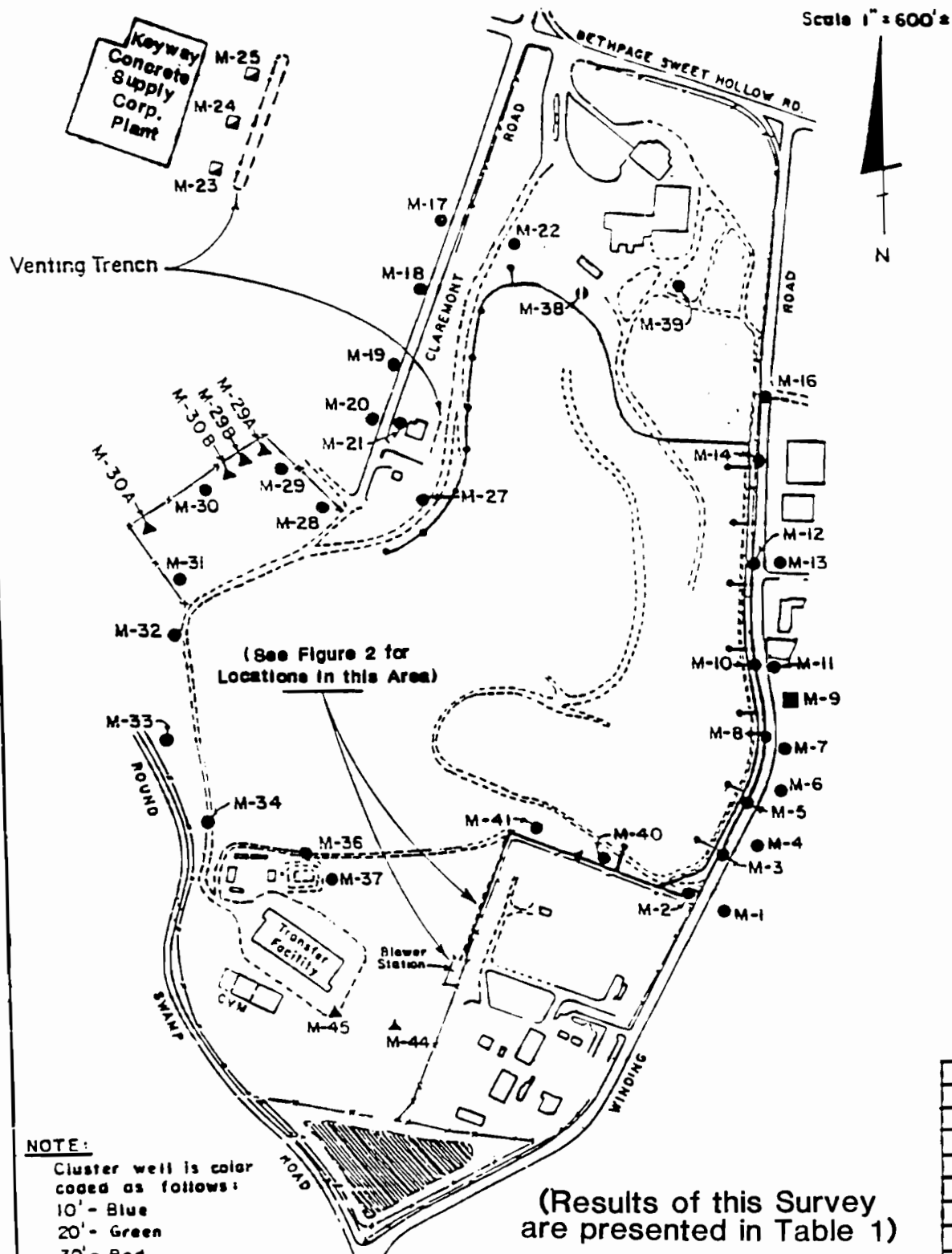
2.3 Current Gas Monitoring

There are presently a number of 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 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.

1993 PERIMETER MONITORING POINTS AT OBSWDC

Scale 1" = 600'



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.

(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

FIGURE 1

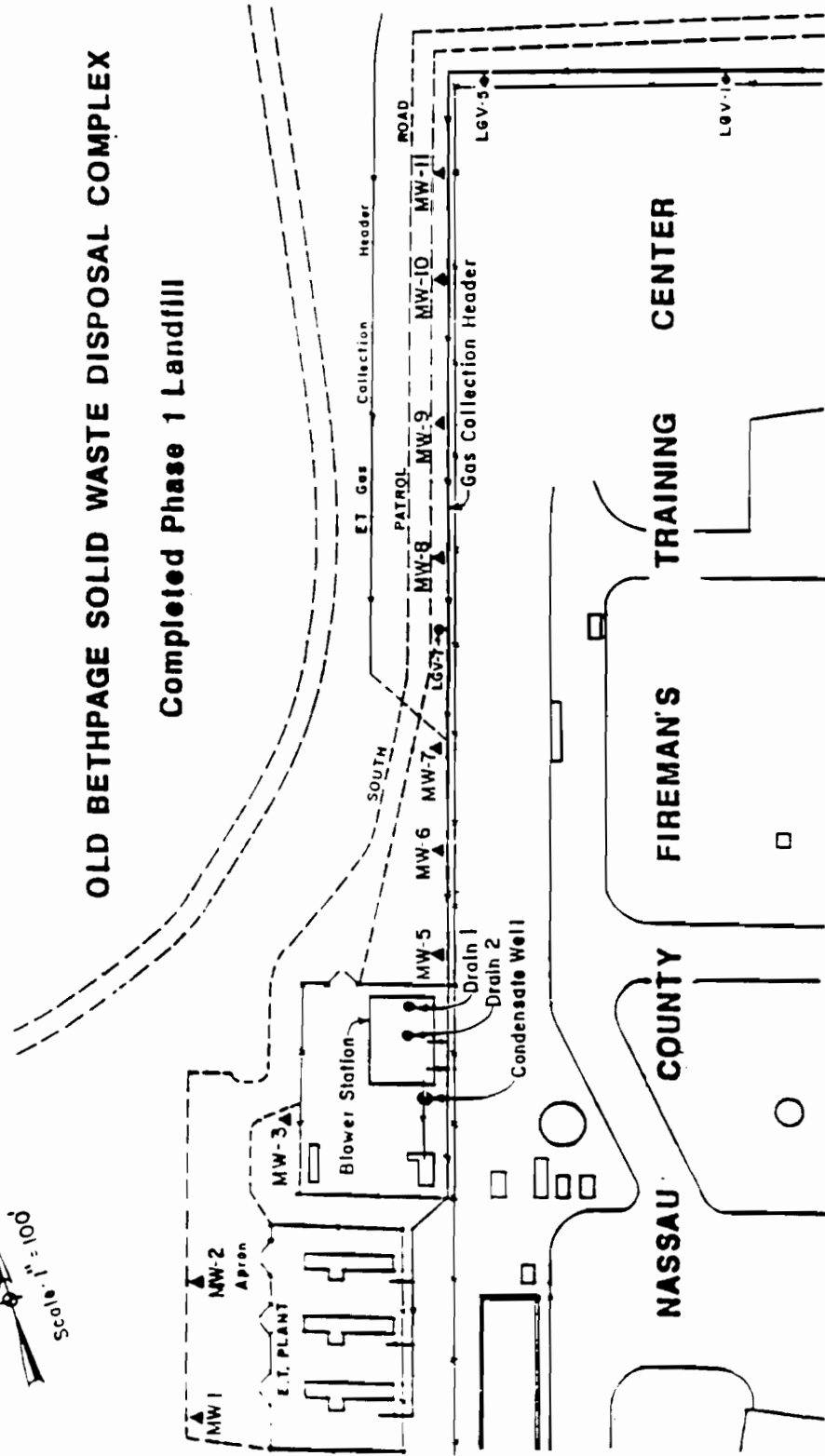


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LEGEND

▲ Denotes Cluster Well, Varying Depth



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)

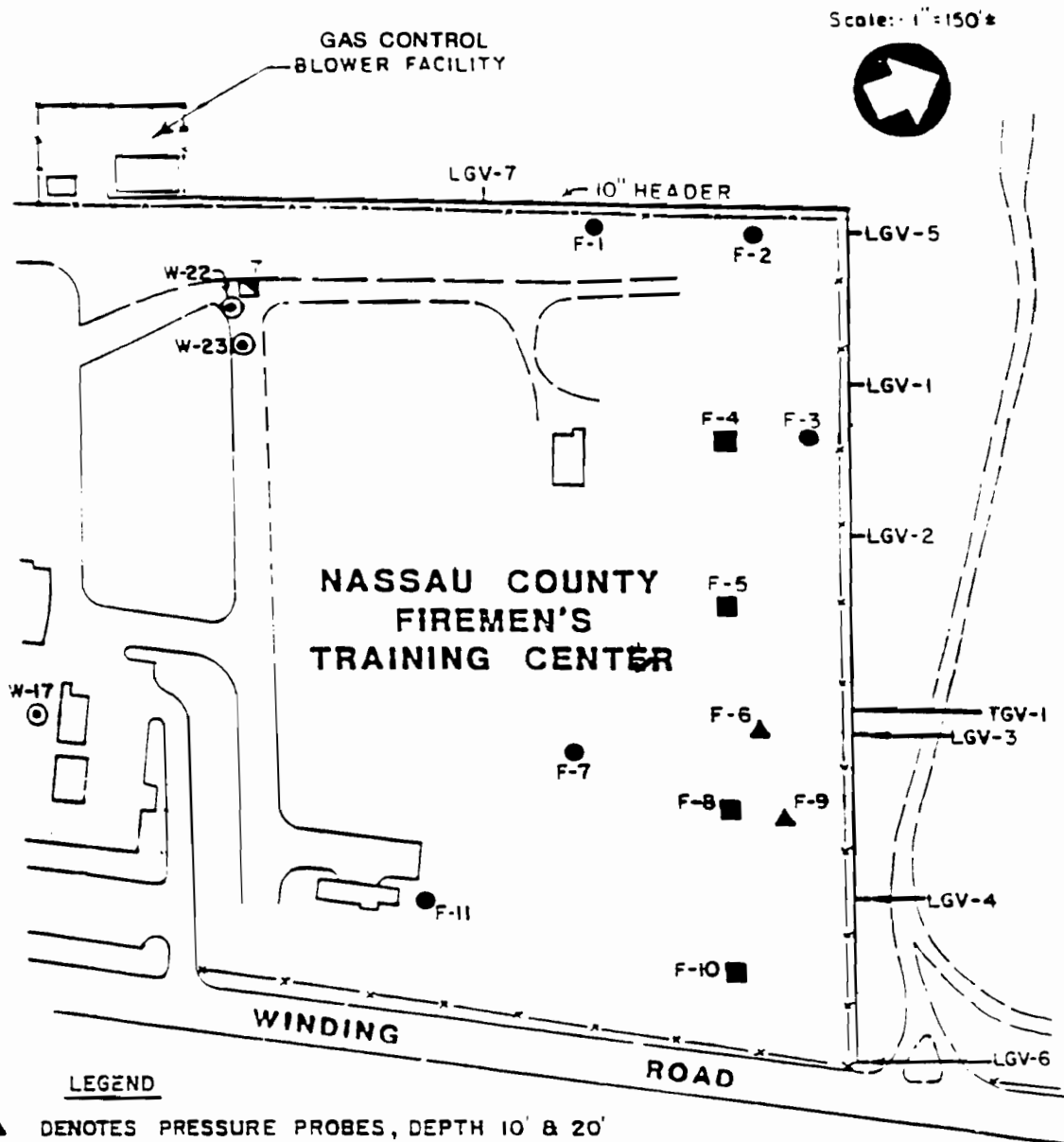
FIGURE 2

1993 PERIMETER MONITORING POINTS AT OBSWDC



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CONSULTING ENGINEERS

1993 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	

NOTES

- CLUSTER WELLS ARE COLOR CODED AS FOLLOWS
10'-BLUE, 20'-GREEN, 30'-RED, 40'-YELLOW
- PRESSURE PROBES ARE COLOR CODED AS FOLLOWS
10'-BLUE, 20'-GREEN



FIGURE 3

LOCKWOOD, KESSLER & BARTLETT, INC.
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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, 6 and 7). 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 Housing Combustible Gas Survey) is conducted at the Senior Citizen Complex (Figure 8) 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.

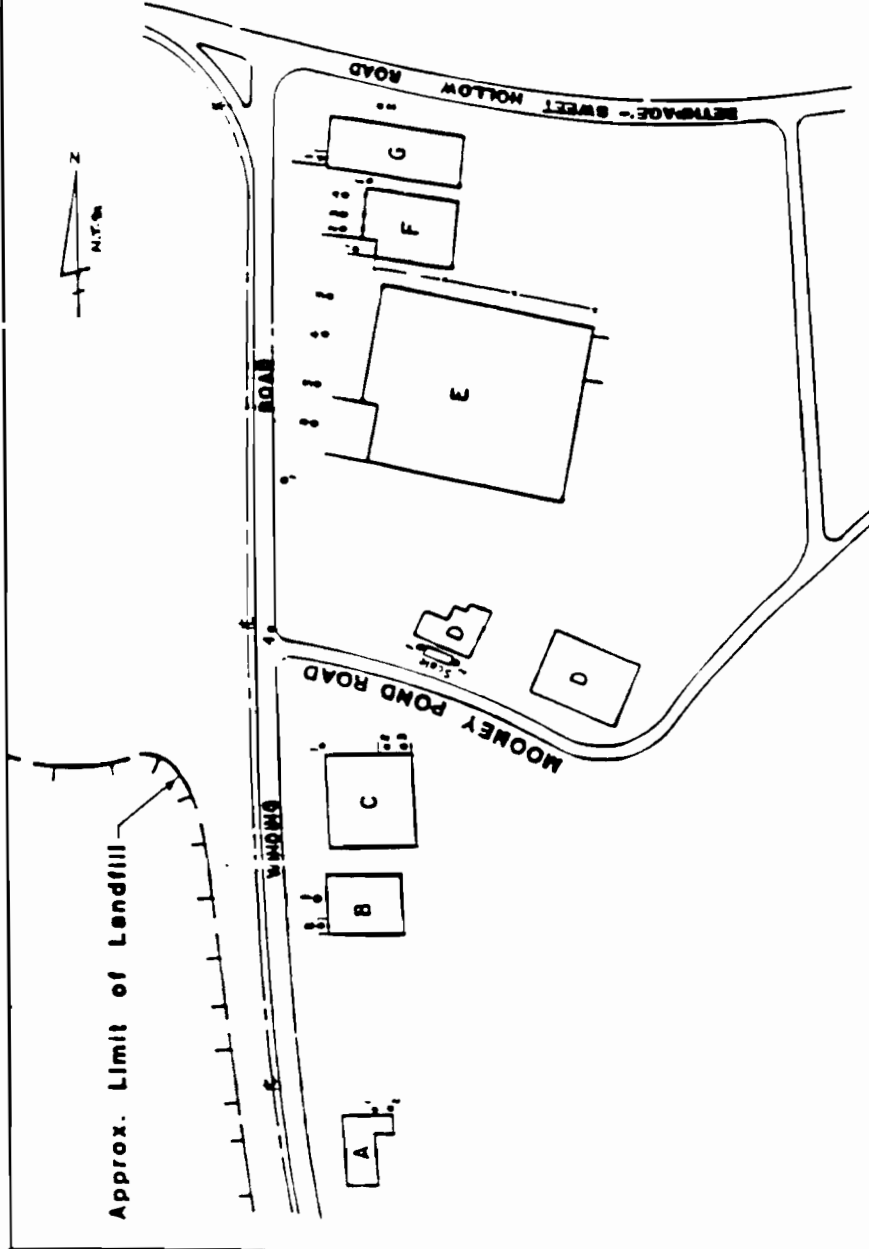
Data obtained by TOB personnel in the three (3) monthly surveys (OBSWDC, ABSIC and SCHCG Surveys) are then sent to LKB for analysis and evaluation. LKB then prepares an evaluation of data report based on the monthly combustible gas data.

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 fire fighting 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 initiated a daily monitoring on November 6, 1987 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

SAMPLE LOCATION	SAMPLE DESCRIPTION	% COMBUSTIBLE GAS	SAMPLE LOCATION	SAMPLE DESCRIPTION	% COMBUSTIBLE GAS
(A) 499 WINDING RD.	None		(F) 310 WINDING RD.	Drain	
(B) 459 WINDING RD.	Drain		(G) 161 BETHPAGE-SWEET HOLLOW RD	Drain	
(C) 445 WINDING RD.	Drain			Drain	
(D) 311 WINDING RD.	Scale			Drain	
(E) 303 WINDING RD.	Scale			Drain	

FIGURE 4



NOTE:

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

(Results of this Survey are presented in Table 3)

ADJACENT BUILDING STRUCTURES AND INCINERATOR COMPLEX SURVEY



CONSULTING ENGINEERS

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



(Results of this Survey are presented in Table 3)

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

[illegible]

FIGURE 6



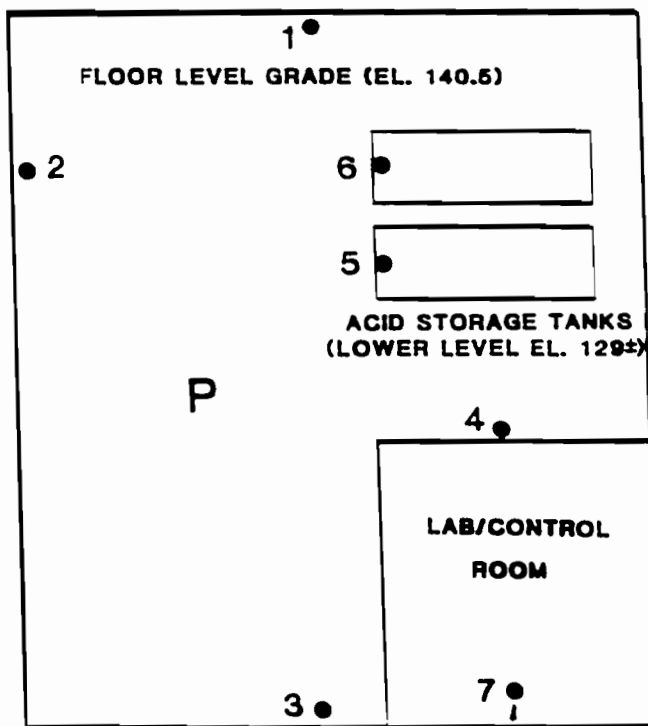
CONSULTING ENGINEERS

**LOCKWOOD,
KESSLER &
BARTLETT, INC.**
SYRACUSE, NEW YORK

ADJACENT BUILDING STRUCTURES & INCINERATOR COMPLEX SURVEY



Not To Scale



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 7



LOCKWOOD, KESSLER & BARTLETT, INC.
CONSULTING ENGINEERS SINCE 1849 SYOSSET, NEW YORK

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 was conducted weekly by TOB personnel.

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. This voluntary 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 has reverted to a monthly sampling of these locations since these areas and gas concentrations are well defined and it is 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 after 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 9).

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,
- monthly monitoring survey.

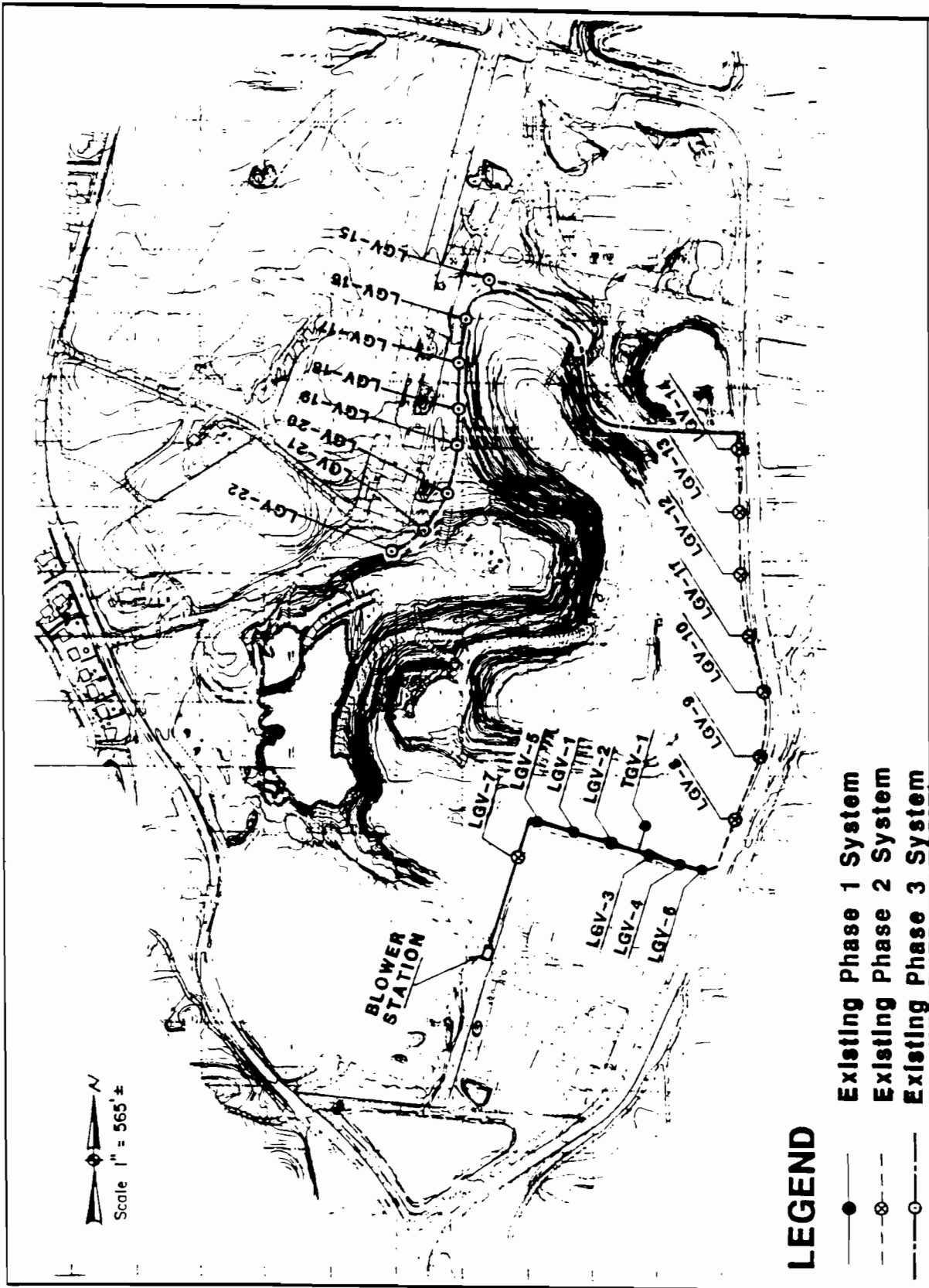


**FIGURE 9: LOCATION OF PHASE 1, 2 & 3
GAS CONTROL & RECOVERY SYSTEMS**

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

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

3.2.1 Site Survey

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 August 23 to September 29, 1993. 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 radically 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 1993 Annual Site Survey). This data compares the combustible gas migration contour compiled this year with the previously established August 1990, August 1991 and August 1992 contours.

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.
- 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.

TABLE 1
1993 MONTHLY MONITORING SURVEY
OLD BETHPAGE SOLID WASTE DISPOSAL COMPLEX
TOWN OF OYSTER BAY
PERCENT COMBUSTIBLE GAS

WEATHER TEMP. BAR. PR.	SUNNY 25 DEG. 30.40 R *	SUNNY 16 DEG. 30.42 R	CLOUDY 28 DEG. 30.52 R	SUNNY 50 DEG. 30.04 S	SUNNY 50 DEG. 29.94 F	SUNNY 62 DEG. 29.90 R	SUNNY 68 DEG. 30.09 R	CLOUDY 71 DEG. 30.08 F	SUNNY 47 DEG. 30.33 R	RAIN 54 DEG. 29.68 S	SUNNY 34 DEG. 30.35 S	SUNNY 40 DEG. 29.92 F
DATE	JAN. 26	FEB. 25	MAR. 23	APR. 20	MAY 18	JUN. 23	JUL. 26	AUG. 30	SEP. 30	OCT. 28	NOV. 30	DEC. 14
LOCATION **												
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
M-20	0	0	0	0	0	0	0	0	0	0	0	0
M-21	0	0	0	0	0	0	0	0	0	0	0	0
M-22	0	0	0	0	0	0	0	0	0	0	0	0
M-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	50	30	0	0	10	0	48	20	20	24	0	0

NOTES:

* R = Rising; S = Steady; F = Falling

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

(Continued)

TABLE 1 (Continued)
1993 MONTHLY MONITORING SURVEY
OLD BETHPAGE SOLID WASTE DISPOSAL COMPLEX
TOWN OF OYSTER BAY
PERCENT COMBUSTIBLE GAS

WEATHER	SUNNY	SUNNY	CLOUDY	SUNNY	SUNNY	SUNNY	SUNNY	CLOUDY	SUNNY	RAIN	SUNNY	SUNNY
TEMP.	25 DEG.	16 DEG.	28 DEG.	50 DEG.	50 DEG.	62 DEG.	68 DEG.	71 DEG.	47 DEG.	54 DEG.	34 DEG.	40 DEG.
BAR. PR.	30.40 R *	30.42 R	30.52 R	30.04 S	29.94 F	29.90 R	30.09 R	30.08 F	30.33 R	29.68 S	30.35 S	29.92 F
DATE	JAN. 26	FEB. 25	MAR. 23	APR. 20	MAY 18	JUN. 23	JUL. 26	AUG. 30	SEP. 30	OCT. 28	NOV. 30	DEC. 14
LOCATION **												
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	2	0.4	0	0	0.4	0	0	0	0	0	0	0
MW-6 Upper	0	0	0	0	0	0	0	0	0	0	0	0
MW-6 Lower	0	0	0	0	0	0	0	0	0	0	0	0
MW-7 Upper	0	0	0	0	0	0	0	0	0	0	0	0
MW-7 Lower	0	0	0	0	0	0	0	0	0	0	0	0
MW-8 Upper	0	0	0	0	0	0	0	0	0	0	0	0
MW-8 Lower	0	0	0	0	0	6	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	0	0	0	0	1	0	0	0	0	0	0	0
MW-11 Lower	17	10	10	10	10	4.5	0	0	11	10	0	0
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
Condens. Well	0	0	0	0	0	0	0	0	0	0	0	0

NOTES:

* R = Rising; S = Steady; F = Falling

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

TABLE 2
1993 MONTHLY MONITORING SURVEY
OLD BETHPAGE SOLID WASTE DISPOSAL COMPLEX
TOWN OF OYSTER BAY
PERCENT COMBUSTIBLE GAS

WEATHER TEMP. BAR. PR.	SUNNY 25 DEG. 30.40 R *	SUNNY 16 DEG. 30.42 R	CLOUDY 28 DEG. 30.52 R	SUNNY 50 DEG. 30.04 S	SUNNY 50 DEG. 29.94 F	SUNNY 62 DEG. 29.90 R	SUNNY 68 DEG. 30.09 R	CLOUDY 71 DEG. 30.08 F	SUNNY 47 DEG. 30.33 R	RAIN 54 DEG. 29.68 S	SUNNY 34 DEG. 30.35 S	SUNNY 40 DEG. 29.92 F
DATE	JAN. 26	FEB. 25	MAR. 23	APR. 20	MAY 18	JUN. 23	JUL. 26	AUG. 30	SEP. 30	OCT. 28	NOV. 30	DEC. 14
LOCATION**												
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	0	0	0	0.2	1.5	0	0	0	10	10
W-22	0	0	0	0	0	0	0	0	0	0	0	0
W-23	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0

NOTES:

* R = Rising; S = Steady; F = Falling

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

3.2.2 Monthly Monitoring Survey

As recommended in the 1992 Annual Report (LKB, May 1993), 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 10)), pressure probes at depths of 10 and 20 feet (Figure 11), cluster wells ranging in depth from 10 to 40 feet (Figure 12) and varying depth cluster wells (Figure 13).

In this year's monthly monitoring survey (January to December 1993), 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.

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-41, MW-5 Lower, MW-8 Lower, and MW-11 Upper and Lower, the varying combustible gas concentrations (0.4 to 50% 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 10% combustible gas, were measured by TOB personnel at Nassau County monitoring well W-17. This sampling point is located at the Nassau County Fireman's

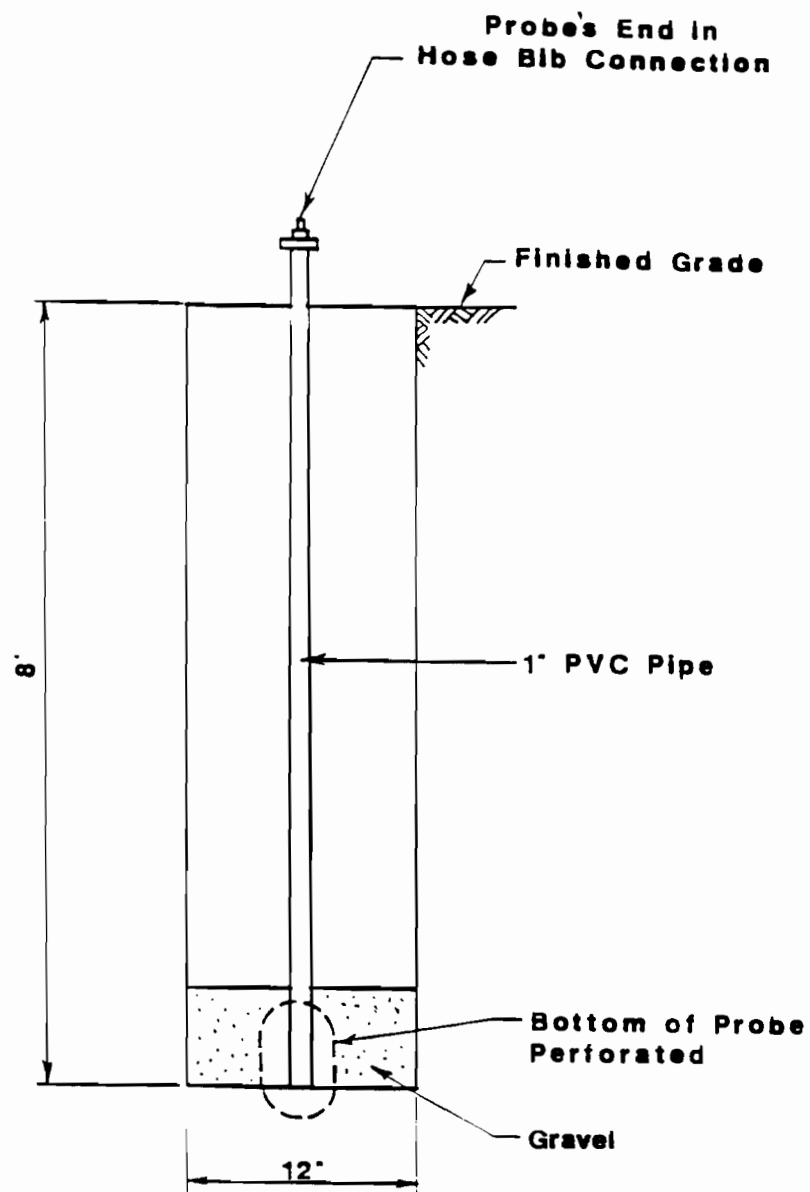


FIGURE 10 : SINGLE POINT SAMPLING PROBE

NOT TO SCALE
ALL DIMENSIONS APPROXIMATE

NOTE:

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

10' - Blue

20' - Green

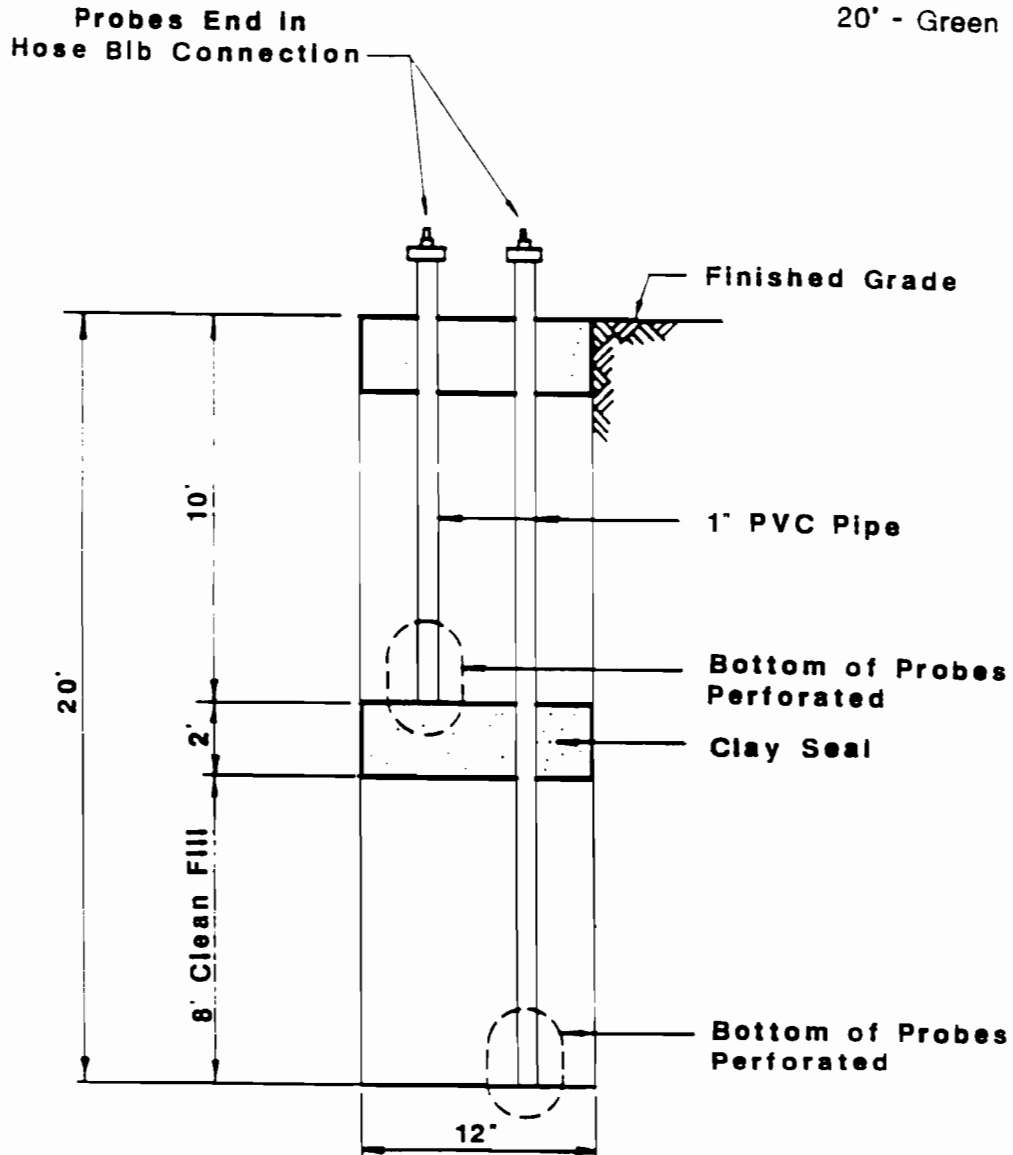
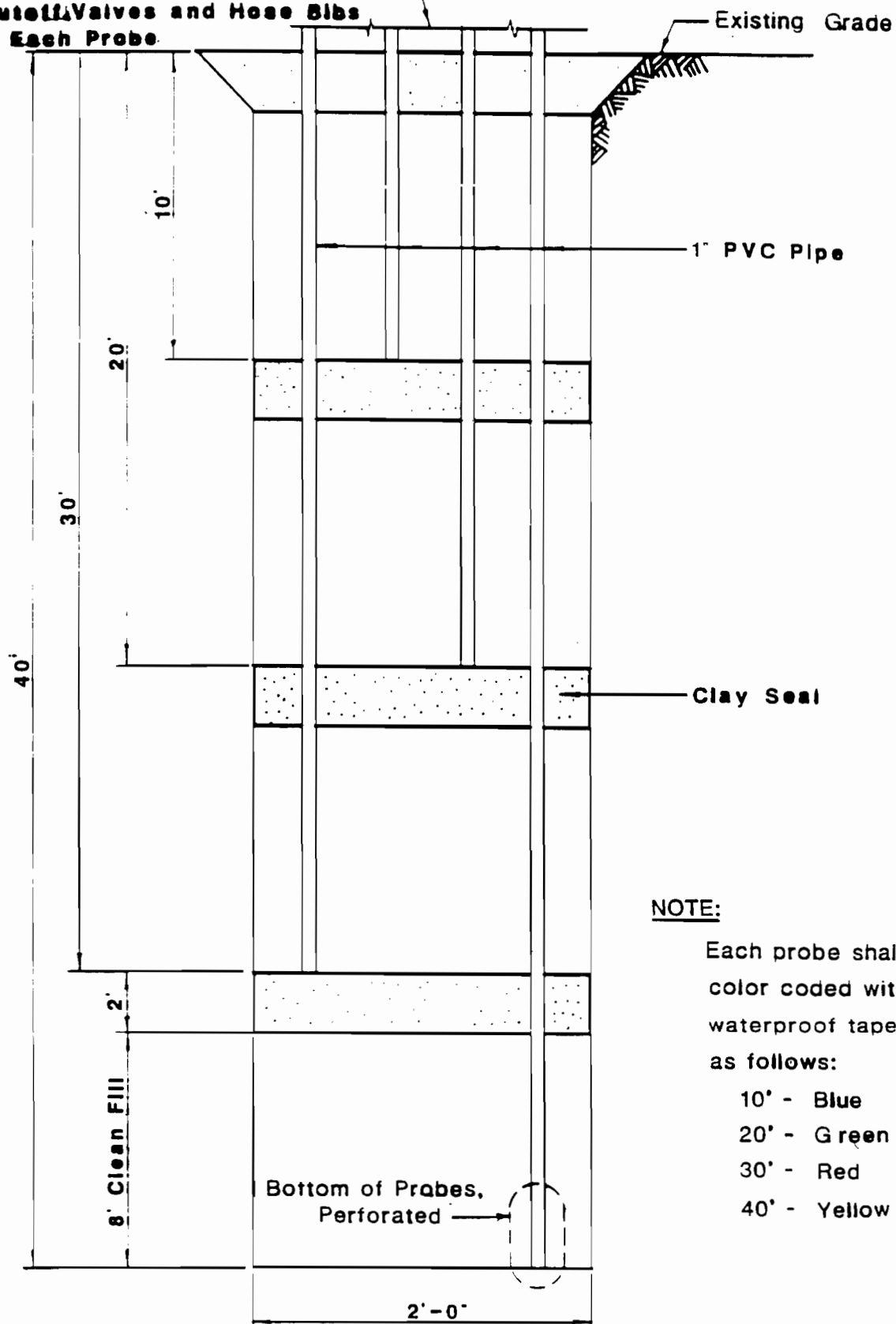


FIGURE 11: PRESSURE PROBE

NOT TO SCALE
ALL DIMENSIONS APPROXIMATE

Above Ground Details Includes
Shutoff Valves and Hose Bibs
on Each Probe.



NOTE:

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

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

FIGURE 12: CLUSTER WELL

Not to Scale
All Dimensions Approximate



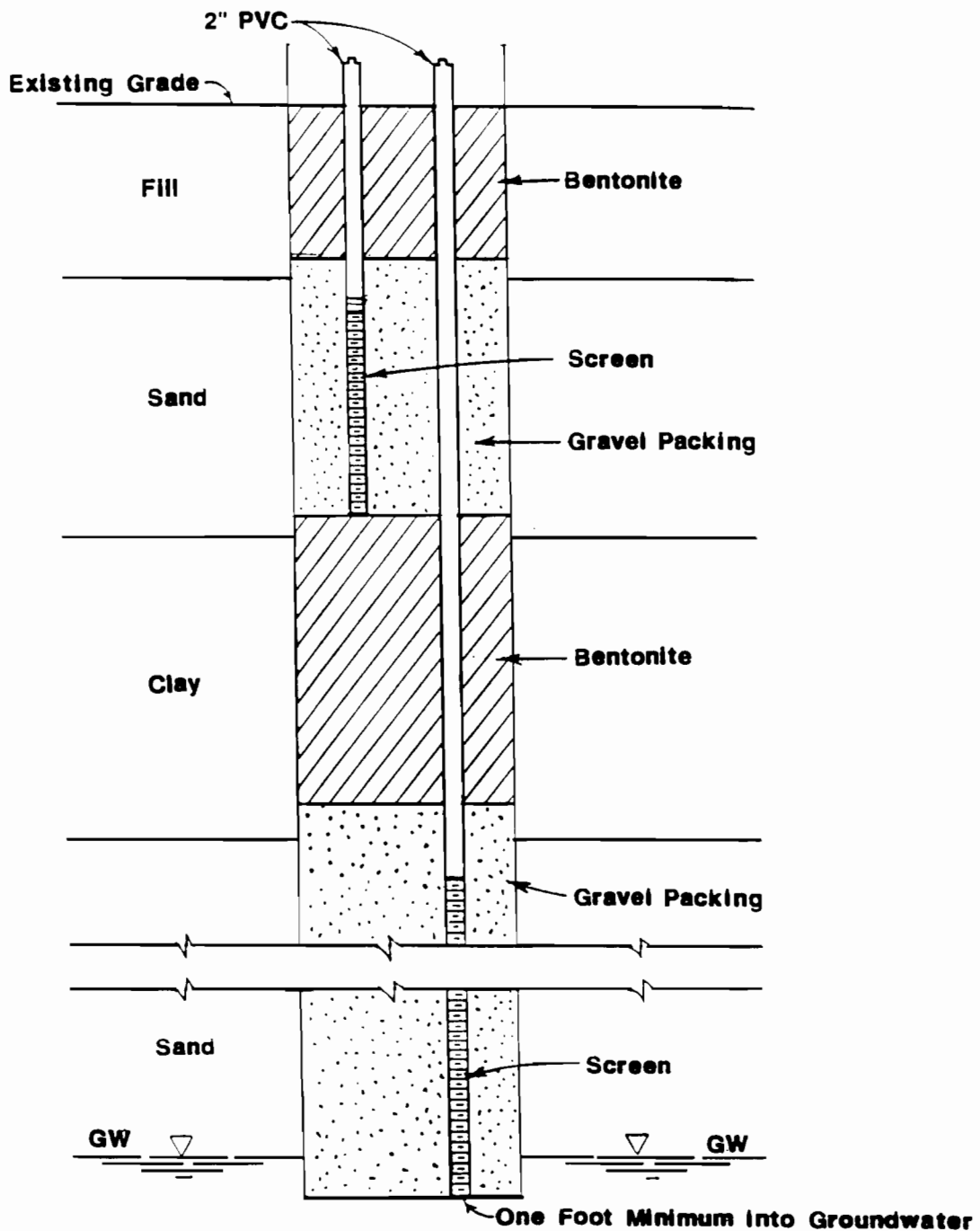


FIGURE 13 : VARYING DEPTH CLUSTER WELL

Not to Scale
All Dimensions Approximate

Training Center. As noted in last year's report, the Town as of November 12, 1990 has reverted to a monthly sampling of locations within the NCFTC 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.

- 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;
- the groundwater remediation facility;
- 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 1992 Annual Report (LKB, May 1993), monthly monitoring was conducted by TOB personnel at building structures immediately adjacent to the OBSWDC and on-site building structures. 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 compactor-baler facility, the groundwater remediation 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 15 building structures (see Figures 4, 5, 6 and 7). The readings were taken from sensors, 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 September 16, 1993 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

TABLE 3
1993 MONTHLY MONITORING SURVEY
ADJACENT BUILDING STRUCTURES AND INCINERATOR COMPLEX SURVEY
TOWN OF OYSTER BAY
PERCENT COMBUSTIBLE GAS

WEATHER	SUNNY	SUNNY	CLOUDY	SUNNY	SUNNY	SUNNY	SUNNY	CLOUDY	SUNNY	RAIN	SUNNY	SUNNY
TEMP.	25 DEG	16 DEG	28 DEG.	50 DEG.	50 DEG.	62 DEG.	68 DEG	71 DEG.	47 DEG.	54 DEG	34 DEG.	40 DEG.
BAR. PR	30.40 R *	30.42 R	30.52 R	30.04 S	29.94 F	29.90 R	30.09 R	30.08 F	30.33 R	29.68 S	30.35 S	29.92 F
DATE	JAN 26	FEB 25	MAR 23	APR 20	MAY 18	JUN 23	JUL 26	AUG 30	SEP 30	OCT 28	NOV 30	DEC 14
LOCATION **												
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-2	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
P-1	0	0	0	0	0	0	0	0	0	0	0	0
P-2	0	0	0	0	0	0	0	0	0	0	0	0
P-3	0	0	0	0	0	0	0	0	0	0	0	0
P-4	0	0	0	0	0	0	0	0	0	0	0	0
P-5	0	0	0	0	0	0	0	0	0	0	0	0
P-6	0	0	0	0	0	0	0	0	0	0	0	0
P-7	0	0	0	0	0	0	0	0	0	0	0	0

NOTES:
 * R = Rising; S = Steady; F = Falling
 ** All sampling locations presented in Table 3 are shown in Figures 4, 5, 6, and 7

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 through 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 9.

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 9). Improvements were incorporated into the design of the Phase 2 System, based on the evaluation of the Phase 1 System operation, and included

TABLE 4
1993 MONTHLY MONITORING SURVEY
SENIOR CITIZEN HOUSING SURVEY
TOWN OF OYSTER BAY
PERCENT COMBUSTIBLE GAS

WEATHER	SUNNY	SUNNY	CLOUDY	SUNNY	SUNNY	SUNNY	SUNNY	CLOUDY	SUNNY	RAIN	SUNNY	SUNNY
TEMP.	25 DEG.	16 DEG.	28 DEG.	50 DEG.	50 DEG.	62 DEG.	68 DEG.	71 DEG.	47 DEG.	54 DEG.	34 DEG.	40 DEG.
BAR. PR.	30.40 R *	30.42 R	30.52 R	30.04 S	29.94 F	29.90 R	30.09 R	30.08 F	30.33 R	29.68 S	30.35 S	29.92 F
DATE	JAN. 26	FEB. 25	MAR. 23	APR. 20	MAY 18	JUN. 23	JUL. 26	AUG. 30	SEP. 30	OCT. 28	NOV. 30	DEC. 14
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:

* R = Rising; S = Steady; F = Falling

** All sampling locations presented in Table 4 are shown in Figure 8.

an improved condensate collection system, and a more rigid header support system.

The Phase 2 System consists of seven vents (LGV-8 through 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 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.

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 through 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.

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 August 23 to September 29, 1993 indicated that the zero percent combustible gas migration contour (Drawing No. 1) remained stable as compared to 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 the past three years Annual Site Survey's (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

It should be noted that a portion of last year's and this year's zero percent combustible gas migration contour in the vicinity of the Phase II pit area was plotted approximately 200 feet to the west of the contours obtained in the 1990 and 1991 zero percent combustible gas migration surveys. These shifts to the west as compared to the 1990 and 1991 surveys can be attributed to the fact that monitoring conducted as part of this year's and last year's sampling was taken along the new toe of slope of the landfill which resulted from the completion of the landfill capping project in this area.

- 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 1993) have supported data provided in previous surveys, specifically the 1992 Annual Report (LKB, May 1993), 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 well W-17, located at the Nassau County Fireman's Training Center (Table 2). As noted in Section 2.3, occurrences of combustible gas readings within the NCFTC have been well defined over the course of five years of sampling and a betterment agreement has been signed between the County and Town wherein both parties will jointly share in upgrading the Town's facilities in areas of joint concern. 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-41, MW-5 Lower, MW-8 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 1993), 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 1993), zero percent combustible 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 from the quarterly sampling performed in 1993 and previous testing indicated that for some parameters ambient air data taken upwind of the landfill occasionally shows higher VOC's than downwind data. Although there is no firm data that the landfill is contributing significantly to ambient VOC concentrations, the relatively small amount of data collected to date and presented in the report is statistically not sufficient to 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 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 an apparent correlation to the observed soil gas values.

4.3.3 Annual Thermal Oxidizer Stack Emission Sampling for VOC's.

As noted in Section 1.3, annual thermal oxidizer stack emissions sampling was not conducted in 1993 due to the poor gas quality at the thermal oxidizer. Thermal oxidizer testing is scheduled to resume in the spring of 1994 after certain process improvements are accomplished.

4.3.4 Pressure Readings

As noted in Section 1.3, the results of the three (3) quarterly pressure sampling events conducted in 1993 indicated that most pressure probes were under zero or negative pressure except for one result obtained on the August 23, 1993 sampling which exhibited a slight positive pressure. Again as previously noted, the occurrence of zero or negative pressure at the sampling probes demonstrates the effectiveness of the Town's landfill gas control system and further supports data presented herein which indicates the line of zero methane gas migration is fully contained within the property boundaries of the OBSWDC.

Appended herewith are the Ambient Air Quality and Soil Gas Quality Survey's - Second Year of Monitoring, Second, Third and Fourth Quarter Reports (Appendix C) and the Evaluation of Ambient Volatile Organic Compounds in Air and Soils and Soil Gas Pressure Readings for 1992-1993; - Second Year of Monitoring, Annual Summary (Appendix D) which provides the sampling protocols and investigation methodologies 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 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 1994. 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 1992 Annual Report (LKB, May 1993) and we recommend that the Town implement this modified schedule for its 1994 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 participate in 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.

In 1992, the County and Town signed a betterment agreement wherein both parties will jointly share in upgrading the Town's facilities in the areas of joint concern. These improvements included 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.

As noted in Section 1.4 of this Report, the County and Town have concluded that, the gas control facilities completed in the spring of 1993 adequately control the potential for gas migration along the common border of the NCFTC/OBSWDC. With the completion of work currently undergoing pilot testing and design by the County, all subsurface landfill gas along the common border of the NCFTC/OBSWDC should be effectively controlled.

5.4 Gas Extraction System Condensate Discharge

The Town has been permitted by the Nassau County Department of Public Works to discharge condensate from the gas extraction system into the Nassau County Sewer System. This connection discharges condensate from the Phase 1 and 2 Gas Control Systems and some carryover of condensate mist from the Phase 3 Gas Control System through a bed of lime chips prior to discharge. Most condensate generated by the Phase 3 Gas Control System is discharged by gravity 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 began in 1992, and will continue annually thereafter. 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 proceeded with the second year of testing in 1992. During 1993, the second, third and fourth rounds of quarterly ambient air and subsurface gas sampling were performed completing the second year of sampling. These results were submitted to the NYSDEC for review.

APPENDIX A

RECOMMENDED MONITORING SCHEDULE FOR 1994

<u>Sample Points</u>	<u>Frequency of Monitoring</u>	<u>Monitoring Performed by</u>
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 was conducted annually. The oxidizer temperatures, however, are monitored on a continuous basis. Note that the Consent Decree requires monthly temperature monitoring.

APPENDIX B

IDENTIFICATION OF MONITORING BUILDINGS ADJACENT TO OBSWDC

<u>Identification Point</u>	<u>Identification Title</u>	<u>Building Location</u>
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	455 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 Road
K	Scalehouse	OBSWDC
L	Incinerator No. 2	OBSWDC
M	Compactor/Baler Building	OBSWDC
N	Incinerator No. 1	OBSWDC
P	Groundwater Treatment Facility	OBSWDC

1993 ANNUAL REPORT

APPENDIX C

**AMBIENT AIR QUALITY SURVEY
AND SOIL GAS QUALITY SURVEY
(SECOND YEAR OF MONITORING – SECOND,
THIRD AND FOURTH QUARTER REPORTS)**

MAY 1994

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

Second Year of Monitoring

Second 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

AUGUST 1993

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

SECOND YEAR OF MONITORING

SECOND QUARTER REPORT

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

SECOND YEAR OF MONITORING

SECOND QUARTER REPORT

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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, soil gases and soil gas pressure in areas at and surrounding the 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 Consent Decree.

As stipulated in the Consent Decree, the ambient air quality, soil gas quality and soil gas pressure were to be monitored at several positions around the landfill. The samples were to be analyzed using approved protocols and the results were to be tabulated. Four sampling events were conducted during the initial year of the program and four events are scheduled for the second year of monitoring.

This report contains the results of the second quarter sampling effort of the second year of monitoring (second year, second quarter sampling event). The sampling effort was conducted on March 1 and 2, 1993. Sections 2.0 and 3.0 of the report contain the sampling protocol and investigation methodology for air and soil gas including sample collection, sample handling and analytical procedures applied for this program. Section 4.0 provides a discussion of results. Section 5 contains the soil gas pressure sampling protocols and test results.

The current tetrachloroethene Annual Guideline Concentration (AGC) value of 0.075 ug/m³ stated in the latest Air Guide-1 document (1991 Edition) has been changed to 1.2 ug/m³. This change is reflected in this report. The second year, first quarter tetrachloroethene results will be reevaluated with the new AGC value and presented later in the second year ambient air and soil gas quality monitoring summary report.

2.0 METHODOLOGY AND PROTOCOLS

2.1 PROGRAM DEFINITION

In conformance with the Remedial Action Plan (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 provides data and analyses for four of the components listed in the RAP: (1) ambient air sampling; (2) 30" deep subsurface gas sampling; (3) subsurface gas sampling at various depths; and (4) soil gas pressure readings. The air, soil gas and pressure sampling procedures follow those developed during the first year of sampling.

The primary objective of the sampling program is to examine the ambient air concentration of trace volatile organic compounds (VOCs) in the vicinity of the Old Bethpage Landfill. During the second year second quarter 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 the fifteen locations specified in the Consent Decree. Soil gas pressure readings were taken at three locations.

The program also involves the collection of meteorological parameters from atop the landfill and at the upwind ambient air sampling location. This data is used 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 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

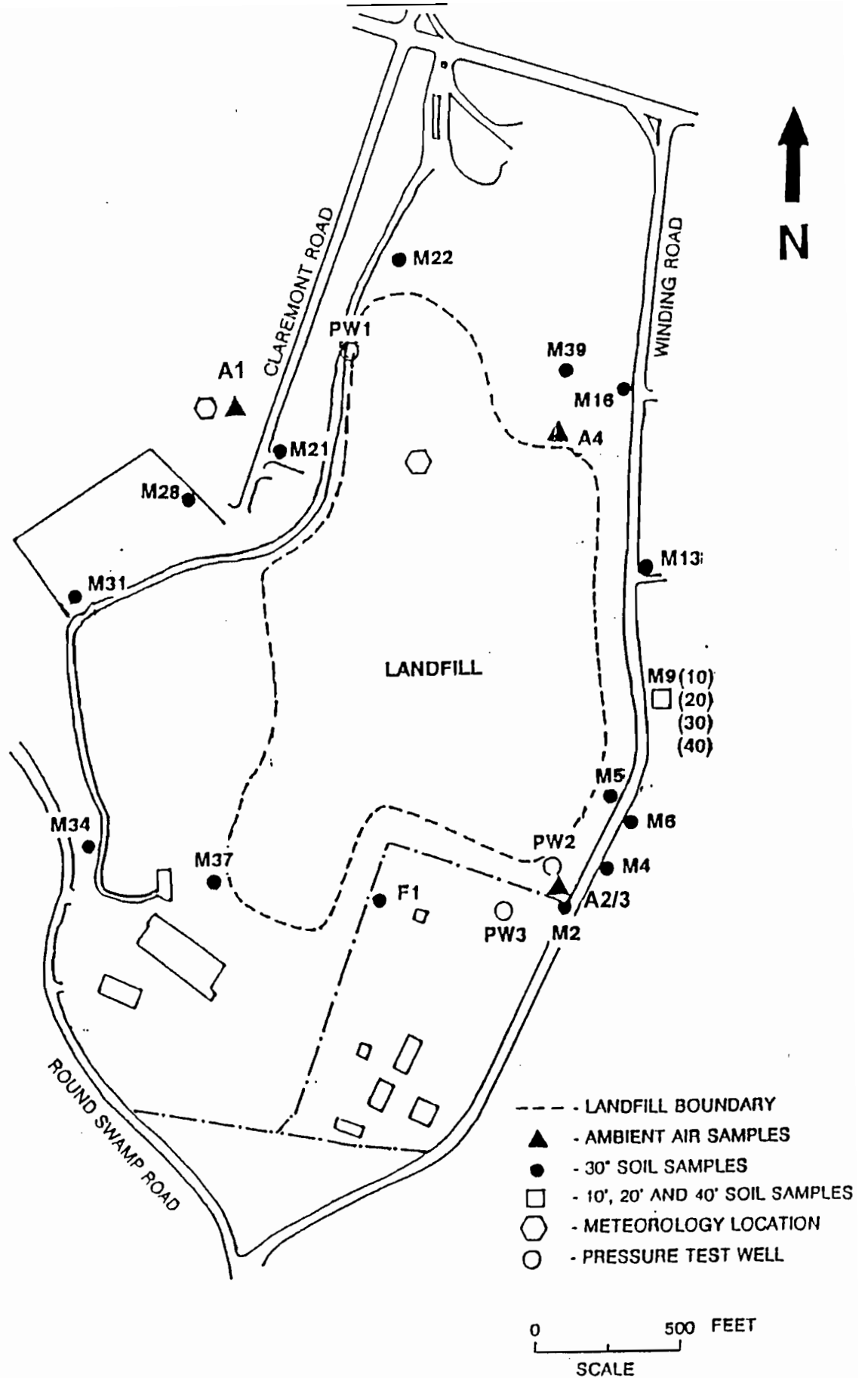


FIGURE 2.1: AMBIENT AIR AND SOIL MONITORING SITES AT OBSWDC

of the program. Sampling is to continue on a quarterly basis, unless the monitoring program is modified by a change to the Consent Decree. Samples are to be analyzed for volatile organic compounds.

The sample collection program was modified as discussed in the reports for the first year. Changes were made to the ambient air sampling scope stated in the 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 24-hour 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 VOCs. Therefore, the two ranges of sample volumes were necessary to avoid mass loading limits on the samples and to achieve acceptable analytical sensitivity for the target compound list.

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. Again, the second year monitoring program also contains quarterly soil gas sample collection. In this second year second 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 requires 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 was required on a quarterly basis during the initial year of the program. The second year monitoring program also includes quarterly sampling at well M9 at all four depths.

As in the initial year of sampling, 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 less

than 68°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 VOCs 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 in the initial year and deemed unacceptable because of low total volume capacity, potential leaks and contamination.
- 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 can be evaluated by using the modified VOST methodology is presented in Table 2.1 along with corresponding New York State Department of Environmental Conservation (NYSDEC) ambient air guidelines. This target compound list for the second year of monitoring is consistent with the VOC constituents being evaluated in the thermal oxidizer testing portion of the Consent Decree. Second quarter target compound list changes (ketones now tentatively identified) reflect GC/MS program alterations (MS mass 44 scan delay) detailed in Section 3.4.

TABLE 2.1

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

PROGRAM TARGET COMPOUND LIST WITH
NYSDEC AMBIENT AIR GUIDELINES

VOC COMPOUND NAME	TOXICITY	CURRENT SGC (ug/m3)		CURRENT AGC (ug/m3)		FORMER AGC (ug/m3)
Benzene	H	30	(p)	0.12	(E,U)	100
Bromodichloromethane	H			0.02	(D)	0.03*
Bromoform	M	1,200	(t)	12	(T)	11.9*
Bromomethane						
Carbon Disulfide	M	710	(r)	7	(D)	100
Carbon Tetrachloride	H	1,300	(r)	0.07	(E,U)	100
Chlorobenzene	M	11,000	(p)	20	(E)	1,170
Chloroethane	L	630,000	(t)	63,000	(T)	52,000
Chloroform	M	980	(r)	23	(R)	167
Chloromethane	M	22,000	(d)	770	(D)	2,100
Dibromochloromethane	M			0.1	(D)	0.03*
1,2-Dichlorobenzene (o)	M	30,000	(t)	200	(E)	1,000
1,3-Dichlorobenzene (m)	M	30,000	(a)	200	(A)	714*
1,4-Dichlorobenzene (p)	M*	110,000*		700*		
1,1-Dichloroethane	L	190,000	(t)	500	(E)	9,524*
1,2-Dichloroethane	M	950	(r)	0.039	(E,U)	0.2
1,1-Dichloroethene	H	2,000	(t)	0.02	(E,U)	66.7
trans-1,2-Dichloroethene	M			360	(D)	360*
1,2-Dichloropropane	M	83,000	(t)	0.15	(D)	833*
cis-1,3-Dichloropropene						
trans-1,3-Dichloropropene						
Ethylbenzene	M	100,000	(t)	1,000	(T)	1,450
Methylene Chloride	M	41,000	(t)	27	(D,U)	1,170
Styrene	M	51,000	(t)	510	(T)	716
1,1,2,2-Tetrachloroethane	M	1,600	(t)	0.02	(E,U)	23.2
Tetrachloroethene	M	81,000	(t)	1.2**	(D,U)	1,120
Toluene	L	89,000	(r)	2,000	(t)	7,500
1,1,1-Trichloroethane	L	450,000	(t)	1,000	(E)	38,000
1,1,2-Trichloroethane	M	13,000	(t)	0.06	(E,U)	150
Trichloroethene	M	33,000	(r)	0.45	(D,U)	900
Trichlorofluoromethane	L	560,000	(t)	700	(E)	
Vinyl Chloride	H	1,300	(t)	0.02	(E,U)	0.4
Xylenes (Total)	M	100,000	(t)	300	(t)	1,450***

TABLE 2.1
Continued

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

PROGRAM TARGET COMPOUND LIST WITH
NYSDEC AMBIENT AIR GUIDELINES

TENTATIVELY IDENTIFIED COMPOUNDS****	TOXICITY	CURRENT SGC (ug/m3)	CURRENT AGC (ug/m3)	FORMER AGC (ug/m3)
Acetone	L	140,000 (r)	14,000 (R)	35,600
Benzaldehyde				
2-Butanone	M	140,000 (t)	300 (E)	1967
2-Chloroethyl Vinyl Ether				
cis-1,2-Dichloroethene	M	190,000 (a)	1,900 (A)	1,880*
Freon 13	L	43,000 (a)	530 (A)	133,333*
2-Hexanone				
4-Methyl-2-Pentanone	M	48,000 (r)	480 (R)	683
Vinyl Acetate				

FOOTNOTES:

SGC - Short-term guideline concentration (current as of June 1991).

AGC - Annual guideline concentration (current as of June 1991, former as of 1986, 9/89 Edition).

*Proposed Value.

**Tetrachloroethene AGC current as of November 22, 1991.

***1450 total for ortho and para xylenes and 1450 total for meta xylene.

****Tentatively Identified Compound (TIC) using EPA SW846 Method 8240. Six additional non-target compound GC/MS peaks with the largest analytical response were also targeted.

Toxicity - H for High; M for moderate; and L for low by NYSDEC.

(a) - SGC based on NYSDEC structure-activity analogy.

(d) - SGC derived by NYSDEC, Division of Air Resources, Bureau of Air Toxics, Toxics Assessment Section.

(p) - SGC derived from proposed ACGIH TLV-TWA (1990-1991).

(r) - SGC derived from NIOSH REL-TWA (1988).

(t) - SGC derived from ACGIH TLV-TWA (1990-1991).

(A) - AGC based on NYSDEC structure-activity analogy.

(D) - AGC derived from NYSDEC, Division of Air Resources, Bureau of Air Toxics, Toxics Assessment Section.

(E) - AGC based on derivation by USEPA.

(I) - AGC based on RFC developed by USEPA - Integrated Risk Information System (IRIS), input pending.

(R) - AGC derived from NIOSH REL-TWA (1988).

(T) - AGC derived from ACGIH TLV-TWA (1990-1991).

(U) - AGC is the ambient air concentration which corresponds to an excess cancer risk of one in one million after lifetime exposure.

2.2.2 Modified VOST Sampler

The Volatile Organic Sampling Train (VOST) is one of three EPA methods identified to collect VOCs from stacks. 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 degrees centigrade (°C) 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.

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, two pre-conditioned VOST Tenax/Charcoal sorbent traps, condensate impinger, aluminum tube holder, ice bath and ice pack, sampling cane and cooler enclosure. The VOST Tenax/Charcoal sorbent traps 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 dry gas meter. The ice bath, ice pack and condensate impinger were used instead of two condensers in the EPA reference method. Two Tenax/Charcoal traps were used in order to account for possible breakthrough in the high volume samples and were used throughout the program for method uniformity among all sources.

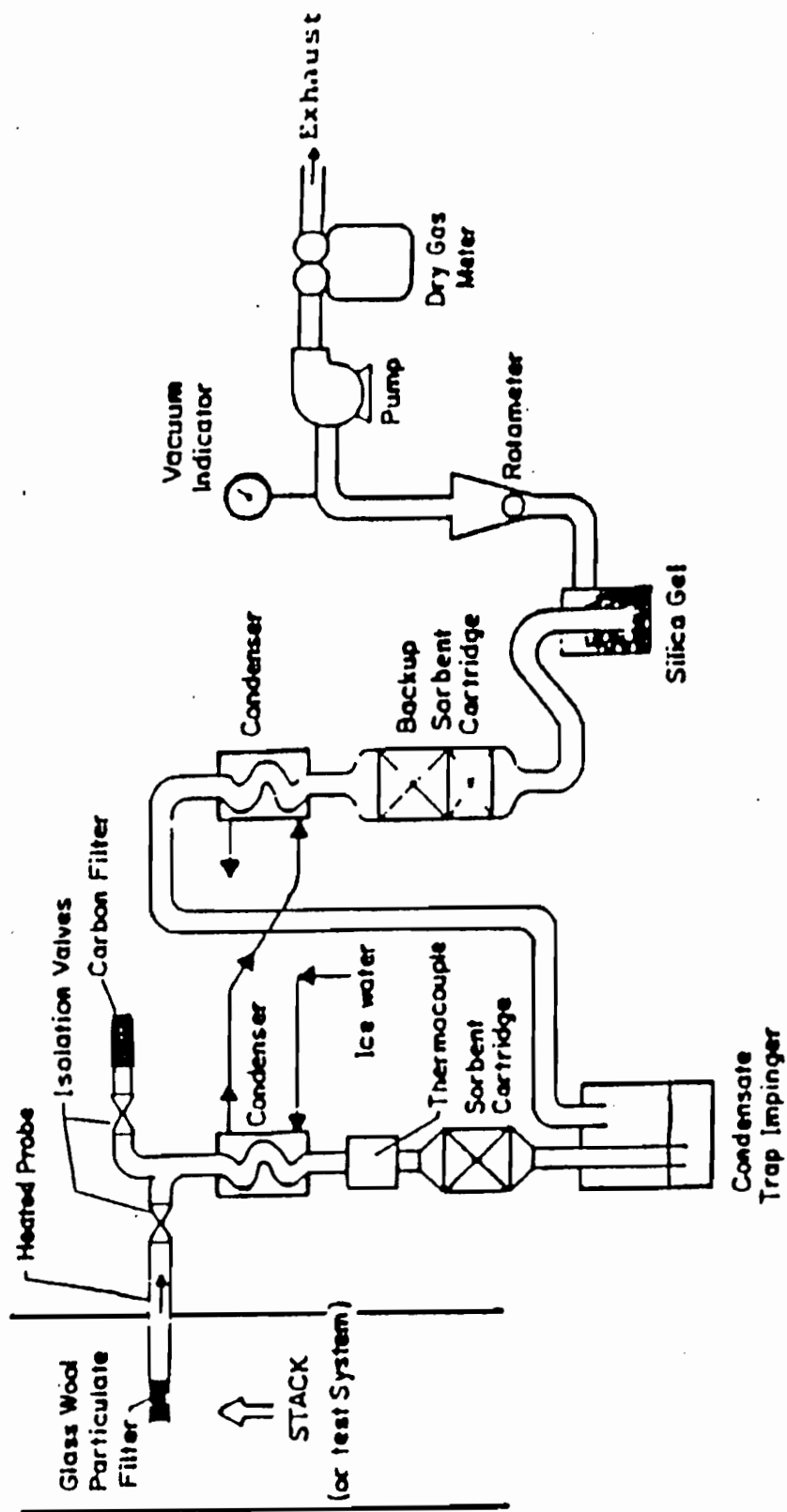


FIGURE 2.2: SCHEMATIC OF EPA REFERENCED
VOLATILE ORGANIC SAMPLING TRAIN
(VOST)

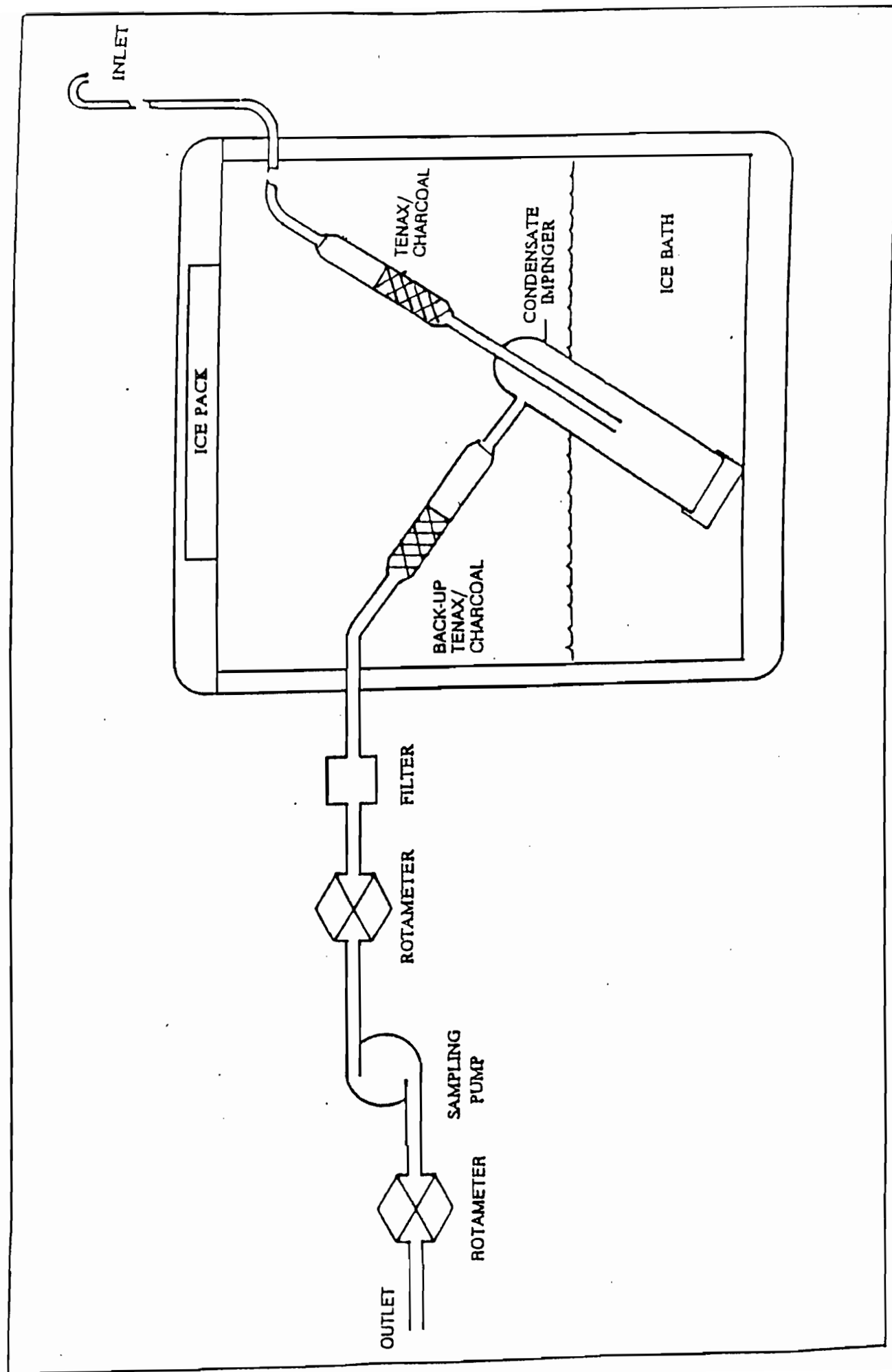


FIGURE 2.3: MODIFIED VOST SAMPLER

2.2.3 Sample Volume Selection

The selection of sample volumes for both air and soil gas samples for this study were 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 quantitation is based on nanogram concentrations of constituents, appropriate sample volumes were necessary to provide the desired analytical sensitivity.

In general, analytical instruments can detect between a few nanograms to thousands of nanograms of individual constituents in a sample. The analytical instrument's lower quantitation limit range for this case was set between 20 and 260 nanograms. The upper quantitation limit (calibration limit) was nominally set at approximately 50 times the lower quantitation limit. 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 (approximately 1000 liters) and low volume (approximately 100 liters) sample sizes were selected.

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. 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 preassigned time period. This capability

TABLE 2.2

**OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX**

**GENERAL RELATIONSHIP BETWEEN MICRO-TIP
READINGS AND SAMPLE VOLUME**

MICRO-TIP READINGS (ppm)*	SAMPLE VOLUME (liters)
<0.1 to 0.5	1,000 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.

is particularly important in the ambient air sampling event. It is 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 before and after each sampling event to calibrate two (2) Supelco rotameters (one high flow (1.0 Lpm), one low flow (0.070 Lpm) to a desired nominal flow rate. It is also used prior to testing to establish a relationship between actual pump volume flow rates and their corresponding rotameter readings. Inconsistencies between both rotameters could reveal a pump leak. These calibration data together with the Supelco rotameter readings recorded during sampling, are then used after all monitoring events to establish the sample volumes collected during each test. The 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 and the Supelco rotameters is around $\pm 2\%$.

A Photovac Micro-Tip meter was also used during the monitoring program before and after each sampling event to measure total VOC concentration. It is a hand held instantaneously reading analyzer that measures the total concentration of all ionizable compounds (in 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 an 8 and a 12 foot meteorological tower, each containing a 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 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 each 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 second year second quarterly 24-hour ambient air sampling event was conducted on March 1 and 2, 1993. 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 sampling parameters are summarized in Table 3.1.

TABLE 3.1

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Second Quarter

SUMMARY OF AMBIENT AIR SAMPLING

SITE ID*	SAMPLE ID	TESTING DATE	DURATION (minutes)	SAMPLING HEIGHT (inches)	NOMINAL FLOWRATE (l/min)	DESIRED QUANTITY (liter)	ACTUAL QUANTITY** (liter)
A-1	2-2A1	3/1-2/93	1,440	40	0.7	1,000	995
A-2	2-2A2	3/1-2/93	1,440	40	0.7	1,000	985
A-3	2-2A3	3/1-2/93	1,440	40	0.07	100	90.8
A-4	2-2A4	3/1-2/93	1,440	40	0.7	1,000	973

SUMMARY OF SUBSURFACE SOIL GAS SAMPLING

SITE ID*	SAMPLE ID	TESTING DATE	DURATION (minutes)	SAMPLING DEPTH (inches)	NOMINAL FLOWRATE (l/min)	DESIRED QUANTITY (liter)	ACTUAL QUANTITY** (liter)
F1	2-2F1	3/1/93	10	30	1.0	10	9.17
M2	2-2M2	3/1/93	10	30	1.0	10	9.20
M4	2-2M4	3/1/93	10	30	1.0	10	9.21
M5	2-2M5	3/1/93	10	30	1.0	10	9.50
M6	2-2M6	3/1/93	10	30	1.0	10	9.26
M9 (10')	2-2M9(10)	3/1/93	10	10 feet	1.0	10	9.59
M9 (20')	2-2M9(20)	3/1/93	10	20 feet	1.0	10	9.32
M9 (30')	2-2M9(30)	3/1/93	10	30 feet	1.0	10	9.33
M9 (40')	2-2M9(40)	3/1/93	10	40 feet	1.0	10	9.33
M13	2-2M13	3/1/93	10	30	1.0	10	9.29
M16	2-2M16	3/1/93	10	30	1.0	10	9.33
M21	2-2M21	3/1/93	10	30	1.0	10	9.49
M22	2-2M22	3/1/93	10	30	1.0	10	9.49
M28	2-2M28	3/1/93	10	30	1.0	10	9.42
M31	2-2M31	3/1/93	10	30	1.0	10	9.43
M34	2-2M34	3/1/93	10	30	1.0	10	9.41
M37	2-2M37	3/1/93	10	30	1.0	10	9.36
M39	2-2M39	3/1/93	10	30	1.0	10	8.94

*See Figure 2.1 for ambient air and soil gas sampling locations.

A1: High volume ambient upwind sample collected at the Battle Row Campground.

A2: High volume ambient downwind sample collected 20 feet southwest of the southeast landfill gate.

A3: Low volume ambient downwind (A2 duplicate) sample collected 20 feet southwest of the southeast landfill gate.

A4: High volume ambient downwind sample collected 250 feet south of well M39.

**Corrected to ambient conditions

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 to the west of the landfill at the Battle Row Campground as shown in Figure 2.1. Sampler A4 was positioned on the north side of the landfill to the south of soil gas well M39. Samplers at both A1 and A4 were set to continuously collect at a 0.7 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. The reason the pump was set at 0.7 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 liters over the 24-hour period. Samplers A-1 and A-4 began sampling at 0848 EDT and 0957 EDT on March 1, 1993 respectively.

Samplers A-2 and A-3 were set up southeast of the landfill. Sampler A-3 was set to continuously collect a 1,000 liter integrated sample at 0.7 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, a sampling manifold was constructed with two (2) SKC single stage universal constant-flow controllers in parallel. A Supelco low flow rotameter was positioned in line with one of the constant-flow controllers downstream of the sorbent traps prior to the SKC pump inlet. The remaining constant-flow controller was opened to atmosphere and connected in parallel with the other flow controller immediately upstream of the SKC pump inlet. The adjustment pod to the constant-flow controller connected to the sorbent traps was turned to register the desired 0.07 Lpm flow rate on the in line rotameter. The remaining constant-flow controller was adjusted to maintain the total flow to the SKC sampling pump within the operating range mentioned earlier. This would allow for the continuous collection of an integrated 100 liter sample over the 24-hour sampling period. Samplers A-2 and A-3 both began sampling at 0930 EDT on March 1, 1993.

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. Based on the above ambient concentrations, flow rates were set at 0.7 Lpm for A1, A3 and A4 and 0.07 Lpm for A2. 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 nine to ten times during the 24-hour sampling period. Rotameter readings during these site checks were within established ranges. Sampling proceeded according to plan over the 24-hour sampling periods at all sites.

The VOC final 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 (if available) was collected in a Tenax/Charcoal trap. All sorbent trap shipping 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 sorbent traps 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. The RTL analytical report is provided in Appendix D. Field data forms and equipment calibrations are provided in Appendix E and F, respectively. Meteorological data is provided in Appendix G.

3.3 SOIL GAS SAMPLING

The soil gas sampling elements of the Consent Decree require soil gas samples to be extracted from several 30" deep subsurface gas wells and from 10', 20' 30' and 40' deep subsurface gas wells at M9. The decree does not specify the sample volume, 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 elements of the work scope in the Consent Decree, RAP Attachment 2, RTP developed the

protocols and procedures outlined in Section 2.3 of this report 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 probe that was attached to the sampler inlet line in place of the sampling cane. Prior to use, the stainless steel sample probe was heated to purge any oils/VOCs attached to the probe surfaces. After purging, the probes were capped to prevent inadvertent exposure to trace VOCs. The sampling 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 with 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 teflon tape, tygon tubing and a 1/4" open bore bulk head union with a brass screw-on cap 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 brass screw-on cap 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 screw-on nut and ferrul. The Micro-Tip was turned on and operated for approximately 30 seconds to extract the stagnant well gases. 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 traps at each well. At the end of the sample, the Micro-Tip was again 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. The RTL analytical report is provided in Appendix D. Field data forms and equipment calibrations are provided in Appendix E and F, respectively. Meteorological data is provided in Appendix G.

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. In the second year, first quarter analytical effort high levels of carbon dioxide had in a few cases obscured early eluting target compound peaks. To avoid this RTP has recommend to RTL that a MS mass 44 scan delay be implemented. The mass 44 scan delay will allow for the analysis of all targeted compounds but may not allow for (semi-)quantitation of tentatively identified compounds with molecular weights less than or equal to 44. The laboratory report (Appendix D) provides a complete description of the analysis of samples. As a result of the scan delay, major data capture and confidence improvements for chloromethane, vinyl chloride, bromomethane, chloroethane and trichlorofluoromethane were made. Target ketones (acetone, 2-butanone, 2-hexanone and 4-methyl-2-pentanone) were tentatively identified when detected by using secondary ion matches at the expected retention time. Caution was given with this ID procedure due to the lack of available confirmation ion ratios. Quantitation of the ketone levels detected are also considered estimates due to calibrations using the primary ion versus the sample using, in some cases, its secondary ion for identification. It should be noted that any ion ratio quantitation made with a single ion integration is much more accurate than a total ion quantitation as specified by the procedure used to calculate tentatively identified compounds (TICs). Also, non targeted TICs below mass 45 may have been missed. This procedure was deemed acceptable by RTP given the significance of the early eluting compounds versus targeted ketones relative to AGC values and observed first year concentrations.

RTL was forwarded a list of the VOCs that were initially identified as the target compound list for this monitoring program. RTP's laboratory instructions required reported sample splitting and breakthrough results for a limited set of trap pairs prior to analyzing the remaining samples. RTL was instructed to perform a 10:1 split analysis of high volume downwind ambient sample A4 (front and back traps combined as one sample) and the soil gas sample from well M28 (front and back traps combined as one sample) and to report mass loading results to RTP. RTL experienced fairly high

concentrations of several compounds including toluene, xylenes, benzene, tetrachloroethene, 1,1,1-trichloroethane, methylene chloride and trichloroethene in A4 as well as all other ambient air samples (A1, A2 and A3). Upon reviewing A4's mass loading RTP instructed RTL to split high volume downwind ambient sample A2 (suspected high mass loading), not to split low volume downwind ambient sample A3 (suspected moderate mass loading) and not to split upwind high volume ambient sample A1. Soil gas sample M28 mass loading was found low enough to discontinue analytical splitting for all remaining soil gas samples. The initial round of analyses included the above mentioned limited sample splitting activities in order to identify maximum mass loadings for each sample set (ambient air and soil gas) and to assign analytical splitting requirements for the remaining samples (avoiding detector saturation and GC/MS run abortion) at the same time maximizing analytical sensitivity.

Ambient air high volume downwind sample A2 and soil gas well sample M9(40') were estimated to have the highest mass loadings of the ambient air and soil gas sample sets and were therefore, analyzed for breakthrough. Mass loading estimates were made relative to sampler position (downwind) and sample volume (high) for the ambient air samples. The maximum soil gas sample VOC mass loading was estimated by identifying the highest final total hydrocarbon reading (Micro-Tip) of all soil gas samples where moisture in the well was not suspected. Significant target VOC breakthrough was not encountered for either A2 or M9(40'); therefore, RTL evaluated both Tenax/Charcoal traps (front and back) from each sample set as a single laboratory run for all remaining analyses. The RTL report is presented in Appendix D.

4.0 DISCUSSION OF RESULTS

4.1 AMBIENT AIR CONCENTRATIONS

For the second year second quarter sampling event at the Old Bethpage Landfill, the ambient air concentrations at selected sites were monitored over a 24-hour period on March 1 and 2, 1993. The sites have been identified and the monitoring and analysis methods are discussed in preceding sections of this report. Laboratory analytical results are translated into ambient air concentrations in this section.

TABLE 4.1

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Second Quarter

AMBIENT AIR VOST SAMPLE RESULTS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION*	A1	A2	A3	A4	FB	TB	AGC	AGC
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)		(ug/m3)	(ug/m3)
Benzene	3.12	3.86	5.07	3.49			0.12	100
Bromodichloromethane							0.02	0.03**
Bromoform							12	11.9**
Bromomethane								
Carbon Disulfide	0.0302						7	100
Carbon Tetrachloride	0.402	0.355	1.10	0.391			0.07	100
Chlorobenzene							20	1,170
Chloroethane							63,000	52,000
Chloroform							23	167
Chloromethane	2.21	1.22	2.64	1.23			770	2,100
Dibromochloromethane							0.1	0.03**
1,2-Dichlorobenzene (o)							200	1,000
1,3-Dichlorobenzene (m)							200	714**
1,4-Dichlorobenzene (p)	0.402	0.284	0.573	0.298			700**	
1,1-Dichloroethane							500	9,524**
1,2-Dichloroethane							0.039	0.2
1,1-Dichloroethene							0.02	66.7
trans-1,2-Dichloroethene							360	360**
1,2-Dichloropropane							0.15	833**
cis-1,3-Dichloropropene								
trans-1,3-Dichloropropene								
Ethylbenzene	1.51	1.52	1.54	1.13			1,000	1,450
Methylene Chloride	2.21	1.83	2.86	1.85			27	1,170
Styrene			0.319				510	716
1,1,2,2-Tetrachloroethane							0.02	23.2
Tetrachloroethene	3.82	3.36	3.63	3.29			1.2***	1,120
Toluene	>1.71	9.41	11.0	8.12			2,000	7,500
1,1,1-Trichloroethane	2.21	1.93	6.61	2.06			1,000	38,000
1,1,2-Trichloroethane							0.06	150
Trichloroethene	2.01	1.52	1.76	2.36			0.45	900
Trichlorofluoromethane	1.91	1.62	1.76	1.85			700	
Vinyl Chloride							0.02	0.4
Xylenes (Total)	>4.02	>8.22	9.69	7.50			300	1,450

TABLE 4.1
Continued

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Second Quarter

AMBIENT AIR VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION*	A1	A2	A3	A4	FB	TB	AGC	AGC
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)		(ug/m3)	(ug/m3)
Acetone	0.894	0.203	1.98	0.678			14,000	35,600
Benzaldehyde								
2-Butanone	0.784	0.812	2.09	0.843			300	1,967
2-Chloroethyl Vinyl Ether								
cis-1,2-Dichloroethene							1,900	1,880**
Freon 13							530	133,333**
2-Hexanone								
4-Methyl-2-Pentanone	0.181		0.231				480	683
Vinyl Acetate								

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION*	A1	A2	A3	A4	FB	TB	AGC	AGC
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)		(ug/m3)	(ug/m3)
Methyl (methylethenyl) Cyclohexene		0.0274						
Hexane				1.85			420	

*Sample Identification: (see Figure 2.1)

A1: High volume ambient upwind sample collected at the Battle Row Campground

A2: High volume ambient downwind sample collected 20 feet southwest of the southeast landfill gate.

A3: Low volume ambient downwind (A2 duplicate) sample collected 20 feet southwest of the southeast landfill gate.

A4: High volume ambient downwind sample collected 250 feet south of well M39.

FB: Field Blank

TB: Trip Blank

**Proposed Value.

***Current AGC for tetrachloroethene as of November 1991.

All values are reported as ug/m3 except for field blank (FB) and trip blank (TB) mass loading results reported as nanograms (ng).

Shaded in values exceed the level of the current (as of June 1991 or November 1991 for tetrachloroethene) and/or previous AGC values.

All blank values are less than the lower quantitation limit. The lower quantitation limit for each sample is:

A1 = 0.0201 ug/m3

A2 = 0.203 ug/m3, 0.0203 ug/m3 for back trap (break through analysis).

A3 = 0.220 ug/m3

A4 = 0.226 ug/m3

Table 4.1 contains a summary of the analytical results from the air samples collected at the Old Bethpage Landfill. These values are in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and have been adjusted for flow volumes as calibrated from the digital flow meter, temperature and barometric pressure. That is, Samples A1, A2 and A4 are adjusted to total sample volumes of 995, 985, and 973 liters, respectively. Sample A3 was a low volume sample with a total sample volume of 90.8 liters. The table includes the lower quantitation limit for each sample. VOC concentration differences between A2 and A3 (co-located samplers) may be due to one or more of the following: variable and/or localized VOC releases and/or analytical inaccuracies inherent with sample splitting (A2 only). All ambient air sample concentrations have been adjusted for trip and field blank concentrations.

As noted in Table 4.1, four VOCs were measured to exceed the level of their assigned current (as of June 1991) annual guideline concentration (AGC) value at both upwind and downwind ambient air sampling locations. These were benzene, carbon tetrachloride, tetrachloroethene and trichloroethene. This single occurrence should not be interpreted as an exceedance of the ambient air guideline. Note that other target compounds may have existed in levels exceeding their assigned AGC value, yet may have gone "undetected" (below the lower quantitation limit) since the lower quantitation limits (from 0.0201 to 0.226 $\mu\text{g}/\text{m}^3$) are greater, in some cases, than some target compound AGC limits ($\geq 0.02 \mu\text{g}/\text{m}^3$).

4.2 SOIL GAS CONCENTRATIONS

Soil gas concentrations were monitored on March 1, 1993 at all selected soil gas well sites identified in the Consent Decree. Table 4.2 provides a summary of soil gas well VOC concentrations. These concentration values are reported in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) of soil gas. The table also includes the lower quantitation limit for each sample. All soil gas sample concentrations were adjusted for field blank mass loadings.

There are no state or federal guidelines for permissible soil gas concentrations of VOC. For a very relative comparison, Table 4.2 provides the AGCs for ambient air quality. The shaded values indicate soil gas concentrations that exceed the level of the current (as of June 1991) NYSDEC AGC for ambient air. A single occurrence of a value in excess of the AGC should not be interpreted as an exceedance of the ambient air guideline.

TABLE 4.2

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
Second Year, Second Quarter
SOIL GAS VOST SAMPLE RESULTS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	2.18	2.17	2.17	2.11	2.16	2.09	2.15	2.14	2.14	2.15	2.14	2.11	2.11	27.6	2.12	2.13	2.14	2.24	AGC	AGC
VOC COMPOUND NAME																				
Benzene					2.48								2.32						0.12	100
Bromodichloromethane																			0.02	0.03*
Bromoform																			12	11.9
Bromomethane																				
Carbon Disulfide																			7	100
Carbon Tetrachloride																			0.07	100
Chlorobenzene																			20	1,170
Chloroethane																			63,000	52,000
Chloroform														2.42					23	167
Chloromethane																			770	2,100
Dibromochloromethane																			0.1	0.03*
1,2-Dichlorobenzene (o)																			200	1,000
1,3-Dichlorobenzene (m)																			200	714*
1,4-Dichlorobenzene (p)																			700*	
1,1-Dichloroethane																			500	9,524*
1,2-Dichloroethane																			0.039	0.2
1,1-Dichloroethene																			0.02	66.7
trans-1,2-Dichloroethene																			360	360*
1,2-Dichloropropane																			0.15	833*
cis-1,3-Dichloropropene																				
trans-1,3-Dichloropropene																				
Ethylbenzene																			1,000	1,450
Methylene Chloride																			27	1,170
Styrene																			510	716
1,1,2,2-Tetrachloroethane																			0.02	23.3
Tetrachloroethene							2.47	2.68	2.68	3.88			2.11						1.2**	1,120
Toluene					3.02								5.27						2,000	7,500
1,1,1-Trichloroethane	2.29			2.63						2.37	3.22	2.11	3.48				2.14	2.68	1,000	38,000
1,1,2-Trichloroethane																			0.06	150
Trichloroethene																			0.45	900
Trichlorofluoromethane											3.43								700	
Vinyl Chloride																			0.02	0.40
Xylenes (Total)																			300	1,450*

TABLE 4.2
(Continued)

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Second Quarter

SOIL GAS VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	2.18	2.17	2.17	2.11	2.16	2.09	2.15	2.14	2.14	2.15	2.14	2.11	2.11	27.6	2.12	2.13	2.14	2.24	AGC	AGC
VOC COMPOUND NAME																				
Acetone																			14,000	35,600
Benzaldehyde																				
2-Butanone																		8.39	300	1,967
2-Chloroethyl Vinyl Ether																				
cis-1,2-Dichloroethene																			1,900	1,880*
Freon 13																			530	133,333*
2-Hexanone																				
4-Methyl-2-Pentanone																			480	683
Vinyl Acetate																				

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	2.18	2.17	2.17	2.11	2.16	2.09	2.15	2.14	2.14	2.15	2.14	2.11	2.11	27.6	2.12	2.13	2.14	2.24	AGC	AGC
VOC COMPOUND NAME																				
alpha-Pinene					238															
***					48.6															
Dimethyloctene												2.11								
(1-Methylethyl) benzene													2.95							

All values are report in micrograms per cubic meter (ug/m3).

All blank values are less than the lower quantitation limit reported for each sample.

Values in shaded areas exceed the level of the current (as of 6/91 or 11/91 for Tetrachloroethene) and/or previous AGC values.

*Proposed Value

**Current AGC for Tetrachloroethene as of November 1991.

***1,7,7-Trimethylbicyclo[2.2.1] hept-2-ene

As noted in Table 4.2, two VOCs (benzene and tetrachloroethene) were measured in excess of the level of the current ambient air (as of June 1991) AGC limit at several soil gas well locations. Benzene was found in excess of the level of the current (as of June 1991) AGC at soil gas wells M6 and M22. Tetrachloroethene levels exceeded current (as of June 1991) AGC values at soil gas wells M9(20'), M9(30'), M9(40'), M13, and M22. Note that since the lower quantitation limits exceed several AGCs, other wells may exceed AGC levels of benzene, tetrachloroethene and other compounds with a low ($<27.6 \text{ ug/m}^3$) AGC value. Unfortunately, larger soil gas volumes can not be extracted to improve the lower quantitation limits because of the volume limits within the wells.

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 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, (2) southeast of the landfill between TGV-1 and LGV-9 and (3) south of the landfill at either F-6 or F-9. 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. Soil gas pressure readings are being continued for the second year of monitoring on a quarterly basis.

A quarterly soil gas pressure measurement was conducted on March 1, 1993. A 10 inch inclined manometer, manufactured by Dwyer Instruments, Inc. was used to monitor soil gas pressures at each well. The 0-1 inch inclined portion is divided into 0.01 inch increments with the remaining portion (1-10 inches) marked in 0.1 inch increments. There are two soil gas pressure 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 1030 EDT and 1535 EDT on March 1, 1993. Table 5.1 provides a summary of the soil gas pressure tests. The readings indicate that most pressure probes were under zero or negative pressure at the time of the test. The upper well at PW2 had a zero reading, however, it is believed that it 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

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Second Quarter

SUMMARY OF SOIL GAS PRESSURE TESTS

SAMPLE ID	DATE (m/d/yr)	TIME (EDT)	WELL ID	WELL LOCATION	WELL DEPTH (feet)	READINGS (INCHES H ₂ O)	SPECIAL NOTES
P1	3/1/93	1030	PW2	SE of landfill	10	0.00	1
P2	3/1/93	1035	PW2	SE of landfill	20	-0.06	
P3	3/1/93	1040	PW1	NW of landfill by haul road	10	-0.07	
P4	3/1/93	1045	PW1	NW of landfill by haul road	20	-0.07	
P5	3/1/93	1120	PW1	NW of landfill by haul road	10	-0.07	
P6	3/1/93	1125	PW1	NW of landfill by haul road	20	-0.04	
P7	3/1/93	1135	PW2	SE of landfill	10	0.00	1
P8	3/1/93	1140	PW2	SE of landfill	20	-0.07	
P9	3/1/93	1525	PW3	S of landfill inside FTC	10	-0.18	
P10	3/1/93	1530	PW3	S of landfill inside FTC	20	-0.26	
P11	3/1/93	1532	PW3	S of landfill inside FTC	10	-0.18	
P12	3/1/93	1535	PW3	S of landfill inside FTC	20	-0.26	

FTC - Firemen's Training Center

1- The upper well (10 feet) at PW2 may have been flooded with water resulting in the zero reading.

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 be 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

**MONITORING PROTOCOLS AND
SAMPLING EQUIPMENT DESCRIPTIONS**

AMBIENT AIR SAMPLING PROTOCOL

1. Obtain pre-conditioned VOST tubes from analytical laboratory and refrigerate with blue ice in the shipping cooler. Prior to testing, inspect the condition of the 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 both a high flow (0.70 Lpm) and low flow (0.07 Lpm) Supelco rotameter and set the desired SKC sampling pump flowrate according to manufacturer's specifications.
 - o Attach precalibrated SKC sampling pump and additional battery pack to the exterior of the sampling cooler. For the low flow ambient air sampling train only, attach the two (2) SKC single stage universal flow controllers, in parallel, connecting the pre-set (0.07 Lpm) controller in line with the pump, low flow rotameter and sample line downstream of the sorbent traps.
 - o Install aluminum trap holder and partially fill the cooler (1/4 full) with ice.
 - o Close the cooler lid, cap the sample line inlet and transport the sampling assembly and VOST traps to the selected sampling site.
3. Remove a pair of VOST traps from the shipping container and follow USEPA VOST procedures augmented as follows. Label each trap shipping container with sample number/location. Using precleaned wrenches, install the traps in the modified VOST sampling train.
4. Monitor total VOC concentrations with the portable Photovac Micro-Tip (Micro-Tip) and determine the acceptability of the precalibrated flow rates. Adjust the flow rate according to the Micro-Tip reading. Reading of zero for total VOCs indicates that 1000 liter volume on high flow samples is appropriate. For readings greater than zero, adjust high flow rate sampling interval to accumulate no more than 100 ug of total VOC on a pair of sorbent traps.

5. Perform a system leak check by drawing a vacuum across the entire sampling train by capping the sample inlet. Turn on the pump. Pump failure should occur within 40 seconds. If not, identify and repair the air leak and repeat.
6. Remove cap from sample inlet, start the sampling event by turning on the SKC pump and record the starting time.
7. Examine the pump operation for proper cycling and record rotameter reading, elapsed time, sample location, sample ID and other observations such as Micro-Tip 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. Note elapsed and clock times for each observation.
9. At the conclusion of 24-hour sampling period, record sample elapsed and clock times and check sample lines, ice levels, Micro-Tip reading and record observations in the field log. Perform a system leak check as per Item 5 above and note results.
10. Open the sampler lid and remove VOST shipping tubes from the storage/shipping container. Remove the VOST traps, from the sampling train, wrench tighten VOST caps and place in the pre-labeled (Item 3) shipping tubes. Remove the impinger trap, pour contents into a clean septum vial and top off with HPLC water. Label and place in storage/shipping container. Place the VOST shipping tubes in an air freight container with manifest.
11. Disassemble the sampling trains, clean and return to storage.
12. Send the sampling traps and vials to laboratory for analysis.

SOIL GAS SAMPLING PROTOCOL

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

1. Inspect all soil gas wells for damage and/or leaks and cap. Assemble a soil gas sampling probe consisting of a precleaned stainless steel tube and teflon sampling line and substitute for ambient air probe calibrate a high flow (1.0 Lpm) supelco rotameter.
2. Transport the sampling tubes and sampling train to the field sampling locations.
3. Record the well site ambient VOC reading.
4. Remove the cap from sampling well, insert sampling probe connected to the Micro-Tip and draw sufficient volume of sample to clear lines and sampling probe and well. Record the average and highest VOC reading during line clearing procedure by using the Micro-Tip.
5. Using the last recorded VOC value, determine the sample volume that would effectively place 10 to 100 ug of total VOC's into the VOST traps.
6. Remove the VOST trap pair from the shipping container, label trap and shipping container with sample number and location. Reconnect the soil gas sample probe to the modified VOST unit.
7. Turn on the sampling pump with a 0.5 Lpm to 1.0 Lpm sample rate for 10 minutes if the Micro-Tip reading is zero or for calculated sampling rate and interval if the Micro-Tip provides a non-zero result. Record the starting time and any abnormalities onsite.
8. Record the sampling ending time/rotameter reading. Turn off pump. Record the ambient total VOC reading at the end of the test.
9. Remove the sample VOST traps as per the ambient air sampling procedure.

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

METEOROLOGICAL MONITORING PROTOCOL

1. Establish the weather conditions appropriate for conducting the ambient air and soil gas survey. (Falling atmospheric pressure, steady wind direction over 24-hour period, rainfall less than 30 percent chance).
2. Assemble the 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 the sites 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 the end of test period and remove equipment. Note all problems/conditions that could influence data accuracy, quality or test results.
6. Prepare a data base in a format suitable for inclusion in the ambient air/soil gas survey.

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. 102 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 $\pm 5\%$ 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 continuously for 1,440 minutes at 0.70 Lpm (nominal). A GEL CEL battery was connected in parallel to the pump battery to provide sufficient power for the 24-hour period. The planned sample was 1,000 liters. Low flow samplers were scheduled to run continuously for the 1440 minute test period. The desired total sample volume was 100 liters.

Pre-calibrated Supelco rotameters were used for visual flow checks during sampling. The Supelco rotameters were calibrated using an 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 sampling units when using the VOST traps.

PUMP CALIBRATOR

An SKC Model 712 Electronic Calibrator (Digital Film Flowmeter) was used to pre-calibrate the nominal flow rate for all Supelco rotameters for field use in determining the pump flow rates during sample collection.

The 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 for both the pump calibrator and Supelco rotameter is stated at $\pm 2\%$.

The operator calibrated the Supelco rotameters prior to the test. A pre and post calibration and a comparison check on the rotameters was completed.

Wind Mark III Wind Sensors

- Low Threshold
- Low Cost
- Low Power CMOS Design
- Lightweight
- Optional External Heaters

Climatronics' Wind Mark III (WM-III) Wind Sensors combine accuracy and reliability with low cost.

The WM-III sensors meet Environmental Protection Agency's (EPA) Prevention of Significant Deterioration (PSD) requirements. They are also well suited for general wind monitoring applications.

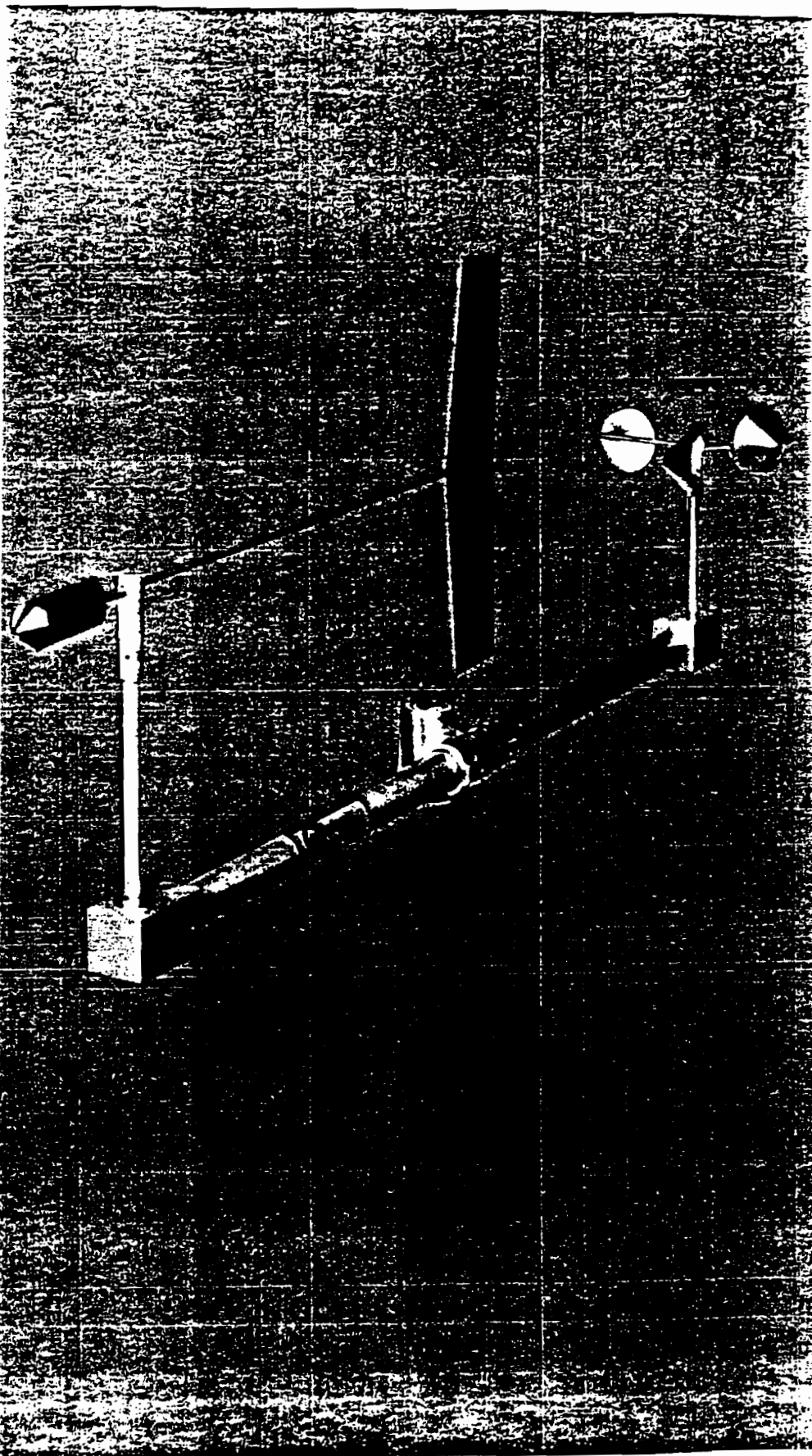
Wind speed is sensed by a three-cup anemometer and is converted to an electrical signal by a 20-hole photochopper, which uses a solid state light source for maximum reliability. Wind direction is sensed by a counterbalanced wind vane coupled to a precision, low-torque potentiometer. Both the wind speed and wind direction sensors use stainless steel precision ball bearings for maximum life and low threshold. Traceability to NBS is available as an option for each anemometer cup assembly by comparison testing against an NBS transfer standard in our wind tunnel test facility.

The sensors and their crossarm are an integral unit. The prewired crossarm mounts on a 3/4-inch IPS vertical pipe stub (1.05 inch O.D.). Orientation of the crossarm is along an East-West plane.

Optional external heaters for both sensors are available. These heaters consume approximately 40 watts of power and are thermostatically controlled.

The WM-III sensor is also available as a wind speed only (P/N 100108-1) or wind direction only (P/N 100108-2) instrument.

Recently, an improved, ruggedized aluminum cup (P/N 101286) and magnesium vane (P/N 101292) combination has been made part of the WM-III sensor package. The original stainless steel cups (P/N 100160) and vinylclad vane (P/N 100107) can still be provided as options. To safely transport the WM-III sensors with cups and vane, a transit case (P/N 100255) is available.



Signal conditioners for the WM-III sensors are available in modular form with a variety of full scale ranges, engineering units, outputs, and several other options. Please consult the Modular Meteorological System (MMS) and the Remote Meteorological System (RMS) bulletins for more details. The WM-III sensors are standard equipment in the Utility Wind System and the Electronic Weather Station (EWS). Please consult these bulletins for additional information.

SENSOR SPECIFICATIONS

PERFORMANCE	WM-III WIND SPEED	WM-III WIND DIRECTION
Accuracy	± 0.11 m/s (0.25 mph) or $\pm 1.5\%$	$\pm 3^\circ$
Threshold	< 0.45 m/s (< 1.00 mph)	< 0.45 m/s (< 1.00 mph)
Distance Constant	4.6m (15.0 ft.) of air max. 2.4m (8.0 ft.) of air max. - optional	4.6m (15.0 ft.) of air max. 2.4m (8.0 ft.) of air max. - optional
Damping Ratio		0.4 to 0.6 at 10° initial angle of attack
Operating Range	0-55 m/s (0-125 mph)	0° to 360° — mechanical 0° to 355° — electrical

ELECTRICAL SPECIFICATIONS

Signal Output	Nominal 2.0 Vpp into 4.7 K ohm, frequency proportional to wind speed, amplitude dependent on supply voltage	Variable DC voltage, magnitude proportional to wind direction.
Power Requirements*	6-12 Vdc at 1 mA nominal	Max. 5 mA through 2 K ohms

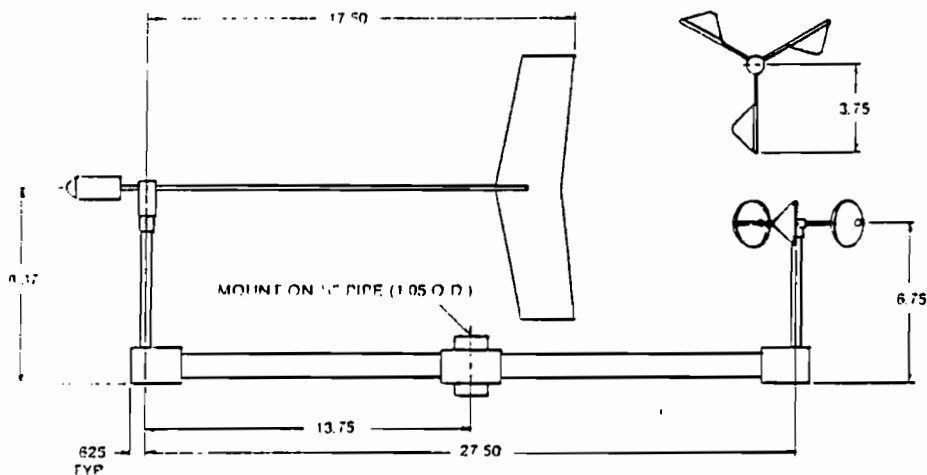
*Proper power provided by Climatronics' signal conditioner.

PHYSICAL SPECIFICATIONS

Weight	Less than 0.9 kg. (2 lbs.)	Less than 0.9 kg. (2 lbs.)
Turning Radius	9.5 cm (3.75 inch)	41.9 cm (17.5 inch)
Operating Temperature	-40° to 60° C (-40° to 140° F)	-40° to 60° C (-40° to 140° F)
Use with Signal Conditioner	P/N 100161 (MMS) P/N 100778 (RMS)	P/N 100161 (MMS) P/N 100779 (RMS)

SENSOR HEATER SPECIFICATIONS

Power Requirements	115 Vac; 60 Hz. 20 Watts per sensor	(P/N 101234)



CORPORATION

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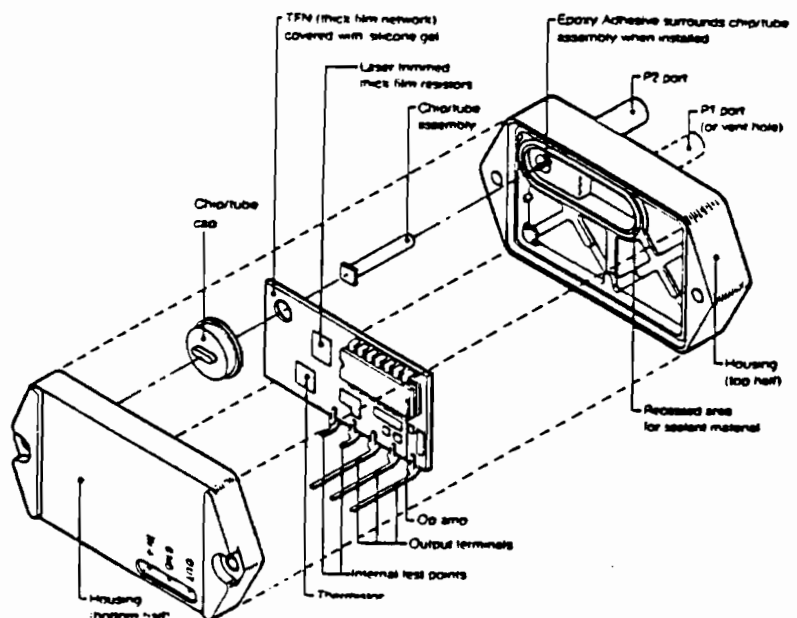
SOLID-STATE BAROMETRIC PRESSURE SENSOR

Climatronics' Solid-State Barometric Pressure Sensor (P/N 101448) uses a piezoresistive device to measure atmospheric pressure and is ideally suited to applications requiring exact measurement of pressure where the benefits of repeatability, low hysteresis and long-term stability are important. It offers state-of-the-art benefits of hybrid IC devices, including compactness, ruggedness, and reliability. Internal circuitry provides temperature compensation as an integral part of each device and is optimized on each unit as part of the calibration procedure.

The heart of the Solid-State Barometric Pressure Sensor is a small, square silicon chip with an integral sensing diaphragm and implanted piezoresistors. Pressure applied on the diaphragm causes it to flex, inducing a stress or strain in the buried resistors. The resistor values will change depending on the amount of pressure applied to the diaphragm. By providing a precisely-controlled reference voltage to the sensor's resistive network, an output voltage signal is produced which is proportional to the ambient pressure. Because of the unique construction, this output is very predictable, providing an ideal sensing element for barometric pressure sensors.

The range of this Solid-State Barometric Pressure Sensor is 600-1100mb. It can be used with Climatronics' modular signal conditioners or interfaced directly to a Remote Terminal Unit (RTU) for direct digital data acquisition.

EXPLODED VIEW



SPECIFICATIONS

Range	600mb to 1100mb (17.72" Hg. to 32.48" Hg.)
Accuracy (includes temperature, co- efficient, hys- teresis, and linearity)	±1.5mb
Resolution	Infinite
Temperature Range Compensated	-18°C to 63°C (0°F to 145°F)
Operating	-40°C to 85°C (-40°F to 185°F)
Elevation Range	Sea Level to 14,000 ft. Sea Level to 4265m
Input Voltage	+12 Vdc (nominal)
Output Voltage	1 to 5 Vdc
Power Required	0.18 Va
Size - Sensor Enclosure (Optional)	3"L x 2"W x 1½"H 7 1/8"L x 4½" W x 5 1/8" H



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SENSOR SPECIFICATIONS — P/N 100108

	<u>WM-III Wind Speed</u> (P/N 100108-1)	<u>WM-III Wind Direction</u> (P/N 100108-2)
Performance	(P/N 100108-1)	(P/N 100108-2)
Accuracy	± 0.11 m/s (0.25 mph) or $\pm 1.5\%$	$\pm 2^\circ$
Threshold	0.34 m/s (0.75 mph)	0.34 m/s (0.75 mph)
Distance Constant	4.6m (15.0 ft.) of air max. 2.4m (8.0 ft.) of air max. - optional	4.6m (15.0 ft.) of air max. 2.4m (8.0 ft.) of air max. - optional
Damping Ratio		0.4 to 0.6 at 10° initial angle of attack
Operating Range	0-55 m/s (0-125 mph)	0° to 360° — mechanical 0° to 540° — electrical

ELECTRICAL SPECIFICATIONS

Signal Output	Nominal 2.0 Vpp into 4.7 K ohm, frequency proportional to wind speed, amplitude dependent on supply voltage	Variable DC voltage, magnitude proportional to wind direction
Power Requirements	6-12 Vdc at 1 mA* nominal	Max. 5 mA through 2 K ohms*

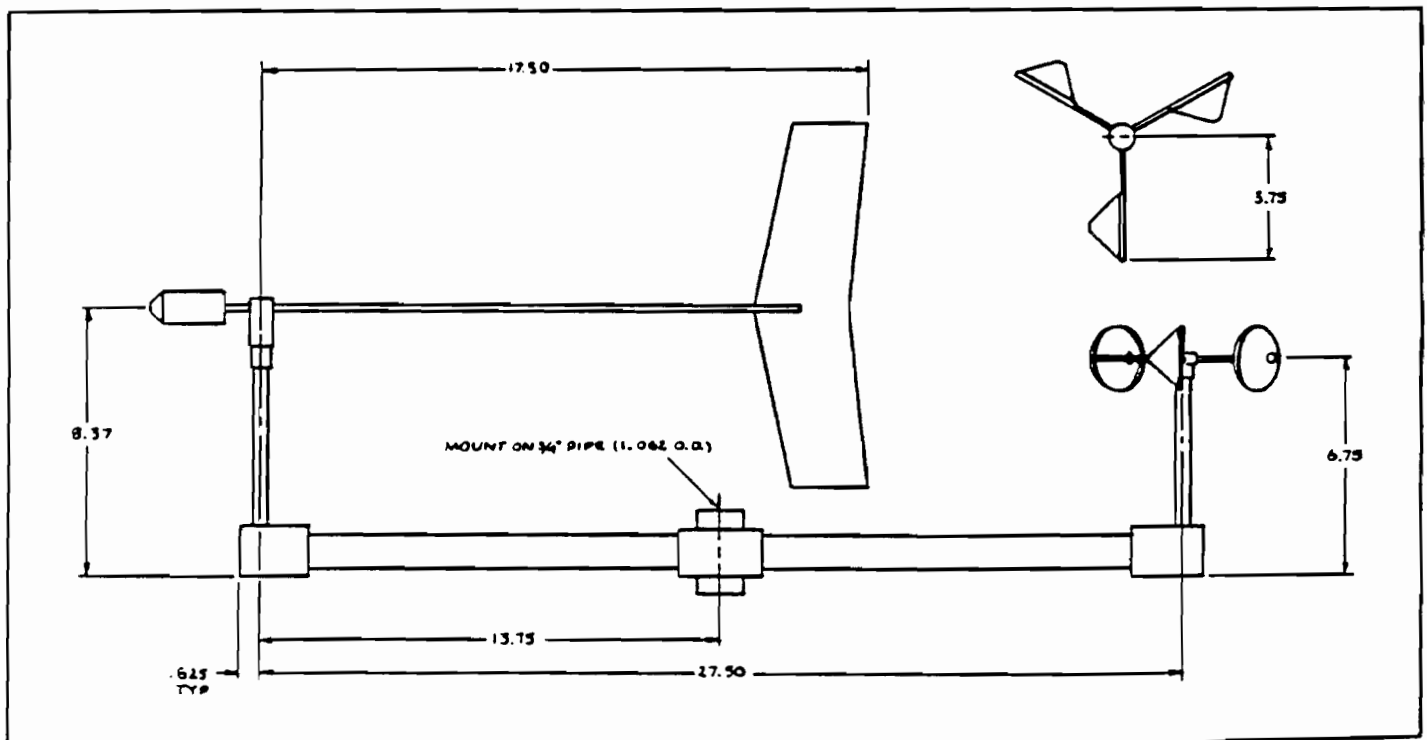
*Proper power provided by translator module.

PHYSICAL SPECIFICATIONS

Weight	Less than 0.9 kg. (2 lbs.)	Less than 0.9 kg. (2 lbs.)
Turning Radius	9.5 cm (3.75 inch)	41.9 cm (16.5 inch)
Operating Temperature	-40° to 60° C (-40° to 140° F)	-40° to 60° C (-40° to 140° F)
Use with Translator	P/N 100163 (MMS) P/N 100778 (RMS)	P/N 100163 (MMS) P/N 100779 (RMS)

SENSOR HEATER SPECIFICATIONS

Power Requirements	P/N 101235 115 Vac; 60 Hz, 40 Watts per sensor





IMP-860 DATALOGGER

- o Direct sensor inputs
- o Control outputs
- o User programmable
- o Built-in data instruction set
- o Large internal data storage
- o Solid-state data cartridges
- o Phone line, dedicated line or radio telemetry
- o PC compatible
- o Low power
- o Choice of enclosures
- o Built-in surge protection

The IMP-860 Datalogger is an extremely versatile, state-of-the-art, digital data acquisition system designed for environmental monitoring applications. It can function as a remote, stand-alone station or can be operated with a central computer either by itself or in a network with other units.

Sensor inputs are accepted directly by the IMP-860, thereby eliminating the need for additional signal conditioning equipment. The signals will be processed as necessary, computations will be performed as required, and the data will be stored in internal memory for later retrieval by a remote computer or on a removable storage medium for manual retrieval.

User programming of the IMP-860 is easily accomplished using either an IBM PC-compatible computer or an operational, portable keyboard/display unit. A comprehensive set of programming instructions is included which allows a multitude of calculations to be performed on any desired channel, including interactions between channels. A standard program is available and can be modified by the user at any time.

The following electrical specifications are valid for an ambient temperature range of -25 °C to +50 °C unless otherwise specified.

ANALOG INPUTS

NUMBER OF CHANNELS: 12 single ended or 6 differential with any combination, software selectable.

CHANNEL EXPANSION: Increments of 32 channels multiplexed through a single IMP-860 channel with the Model CAM32 Relay Scanner. Maximum of 5 CAM32s possible.

ACCURACY OF VOLTAGE MEASUREMENTS AND ANALOG OUTPUT VOLTAGES: 0.2% of FSR, 0.1% of FSR (0 to 40 °C).

RANGE AND RESOLUTION: Ranges are software selectable for any channel. Resolution for single ended measurements is twice the value shown.

Full Scale Range	Resolution
± 2.50 volts	333 microvolts
± 0.25 volts	33.3 microvolts
± 25.0 millivolts	3.33 microvolts
± 7.5 millivolts	1.00 microvolts
± 2.5 millivolts	0.33 microvolts

INPUT SAMPLE RATES: The fast or slow A/D conversion uses a 250 us or 16.666 ms signal integration time (16.666 ms is one AC power line cycle). Differential measurements include a second sampling with reversed input polarity to reduce thermal offset and common mode errors. Input sample rates are the time required to measure and convert the result to engineering units. Times do not include the self-calibration measurement which occurs once per instruction.

Fast single ended voltage: 2.4 ms
Fast differential voltage: 3.7 ms
Slow single ended voltage: 18.8 ms
Slow differential voltage: 37.0 ms
Fast dif. thermocouple: 8.3 ms

INPUT NOISE VOLTAGE:

Fast differential — 0.83 microvolts RMS
Slow differential — 0.10 microvolts RMS

COMMON MODE RANGE: ±2.5 volts.

DC COMMON MODE REJECTION: >140 dB.

NORMAL MODE REJECTION: 70 dB (60 Hz with slow differential measurement).

INPUT CURRENT: 3 nanoamps max.

INPUT RESISTANCE: 200 gigohms.

EXCITATION OUTPUTS

DESCRIPTION: The IMP-860 has 3 switched excitations, active only during measurement, with only one output active at any time. The off state is high impedance.

RANGE: ±2.5 volts.

RESOLUTION: 0.67 millivolts.

ACCURACY: Same as voltage input.

OUTPUT CURRENT: 20 mA @ ± 2.5 V, 35 mA @ ± 2.0 V, 50 mA @ ± 1.5 V.

FREQUENCY SWEEP FUNCTION: A swept frequency square wave output between 0 and 2.5 volts is provided for vibrating wire transducers. Timing and frequency range are specified by the instruction.

PERIOD AVERAGING MEASUREMENTS

DEFINITION: The time period for a specified number of cycles of an input frequency is measured, then divided by the number of cycles to obtain the average period of a single cycle.

INPUTS: Any single ended analog channel with configuration defined in the user program. Signal dividing may be required to eliminate interference with measurements on adjacent channels.

INPUT FREQUENCY RANGE:

Range Code	Preamplifier Gain	Input Hysteresis	Maximum Frequency
4	1	10 mV	200 kHz
3	10	1 mV	50 kHz
2	33	300 uV	20 kHz
1	100	100 uV	8 kHz

REFERENCE ACCURACY: ±20 ppm.

RESOLUTION: ±60 nanoseconds divided by the number of cycles measured. Resolution is reduced by signal noise and for signals with a slow transition through the zero voltage threshold.

TIME REQUIRED FOR MEASUREMENT: Signal period times the number of cycles measured plus 1.5 cycles; minimum measurement time is 2 ms.

RESISTANCE AND CONDUCTIVITY MEASUREMENTS

ACCURACY: 0.015% of full scale bridge output, limited by the matching bridge resistors. The excitation voltage should be programmed so the bridge output matches the full scale input voltage range.

MEASUREMENT TYPES: 6 wire and 4 wire full bridge; 4 wire, 3 wire, and 2 wire half bridge. Bridge measurements are ratio-metric and dual polarity to eliminate thermal emf's. AC resistance measurements use a dual polarity 750 us excitation pulse for ionic depolarization, with the signal integration occurring over the last 250 us.

PULSE COUNTERS

NUMBER OF PULSE COUNTER CHANNELS: 2 eight bit or 1 sixteen bit selectable.

MAXIMUM COUNT RATE: 2000 Hz, eight bit counters; 250 kHz, sixteen bit counters. Pulse counter channels scanned at 8 Hz.

MODES: Switch closure, high frequency pulse, and low level AC.

SWITCH CLOSURE MODE

Minimum Switch Closed Time: 5 ms.
Minimum Switch Open Time: 6 ms.
Maximum Bounce Time: 1 ms open without count.

HIGH FREQUENCY PULSE MODE

Minimum Pulse Width: 2 us.
Maximum Input Frequency: 250 kHz.
Voltage Thresholds: Count upon transition from below 1.5 V to above 3.5 V.
Maximum Input Voltage: ±20 V.

LOW LEVEL AC MODE

(Typical of magnetic pulse flow sensors, selected anemometers, etc.)

Min. AC Input Voltage: 5 mV RMS.

Input Hysteresis: 11 mV.

Max. AC Input Voltage: 20 V RMS.

Frequency Range:

AC Input (RMS)	Range
20 millivolts	1 Hz to 100 Hz
50 millivolts	0.5 Hz to 400 Hz
150 millivolts to 20 V	0.3 Hz to 1000 Hz

(Consult factory if higher frequencies are desired.)

DIGITAL I/O PORTS

8 ports, software selectable as binary inputs or control outputs.

OUTPUT VOLTAGES (no load):

high — 5 V ± 0.1 V; low — < 0.1 V.

OUTPUT RESISTANCE: 500 ohms.

INPUT STATE: high — > 3 V; low — < 0.8 V.

INPUT RESISTANCE: 100 kohms.

TRANSIENT PROTECTION

All input and output connections to the IMP-860 module are protected using RC filters or transzors connected to a heavy copper bar between the circuit card and the case. The IMP-860 Wiring Panel includes additional spark gap and transzorb protection.

CPU AND INTERFACE

PROCESSOR: Hitachi 6303.

MEMORY: 32k ROM, 16k RAM expandable to 64k.

DISPLAY: 8 digit LCD (0.5" digits).

PERIPHERAL INTERFACE: 9 pin D-type connector for keyboard/display, storage module, cassette, modem, printer, and RS232 adapter. Baud rates selectable at 300, 1200, 9600, and 76,800.

CLOCK ACCURACY: ±1 minute per month.

MAXIMUM PROGRAM EXECUTION RATE:

System tasks initiated in sync with real-time up to 64 Hz. One measurement with tape transfer is possible at this rate without interruption.

SYSTEM POWER REQUIREMENTS

VOLTAGE: 9.6 to 16 volts.

TYPICAL CURRENT DRAIN: 0.5 mA quiescent, 13 mA during processing, and 35 mA during analog measurement.

BATTERIES: 7.5 Ahr alkaline D-cells or 5 Ahr rechargeable lead acid batteries, standard.

PHYSICAL SPECIFICATIONS

SIZE: 7.8" x 3.5" x 1.5"; 9" x 3.5" x 2.9" with IMP-860 Wiring Panel. Input connectors extend length 0.15".

WEIGHT: 2 lbs.

WARRANTY

Two years against defects in materials and workmanship.



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PRECIPITATION GAUGES

- RELIABLE AND ACCURATE
- TIPPING AND WEIGHING BUCKETS
- ENGLISH OR METRIC MEASURE
- OPTIONAL ELECTRIC/PROPANE HEAT

Climatronics offers a variety of precipitation gauges, which are all accurate and durable. Models are available for both AC and DC powered systems, with or without heaters.



Tipping Bucket Gauges are available with screened funnels of 6 or 8-inch diameter. Precipitation is channeled to a triangular bucket which tips for every 0.01 inch of water collected. When the bucket empties it activates a sealed reed switch; which sends an event message to the signal conditioner. Upon tipping, the accumulated water is drained.

Both tipping bucket sensors can be provided with optional electric heaters for AC powered systems. In addition, the 8 inch version can accommodate a propane heater for DC powered systems. The heaters prevent data loss during freezing conditions and melt snow so the water content may be measured by the tipping bucket. Either type of gauge is easy to install; requiring a level piece of ground that is free from obstruction. Signal conditioners are available in modular form with an input range of 0-1 inch (0-2.5 cm) or 0-10 inch (0-25 cm), corresponding standard output ranges of 0-1 or 0-5 Vdc.

A wind shield is available to prevent undue turbulence near the sensor funnel, insuring a representative data capture.

SENSOR SPECIFICATIONS

	<u>*6" Tipping Bucket</u> <u>P/N 100508</u>	<u>**8" Tipping Bucket</u> <u>P/N 100097</u>
ACCURACY	±1% up to 7.5 cm/hr (3 inch/hr.)	±3% for rain rates of 2.54 to 15.24 cm/hr (1 to 6 inch/hr.)
	±5% up to 25 cm/hr (10 inch/hr)	
RESOLUTION (Sensitivity)	0.025 cm (0.01 in.)	0.025 cm (0.01 in.)

ELECTRICAL SPECIFICATIONS

	<u>*6" Tipping Bucket</u> <u>P/N 100508</u>	<u>**8" Tipping Bucket</u> <u>P/N 100097</u>
POWER REQUIREMENTS (Without Heat)	1 None	1 None
OUTPUT	Switch Closure	Switch Closure
CONTACT RATING	2 amps @ 12 Vdc	3 amps @ 50 Vdc

PHYSICAL SPECIFICATIONS

	<u>*6" Tipping Bucket</u> <u>P/N 100508</u>	<u>**8" Tipping Bucket</u> <u>P/N 100097</u>
SIZE	26.0 H x 15.9 cm Dia. (10.25 H x 6.25 in Dia.)	46.3 H x 20.3 cm Dia. (18.25 H x 8 in Dia.)
WEIGHT	1.1 Kg (2.5 lbs)	11.4 Kg (25 lbs)
OPERATING TEMPERATURE (Heated)	-40°C to +60°C (-40°F to +140°F)	-40°C to +60°C (-40°F to +140°F)
USE WITH SIGNAL CONDITIONER	P/N 100747 (MMS) P/N 100840 (RMS)	P/N 100747 (MMS) P/N 100840 (RMS)

- 1 Power supplied by Signal Conditioner
* Electric Heat Available, 40 watts
** Electric and Propane Heat Available
(Electric Heat, 200 watts)



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APPENDIX C

CHRONOLOGY

AMBIENT AIR, SOIL GAS AND WELL PRESSURE SAMPLING EVENTS

CHRONOLOGY - AMBIENT AIR SAMPLING

SAMPLE 2-2A1

- MARCH 1, 1993

Started sampler A-1 using pump A and sampling unit #1 at 0848 EDT. The nominal flow rate was 0.7 liters per minute (Lpm). The sampler was programmed to run 1440 minutes continuously for 24 hours. The sampling location was A1 as shown in Figure 2.1. This location is outside the landfill property at an open area on the east end of the Battle Row Campground about 24 yards west of the southeast campground gate. The campground is located west of the landfill. This was an upwind high volume (1,000 liter) sample. The initial ambient VOC concentration was 0.0 ppm, and the initial rotameter reading was set at 90 units using rotameter RR1. A leak check was performed before sampling, and no leak was found. A maximum and minimum temperature thermometer (max/min thermometer) was set inside the sampler to record the temperature change.

Checked rotameter readings at 1206 EDT, 1208 EDT, 1528 EDT, 1654 EDT, 1918 EDT and 2230 EDT, the readings were 95 units, 90 units, 91 units, 90 units, 91 units and 91 units, respectively. The recorded total elapse times were 198 minutes, 200 minutes, 400 minutes, 486 minutes, 630 minutes and 821 minutes, respectively. The operator observed light westerly to near calm winds and noted them on the data sheet.

- MARCH 2, 1993

The operator checked the sampler three times (0305 EDT, 0701 EDT, and 0841 EDT) and the rotameter readings were at 91, 91 and 92 units with the total elapse times of 1097, 1333 and 1433 minutes, respectively. The pump operation was normal during the whole sampling period. No unusual events were noted. The sampler was removed from service at 0848 EDT with the

total elapse time of 1440 minutes. The ambient VOC reading was 0.0 ppm. The recorded maximum temperature inside the sampling cooler was 38°F.

SAMPLE 2-2A2

- MARCH 1, 1993

Sampler A-2 began sampling at 0930 EDT. Pump C was used along with sampling unit #2. The sampling location was A2 which is southeast of the landfill and northwest of the soil gas well M2. The nominal flow rate was 0.7 Lpm. Rotameter RR1 was used to set the pump flow rate. The initial rotameter reading was set at 90 units. The pump was programmed to run 24 hours continuously to collect a nominal 1000 liter sample. The ambient VOC concentration was 0.0 ppm prior to sampling. A max/min thermometer was set inside the sampler to measure the maximum and minimum temperatures during the sampling period. The leak check was approved before the sampler was started. This was a high volume, downwind ambient sample.

The rotameter reading was checked at 1216 EDT, the reading was 94 units. The operator adjusted the reading to 90 units at 1218 EDT. Rotameter readings were checked again at 1520 EDT, 1630 EDT, 1904 EDT and 2218 EDT. The rotameter readings were 90 units, 91 units, 90 units and 92 units, respectively. No unusual events were noted. The operator recorded calm winds around 2220 EDT.

- MARCH 2, 1993

Inspected A-2 at 0252 EDT, 0651 EDT and 0906 EDT. No problems were noted. All rotameter readings were recorded at 92 units. The sampler was removed from service according to the established protocol at 0930 EDT with a total elapse time of 1440 minutes. The ambient VOC concentration was 0.0 ppm. The recorded maximum temperature within the A-2 sampler was 49°F. The operator observed calm winds around 0640 EDT and moderate westerly winds around 0905 EDT and noted them in the data sheet.

SAMPLE 2-2A3

- MARCH 1, 1993

The A-3 sampler was started at 0930 EDT with pump #4 and sampling unit #3. This was a low volume, downwind sample. The nominal flow rate was 0.070 Lpm and the nominal sample volume was 100 liters. The sample location was also southeast of the landfill, approximately two feet from sampler A-2. The initial ambient VOC concentration was 0.0 ppm. The initial rotameter reading was set at 51 units using rotameter RR2. A leak check was performed before the sampler was started and all connections were leak free.

Sampler A-3 was checked at 1128 EDT, the rotameter reading was 54 units, it was adjusted to 51 units at 1130 EDT. Sampler A-3 was inspected again at 1220 EDT, 1521 EDT, 1629 EDT, 1905 EDT and 2219 EDT. No problems were found. The rotameter readings were 51 units for the first 3 inspections and 50 units for the last two inspections. The operator observed calm wind conditions during the 2219 EDT inspection.

- MARCH 2, 1993

Checked A-3 sampler at 0254 EDT, 0652 EDT, and 0907 EDT. The rotameter indicated readings of 50, 50 and 51 units, respectively. The operator observed calm wind conditions around 0640 EDT and moderate westerly winds around 0906 EDT and noted them on the data sheet. Checked the sampler again at the end of sampling; all connections were in order. The sampler was removed from service at 0930 EDT according to the established protocol with a total elapse time of 1440 minutes. The final ambient VOC reading was 0.0 ppm. The recorded maximum temperature inside the sampler was 46°F.

SAMPLE 2-2A4

- MARCH 1, 1993

Sampler A-4 was positioned northeast of the landfill, southwest of the landfill water treatment facility, as shown on Figure 2.1. This was a second upwind high volume sample. Sampling was started at 0957 EDT. Pump D was programmed to run at a nominal flow rate of 0.7 Lpm for 1440 minutes over 24 hours to collect 1000 liters of sample. A leak check was performed before the sampler was started and no leaks were observed. The max/min thermometer was placed inside the sampler. The initial rotameter reading was set at 90 units using rotameter RR1. The Micro-Tip meter indicated an initial ambient VOC concentration of 0.0 ppm.

The operator checked the sampler at 1158 EDT and observed the rotameter reading of 98 units. Operator adjusted the rotameter reading to 90 units at 1200 EDT. Sampler A-4 was inspected again at 1537 EDT, 1620 EDT, 1855 EDT, and 2208 EDT, the rotameter readings at the above times varied between 88 and 89 units, the operator noted all readings on the data sheet.

- MARCH 2, 1993

The operator checked sampler A-4 at 0243 EDT, 0640 EDT and 0953 EDT. The rotameter readings were at 88, 89 and 91 units, respectively.

The unit was taken out of service at 0957 EDT according to established protocols. The recorded pump total elapse time was 1440 minutes. The final ambient VOC concentration was 0.0 ppm. The recorded maximum temperature was 47°F. No unusual events were observed during the sampling period.

CHRONOLOGY - SOIL GAS SAMPLING

MARCH 1, 1993

- SAMPLE 2-2F1

Sample 2-2F1 was collected from well F1 (30"deep) located inside the Firemans' Training Center about eight feet away from a fenced subsurface vault. Rotameter RR3, an SKC pump along with a designated soil gas well sampler. The nominal flowrate was 1.0 Lpm and the nominal sample volume was 10 liters. The initial ambient VOC concentration was 0.0 ppm. The initial well and sampling line VOC reading was 0.0 ppm. The well was evacuated for 30 seconds to pull a full well volume of stagnant air prior to sampling. Sampling started at 920 EDT with an initial rotameter reading of 114 units at the bottom of the stainless steel ball. A leak check was performed prior to the sampling and all connection lines.

The operator checked rotameter reading at 925 EDT, the reading was 115 units. Sampling stopped at 930 EDT as scheduled. The final rotameter reading was still 115 units. The final ambient air VOC reading was 0.0 ppm. The recorded maximum temperature inside the sampler was 40°F.

- SAMPLE 2-2M2

Sample 2-2M2 was collected between 945 EDT and 955 EDT from well M2 (30"deep). This well was located next to the landfill property along the west side of Winding Road. Rotameter RR3 and an SKC pump along with a designated sampler were used. The nominal flowrate was 1.0 Lpm. A leak check was performed prior to sampling on all connection lines. One full well volume of stagnant air was evacuated. Initial ambient air, sample inlet line and well VOC readings were taken and all readings were 0.0 ppm. The rotameter reading was checked at 950 EDT. The reading was up to 119 units. The operator adjusted the reading to 115 units at 951 EDT. Final ambient air VOC concentration was 0.0 ppm. The recorded maximum sampler interior temperature was 40°F.

-SAMPLE 2-2M4

Sample 2-2M4 was collected from the 30" deep soil gas well M4 located along the east side of Winding Road. Rotameter RR3, an SKC pump and a designated soil gas well sampler were used with a nominal flowrate of 1.0 Lpm to collect 10 liters of sample. A leak check was performed as part of the procedure. Initial VOC concentrations were measured for ambient air, and the soil gas well; all readings were 0.0 ppm. The well was conditions by evacuating a full well volume of stagnant air.

Sampling started at 1007 EDT and lasted for 10 minutes as scheduled. During the 10 minute sampling period, the rotameter reading stayed at 115 units. The final ambient air and well VOC concentrations were measured again and the results were 0.0 ppm. The recorded maximum temperature inside the sampler was 40°F.

- SAMPLE 2-2M5

Sample 2-2M5 was collected from well M5, a 30" deep well located west of Winding Road east of the landfill. Rotameter RR3 and an SKC pump with a designated soil gas well sampler were used. The nominal flowrate was 1.0 Lpm. Initial ambient air and well VOC concentrations were taken and all readings were 0.0 ppm. After the leak check, the sampler was started at 1025 EDT. The initial rotameter reading was 115 units.

The sampler was stopped at 1035 EDT. The final rotameter reading was 118 units. The final ambient air and well VOC readings were 0.0 ppm. The operators observed that the soil gas well location was partially covered by snow. The recorded maximum sampler interior temperature was 36°F.

- SAMPLE 2-2M6

This sample was taken from soil gas well M6 (30"deep) located on the east side of Winding Road east of the landfill about 60 feet north of M4. M6 was re-installed on March 1, 1993 around 830 EDT, about 2 hours prior to the sampling. It was hit by a motor vehicle a few days prior to the test effort. Rotameter RR3, an SKC pump and a soil gas well sampler were used. The nominal flowrate was 1.0 Lpm. The initial ambient air VOC concentration was 0.0 ppm. The initial well VOC concentration was measured at 6.4 ppm. The system leak check passed and sampling started at 1049 EDT and lasted for 10 minutes.

The final ambient air and well VOC concentrations were 0.0 ppm. The final rotameter reading was 115 units which was the same as the initial reading. The recorded maximum sampler interior temperature was 42°F.

- SAMPLE 2-2M13

This sample was collected from well M13 (30"deep). This well was located east of Winding Road. Rotameter RR3 and an SKC pump with a soil gas well sampler were used. The initial ambient air and well VOC readings were 0.0 ppm. The nominal flowrate and volume were 1.0 Lpm and 10 liters, respectively. A leak check was conducted on all connections. Sampling started at 1110 EDT and the initial rotameter reading was 115 units.

Sampling ended at 1120 EDT. The rotameter reading remained at 115 units from the beginning to the end of sampling. The final ambient air and well VOC concentrations were taken and the results were both 0.0 ppm. The operators observed moderate truck traffic during the sampling set up time. The recorded maximum sampler interior temperature was 38°F.

- SAMPLE 2-2M16

Sample 2-2M16 was collected between 1252 EDT and 1302 EDT from the 30" deep well M16 located on the west side of Winding Road east of the landfill. Rotameter RR3, an SKC pump and a soil gas well sampler were used with 1.0 Lpm nominal flowrate to collect 10 liters of sample. A leak check was performed. The initial ambient air VOC concentration was 0.0 ppm. The initial well VOC concentration was 1.5 ppm. The rotameter reading remained at 115 units during the entire sampling period.

Final ambient air and well VOC readings were 0.0 ppm and 1.2 ppm, respectively. The recorded maximum sampler interior temperature was 39°F.

- SAMPLE 2-2M21

This sample was collected from well M21 (30" deep) located on the west side of the landfill east of Claremont Road. Rotameter RR3, an SKC pump and a soil gas well sampler were used. A leak check was performed before sampling. The nominal flowrate was 1.0 Lpm and the nominal sample volume was 10 liters. The initial ambient air and well VOC readings were 0.0 ppm.

Sample collection started at 1540 EDT and ended at 1550 EDT. During the 10 minute sampling period, the rotameter reading remained at 115 units. Final ambient air and well VOC conditions were measured at 0.0 ppm. The operator observed the air temperature inside the sampler. The maximum sampler interior temperature was 47°F.

- SAMPLE 2-1M9 (10')

This sample was taken from one of the four deep wells located at M9. Sample 2-2M9 was collected from the 10 foot deep well marked with blue color. Rotameter RR3, an SKC pump and a soil gas well sampler were used. The nominal flowrate and volume were 1.0 Lpm and

10 liters, respectively. The well was evacuated for 1.5 minutes before sampling to remove one full volume of stagnant air inside the well. The evacuation was done using a spare SKC pump and sampling line. A sampling train leak check was performed. The initial ambient air and well VOC concentrations were measured at 0.0 ppm. Sampling started at 1145 EDT. Initial rotameter reading was 115 units and remained at that level for the 10 minute sampling period.

The sampler was stopped at 1155 EDT. Final ambient air and well VOC readings were recorded and the results were 0.0 ppm and 0.2 ppm, respectively. The recorded maximum sampler interior temperature was 38°F.

- SAMPLE 2-2M9 (20')

This sample was collected from the 20 foot deep well at M9. This well was marked with green color. Rotameter RR3, an SKC pump and a soil gas well sampler were used. The well was evacuated for three minutes before sampling and a sampling train leak check was performed. Initial ambient air and well VOC concentrations were recorded; the results were 0.0 ppm and 0.6 ppm, respectively. The sampling started at 1200 EDT and finished at 1210 EDT. The rotameter reading remained at 115 units throughout the sampling. Final ambient VOC concentration was 0.0 ppm and the final well VOC concentration increased to 0.8 ppm. The recorded maximum sampler interior temperature was 38°F.

- SAMPLE 2-2M9 (30')

This sample was collected from the 30 foot deep well located at M9. The well was marked with red color. Rotameter RR3, an SKC pump and a soil gas well sampler were used. The well was evacuated for 4.5 minutes before sampling started and a sampling train leak check was performed. The nominal flowrate was 1.0 Lpm, and nominal sample volume was 10 liters. Initial ambient air and well VOC concentrations were 0.0 ppm and 0.2 ppm, respectively. Testing started at 1214 EDT with initial rotameter reading of 115 units.

Sampling ceased at 1224 EDT. The final rotameter reading was 115 units and final ambient air and well VOC readings were 0.0 ppm and 1.3 ppm, respectively. The recorded maximum sampler interior temperature was 39°F.

- SAMPLE 2-2M9 (40')

This sample was collected from the 40 foot well at M9. This well was marked with yellow color Rotameter RR3, an SKC pump and a soil gas well were used. The well was evacuated at 1.0 Lpm for 6 minutes prior to sampling to remove one full well volume of stagnant soil gas. The leak check was approved prior to testing. The nominal sampling volume was 10 liters, the nominal sampling rate was 1.0 Lpm. The initial ambient air and well VOC concentrations were recorded and the readings were 0.0 ppm, and 2.0 ppm, respectively.

Sampling started at 1230 EDT. The initial rotameter reading was 115 units. The test lasted for 10 minutes and the final ambient air and well concentrations were recorded and the readings were 0.0 ppm and 1.8 ppm, respectively. The final rotameter reading was 115 units. The recorded maximum sampler interior temperature was 38°F.

- SAMPLE 2-2M31

Sample 2-2M31 was collected from well M31 which was a 30" deep well located west of the landfill. Rotameter RR3, an SKC pump and a soil gas well sampler were used for this sampling with a nominal flowrate and volume of 1.0 Lpm and 10 liters. The well was evacuated for 30 seconds prior to sampling. The initial ambient air and well VOC concentrations were recorded and the readings were 0.0 ppm. A leak check was performed on all connections.

Sampling started at 1502 EDT with an initial rotameter reading of 115 units. The sampling ended at 1512 EDT, as scheduled. The final rotameter reading was 115 units. Final ambient

air concentration was 0.0 ppm, and the final well concentration was 1.1 ppm. The recorded maximum sampler interior temperature was 44°F.

- SAMPLE 2-2M28

Sample 2-2M28 was collected from the 30" deep well M28 located north of the recharge basin, just within the western landfill property line. Rotameter RR3, an SKC pump and a designated soil gas well sampler were used. The nominal flowrate and sample volume were 1.0 Lpm and 10 liters respectively. The initial ambient air and well VOC concentration were measured and the readings were 0.0 ppm. A leak check was performed prior to sampling.

Sampling started at 1437 EDT with an initial rotameter reading of 115 units. The sampling stopped at 1447 EDT, as scheduled. The final rotameter reading was 115 units. The final ambient air VOC concentration was measured at 0.0 ppm and the final well VOC concentration was measured at 9.7 ppm. The recorded maximum sampler interior temperature was 42°F.

- SAMPLE 2-1M22

Sample 2-2M22 was collected from a 30" deep well M22 located north of the landfill. Rotameter RR3, an SKC pump and a designated soil gas well sampler were used. The well was evacuated for 30 seconds prior to sampling. A leak check was performed to check the line connection. Initial ambient air and well VOC concentrations were measured at 0.0 ppm.

The sampling started at 1600 EDT and lasted for ten minutes, as scheduled. During sampling the rotameter reading was 115 units. The ambient air and well VOC concentrations were recorded again at the end of sampling and readings were 0.0 ppm. The recorded maximum sampler interior temperature was 48°F.

- SAMPLE 2-2M39

Sample 2-2M39 was collected from M39, a 30" deep well located north northwest of the air stripper, next to a telephone pole. Rotameter RR3, an SKC pump and a designated soil gas well sampler were used. The nominal flowrate and sample volume were 1.0 Lpm and 10 liters, respectively. The well was evacuated for 30 seconds prior to the sampling and a leak check was performed. The initial ambient air and well concentrations were 0.0 ppm. The initial rotameter reading was 115 units.

Sampling started at 1620 EDT and finished at 1630 EDT. The final rotameter reading was 105 units. The final ambient air and well VOC concentrations were 0.0 ppm. The recorded maximum sampler interior temperature was 48°F.

- SAMPLE 2-2M34

Sample 2-2M34 was collected from M34, a 30" deep well located southwest of the landfill on the west side of the haul road. Rotameter RR3, an SKC pump and a soil gas well sampler were used. The nominal flowrate was 1.0 Lpm, the nominal sample volume was 10 liters. The ambient air and well VOC concentrations were measured before sampling and the readings were 0.0 ppm. The well was evacuated for 30 seconds prior to sampling.

Sampling started at 1414 EDT. The initial rotameter reading was 115 units. Sampling ended at 1424 EDT. The final rotameter reading was 115 units. Final ambient air VOC concentrations was 0.0 ppm. The recorded maximum sampler interior temperature was 42°F.

- SAMPLE 2-2M37

Sample 2-2M37 was collected from M37, a 30" deep well located at the southwest corner of the landfill. Rotameter RR3, an SKC pump along with a designated soil gas sampler were used. The nominal flowrate and sample volume were 1.0 Lpm and 10 liters, respectively.

The ambient air and well VOC concentrations were measured before sampling and the readings were 0.0 ppm. The well was evacuated for 30 seconds prior to sampling.

Sampling started at 1347 EDT. The initial rotameter reading was 115 units. Sampling ended at 1357 EDT. The final rotameter reading was 115 units. Final ambient air and well VOC concentrations were 0.0 ppm. The recorded maximum sampler interior temperature was 43°F.

-SAMPLE 2-2FB(A)

Sample 2-2FB(A) was one of two field blank samples collected. It was collected at the soil gas well sampling site M39. The sampling traps were removed from the shipping tubes, trap ends were opened and remained open for about 15 seconds. At the end of sample collection the trap ends were closed, placed back into the shipping tubes and labeled.

- SAMPLE 2-2FB(B)

Sample 2-2FB(B) was the second field blank sample collected as a backup field blank sample. It was collected at the same site as 2-2FB(A). Identical field blank sample collection procedures were applied. The traps were opened to the site atmosphere for about 15 seconds.

- SAMPLE 2-2TB(A)

Sample 2-2TB(A) was prepared at the site of soil gas well M31. The sorbent traps were taken out of the shipping box with the traps remaining inside the shipping tubes. They were then labeled and put back into the shipping box.

- SAMPLE 2-2TB(B)

Sample 2-2TB(B) was prepared as the second trip blank sample. It was also prepared at the site of soil gas well M31. Again, the sorbent traps were taken out of the shipping box with the traps remaining inside the shipping tubes. They were then labeled and put back into the shipping box.

CHRONOLOGY - WELL PRESSURE READINGS

MARCH 1, 1993

- PW1

PW1 is located northwest of the landfill along the haul road. There are two wells inside PW1. One well is marked with blue color, the other one is marked with green color. A Dwyer inclined manometer was used for well pressure measurements. The manometer was leveled, leak checked and zeroed before it was used to measure the well pressure. Pressure readings from both wells were taken two times to assure the readings were reliable. All readings were noted on the datasheet.

- PW2

PW2 is located at the southeast corner of the landfill. There are two wells inside PW2. One well is marked with blue color, the other one is marked with green color. A Dwyer inclined manometer was used for the pressure measurement. The manometer was leveled, leak checked and zeroed before it was used to measure the well pressure. Pressure readings were taken two times and all readings were recorded on the datasheet.

- PW3

PW3 is located south of the landfill inside the Firemens' Training Center. It is located east of soil gas well F1. Two wells are located at PW3 and they are marked with red and green color, respectively. Again, a Dwyer inclined manometer was used for the well pressure readings. The manometer was leveled, leak checked and zeroed as part of the quality assurance procedure. Two pressure readings were taken for both wells and all readings were recorded on the datasheet.

APPENDIX D
ANALYTICAL RESULTS

GRASEBY

NUTECH-RTL

VOST GC/MS REPORT

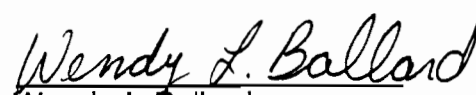
prepared for

RTP ENVIRONMENTAL ASSOCIATES

by

GRASEBY NUTECH-RTL


J. Wayne Jones
Chemist/ GCMS Supervisor


Wendy L. Ballard
Chemist/ Reviewer

GRTL ID # 93030302

March 31, 1993

GRASEBY NUTECH-RTL

4022 STIRRUP CREEK DRIVE, SUITE 325, DURHAM, NC 27703-9000, USA

TEL: 919 544 5775 FAX: 919 544 5770

GRASEBY,
NUTECH-RTL

March 31, 1993

Scott Mills
RTP Environmental Associates
400 Post Avenue
Westbury, NY 11590

RE: GRTL ID #93030302 [RTP PO# LKBOBL2-2/RSM (2/17/93)- VOST Analysis]

Dear Mr. Mills:

Enclosed please find the results of analysis for the samples submitted to our laboratory on 3/3/93.

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

Sincerely,

GRASEBY NUTECH-RTL



J. Wayne Jones
Chemist

jwj

Enclosures

INTRODUCTION

Scope:

To analyze (VOST) Tenax/Charcoal cartridge pairs for the target compound list (TCL) and tentatively identify five custom compounds and the next five non-target compounds (TIC) 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 compounds are desorbed from the analytical trap into the GC/MS system.

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.

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

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

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/MSD 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 μ m,
Internal diameter 0.75 mm,
Construction of Borosilicate glass
with fused silica ends

Mass Spectrometer Conditions:

Run Time	:	25 minutes
Scan Range	:	45 - 260 AMU
Scan Delay	:	1.90 minutes
Ion Source Temp	:	200 °C
Electron Multiplier	:	2700 $\pm$ 200 EV
Separator Temp	:	225 °C

Sample Chronicle:

Client	RTP Environmental Associates
RTL Project ID	93030302
Analysis Type	VOST Tenax/charcoal (T/C) pairs
Date of Collection	not supplied
Date Received	3/3/93
Date Authorized	3/3/93
Date Analyzed	3/9/93 - 3/11/93
Date Reported	3/31/93

Narrative:

The details of the letter dated March 2, 1993 were followed with consideration given for split ratios and individual analysis of specified sample pairs. However, a scope modification was necessary to identify the "ketones" requested on the target compound list. The authorized minimum scan range change from 35 to 45 would not provide the significant data needed to identify and quantify the ketones. Tentative identification was therefore agreed on with the available data and expected retention time matches. Reference the letter faxed March 5, 1993 detailing the new scope changes and provisions for identifications.

Several notable occurrences were observed and are noted on each respective sample report. The laboratory remains available to assist with questions concerning these reports or sampling procedures.

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

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-1

File ID: T1401

Sample ID: 2-2TB-A

Description: VOST T/C only

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	81
Toluene-d ₈	92
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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	BQL
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	BQL
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 – 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-1

File ID: T1401

Sample ID: 2-2TB-A

Description: VOST T/C only

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-1

File ID: T1401

Sample ID: 2-2TB-A

Description: VOST T/C only

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
No peaks found			

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-2

File ID: T1400

Sample ID: 2-2-FB-A

Description: VOST T/C only

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-2

File ID: T1400

Sample ID: 2-2-FB-A

Description: VOST T/C only

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
No peaks found			

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-3

File ID: T1415

Sample ID: 2-2A1-F/B

Description: VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	83
Toluene-d ₈	80
4-Bromofluorobenzene	124

CAS Number	Target Compound	Results (ng)
74-87-3	Chloromethane	2200 ^a
75-01-4	Vinyl chloride	BQL
74-83-9	Bromomethane	BQL
75-00-3	Chloroethane	BQL
75-69-4	Trichlorofluoromethane	1900 ^a
75-35-4	1,1-Dichloroethene	BQL
75-15-0	Carbon disulfide	30
75-09-2	Methylene chloride	2200 ^a
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	2200 ^a
56-23-5	Carbon tetrachloride	400
71-43-2	Benzene	3100 ^a
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	2000 ^a
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	> 1700 ^{a,b}
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	3800 ^a
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	1500 ^a
1330-20-7	Xylene (total)	> 4000 ^{a,b}
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	400
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 - 1,000

BQL: Below Quantitation Limit

a,b: See Endnotes

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates
RTL ID: 93030302-3
Sample ID: 2-2A1-F/B

Received: 3/3/93
File ID: T1415
Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
cis-1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *	4.70	890	58
2-Butanone *	8.38	780	72
4-Methyl-2-pentanone *	13.51	180	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-3

File ID: T1415

Sample ID: 2-2A1-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Unknown freon	1.61	3100	---
Unknown hydrocarbon	6.02	2600	---
Ethylmethylbenzene isomer	20.49	5300	120
Trimethylbenzene isomer	21.48	2900	120
Methylpropylbenzene isomer	23.06	2300	134

GRASEBY NUTECH-RTL

Client:	RTP Environmental Associates	Received:	3/3/93
RTL ID:	93030302-4	File ID:	T1418
Sample ID:	2-2A2-F	Description:	VOST T/C only

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	94
Toluene-d ₈	99
4-Bromofluorobenzene	104

CAS Number	Target Compound	Results (ng)
74-87-3	Chloromethane	1200
75-01-4	Vinyl chloride	BQL
74-83-9	Bromomethane	BQL
75-00-3	Chloroethane	BQL
75-69-4	Trichlorofluoromethane	1600
75-35-4	1,1-Dichloroethene	BQL
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	1800
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	1900
56-23-5	Carbon tetrachloride	350
71-43-2	Benzene	3800
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	1500
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	9200
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	3300
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	1500
1330-20-7	Xylene (total)	8100
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	280
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 200 – 10,000

BQL: Below Quantitation Limit

Split ratio= 1:10

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-4

File ID: T1418

Sample ID: 2-2A2-F

Description: VOST T/C
only

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *	4.49	200	58
2-Butanone *	8.5	800	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

Split ratio= 1:10

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-4

File ID: T1418

Sample ID: 2-2A2-F

Description: VOST T/C
only

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Unknown hydrocarbon	1.79	8500	—
Unknown hydrocarbon	1.92	4400	—
Unknown hydrocarbon	20.27	1200	—
Ethylmethylbenzene isomer	20.53	4000	120
Ethylmethylbenzene isomer	21.52	1900	120

Split ratio= 1:10

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-4

File ID: T1414

Sample ID: 2-2A2-B

Description: VOST T/C only

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	90
Toluene-d ₈	102
4-Bromofluorobenzene	99

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	BQL
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	67
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	BQL
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 – 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-4

File ID: T1414

Sample ID: 2-2A2-B

Description: VOST T/C
only

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-4

File ID: T1414

Sample ID: 2-2A2-B

Description: VOST T/C
only

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Unknown freon	1.94	2400	---
Unknown hydrocarbon	20.74	16	---
Methyl(methylethenyl)cyclohexene isomer	22.06	27	136

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-5

File ID: T1419

Sample ID: 2-2A3-F/B

Description: VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	88
Toluene-d ₈	104
4-Bromofluorobenzene	105

CAS Number	Target Compound	Results (ng)
74-87-3	Chloromethane	240
75-01-4	Vinyl chloride	BQL
74-83-9	Bromomethane	BQL
75-00-3	Chloroethane	BQL
75-69-4	Trichlorofluoromethane	160
75-35-4	1,1-Dichloroethene	BQL
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	260
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	600
56-23-5	Carbon tetrachloride	100
71-43-2	Benzene	460
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	160
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	1000
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	330
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	140
1330-20-7	Xylene (total)	880
100-42-5	Styrene	29
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	52
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 – 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates
RTL ID: 93030302-5
Sample ID: 2-2A3-F/B

Received: 3/3/93
File ID: T1419
Description: VOST T/C pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *	4.75	180	58
2-Butanone *	8.50	190	72
4-Methyl-2-pentanone *	13.56	21	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-5

File ID: T1419

Sample ID: 2-2A3-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Unknown freon and Xenon coelution	1.92	940	---/131
Unknown	6.06	530	---
Unknown hydrocarbon	19.41	94	---
Ethylmethylbenzene isomer	20.60	310	120
Trimethylbenzene isomer	21.52	170	120

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-6

File ID: T1402

Sample ID: 2-2A4-F/B

Description: VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	90
Toluene-d ₈	85
4-Bromofluorobenzene	112

CAS Number	Target Compound	Results (ng)
74-87-3	Chloromethane	1200
75-01-4	Vinyl chloride	BQL
74-83-9	Bromomethane	BQL
75-00-3	Chloroethane	BQL
75-69-4	Trichlorofluoromethane	1800
75-35-4	1,1-Dichloroethene	BQL
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	1800
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	2000
56-23-5	Carbon tetrachloride	380
71-43-2	Benzene	3400
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	2300
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	7900
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	3200
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	1100
1330-20-7	Xylene (total)	7300
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	290
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 220 - 11,000

BQL: Below Quantitation Limit

Split ratio= 1:11

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-6

File ID: T1402

Sample ID: 2-2A4-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *	4.48	660	58
2-Butanone *	8.63	820	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

Split ratio= 1:11

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-6

File ID: T1402

Sample ID: 2-2A4-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Unknown hydrocarbon	1.72	8400	—
Hexane	6.26	1800	86
Unknown hydrocarbon	19.35	930	—
Ethylmethylbenzene isomer	20.53	3700	120
Ethylmethylbenzene isomer	21.52	1900	120

Split ratio= 1:11

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-7

File ID: T1420

Sample ID: 2-2F1-F/B

Description: VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	88
Toluene-d ₈	105
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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	21
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	BQL
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 – 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-7

File ID: T1420

Sample ID: 2-2F1-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-7

File ID: T1420

Sample ID: 2-2F1-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	1.82	1900	131

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Received: 3/3/93
 RTL ID: 93030302-8 File ID: T1421
 Sample ID: 2-2M2-F/B Description: VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	87
Toluene-d ₈	105
4-Bromofluorobenzene	97

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	BQL
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	BQL
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 – 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-8

File ID: T1421

Sample ID: 2-2M2-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-8

File ID: T1421

Sample ID: 2-2M2-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	1.84	1700	131

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Receiv

RTL ID: 93030302-9

File ID:

Sample ID: 2-2M4-F/B

Description:

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	90
Toluene-d ₈	106
4-Bromofluorobenzene	97

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	BQL
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	BQL
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 – 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-9

File ID: T1422

Sample ID: 2-2M4-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-9

File ID: T1422

Sample ID: 2-2M4-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	1.83	2000	131

GRASEBY NUTECH-RTL

Client:	RTP Environmental Associates	Received:	3/3/93
RTL ID:	93030302-10	File ID:	T1423
Sample ID:	2-2M5-F/B	Description:	VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	91
Toluene-d ₈	106
4-Bromofluorobenzene	99

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	25
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	BQL
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 – 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-10

File ID: T1423

Sample ID: 2-2M5-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-10

File ID: T1423

Sample ID: 2-2M5-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	1.81	1700	131

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-11

File ID: T1424

Sample ID: 2-2M6-F/B

Description: VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	91
Toluene-d ₈	105
4-Bromofluorobenzene	101

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	BQL
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	23
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	28
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	BQL
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 - 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-11

File ID: T1424

Sample ID: 2-2M6-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-11

File ID: T1424

Sample ID: 2-2M6-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	1.86	1100	131
alpha- Pinene	18.95	2200	136
Unknown cyclic hydrocarbon	19.61	470	—
Unknown cyclic hydrocarbon	20.53	610	—
1,7,7-Trimethylbicyclo[2.2.1]hept-2-ene	22.04	450	136

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-12

File ID: T1425

Sample ID: 2-2M9(10)-F/B

Description: VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	90
Toluene-d ₈	104
4-Bromofluorobenzene	95

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	BQL
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	BQL
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 – 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-12

File ID: T1425

Sample ID: 2-2M9(10)-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-12

File ID: T1425

Sample ID: 2-2M9(10)-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	1.81	1700	131
Methylmethylethylbenzene isomer	22.32	62	134

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-13

File ID: T1430

Sample ID: 2-2M9(20)-F/B

Description: VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	87
Toluene-d ₈	103
4-Bromofluorobenzene	98

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	BQL
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	23
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 - 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-13

File ID: T1430

Sample ID: 2-2M9(20)-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
cis-1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-13

File ID: T1430

Sample ID: 2-2M9(20)-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	1.82	1800	131

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-14

File ID: T1431

Sample ID: 2-2M9(30)-F/B

Description: VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	88
Toluene-d ₈	103
4-Bromofluorobenzene	96

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	BQL
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	25
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 – 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-14

File ID: T1431

Sample ID: 2-2M9(30)-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-14

File ID: T1431

Sample ID: 2-2M9(30)-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	1.85	1800	131

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-15

File ID: T1432

Sample ID: 2-2M9(40)-F

Description: VOST T/C only

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	89
Toluene-d ₈	103
4-Bromofluorobenzene	98

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	BQL
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	25
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 - 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-15

File ID: T1432

Sample ID: 2-2M9(40)-F

Description: VOST T/C
only

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-15

File ID: T1432

Sample ID: 2-2M9(40)-F

Description: VOST T/C
only

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	2.12	710	131

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-15

File ID: T1417

Sample ID: 2-2M9(40)-B

Description: VOST T/C only

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	87
Toluene-d ₈	105
4-Bromofluorobenzene	96

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	BQL
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	BQL
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 – 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-15

File ID: T1417

Sample ID: 2-2M9(40)-B

Description: VOST T/C
only

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-15

File ID: T1417

Sample ID: 2-2M9(40)-B

Description: VOST T/C
only

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	2.15	860	131

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-16

File ID: T1433

Sample ID: 2-2M13-F/B

Description: VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	92
Toluene-d ₈	104
4-Bromofluorobenzene	97

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	22
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	37
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 – 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-16

File ID: T1433

Sample ID: 2-2M13-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
cis-1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-16

File ID: T1433

Sample ID: 2-2M13-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	1.82	1900	131

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-17

File ID: T1434

Sample ID: 2-2M16-F/B

Description: VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	90
Toluene-d ₈	103
4-Bromofluorobenzene	95

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	30
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	BQL
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 – 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-17

File ID: T1434

Sample ID: 2-2M16-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-17

File ID: T1434

Sample ID: 2-2M16-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	1.80	1800	131

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-18

File ID: T1435

Sample ID: 2-2M21-F/B

Description: VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	92
Toluene-d ₈	103
4-Bromofluorobenzene	96

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	20
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	BQL
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 - 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-18

File ID: T1435

Sample ID: 2-2M21-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-18

File ID: T1435

Sample ID: 2-2M21-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	1.82	1700	131
Unknown cyclic hydrocarbon	18.12	16	—
Dimethyloctene	19.44	20	140

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-19

File ID: T1436

Sample ID: 2-2M22-F/B

Description: VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	92
Toluene-d ₈	104
4-Bromofluorobenzene	97

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	33
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	22
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	50
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	20
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 – 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-19

File ID: T1436

Sample ID: 2-2M22-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
cis-1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-19

File ID: T1436

Sample ID: 2-2M22-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	1.82	2000	131
(1-Methylethyl)benzene	20.55	28	120

GRASEBY NUTECH-RTL

Client:	RTP Environmental Associates	Received:	3/3/93
RTL ID:	93030302-20	File ID:	T1403
Sample ID:	2-2M28-F/B	Description:	VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	83
Toluene-d ₈	87
4-Bromofluorobenzene	57

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	BQL
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	BQL
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 260 – 13,000

BQL: Below Quantitation Limit

Split ratio= 1:13

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-20

File ID: T1403

Sample ID: 2-2M28-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

Split ratio= 1:13

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-20

File ID: T1403

Sample ID: 2-2M28-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Unknown hydrocarbon	1.79	6300	—
Unknown	19.28	22	—
Ethylmethylbenzene isomer	20.59	34	120
Unknown	21.58	21	—
Unknown	23.09	82	—

Split ratio= 1:13

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-21

File ID: T1437

Sample ID: 2-2M31-F/B

Description: VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	91
Toluene-d ₈	103
4-Bromofluorobenzene	94

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	BQL
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	BQL
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 – 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-21

File ID: T1437

Sample ID: 2-2M31-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
cis-1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-21

File ID: T1437

Sample ID: 2-2M31-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	1.80	1700	131

GRASEBY NUTECH-RTL

Client:	RTP Environmental Associates	Received:	3/3/93
RTL ID:	93030302-22	File ID:	T1438
Sample ID:	2-2M34-F/B	Description:	VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	94
Toluene-d ₈	104
4-Bromofluorobenzene	99

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	BQL
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	BQL
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 – 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-22

File ID: T1438

Sample ID: 2-2M34-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
cis-1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-22

File ID: T1438

Sample ID: 2-2M34-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	1.82	1400	131
Unknown cyclic hydrocarbon	5.44	27	—

GRASEBY NUTECH-RTL

Client:	RTP Environmental Associates	Received:	3/3/93
RTL ID:	93030302-23	File ID:	T1439
Sample ID:	2-2M37-F/B	Description:	VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	94
Toluene-d ₈	104
4-Bromofluorobenzene	97

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	20
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	BQL
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 – 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-23

File ID: T1439

Sample ID: 2-2M37-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether		ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		ND	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-23

File ID: T1439

Sample ID: 2-2M37-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	1.82	2000	131

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates
 RTL ID: 93030302-24
 Sample ID: 2-2M39-F/B

Received: 3/3/93
 File ID: T1440
 Description: VOST T/C pair

Surrogate Percent Recovery	
1,2-Dichloroethane-d ₄	93
Toluene-d ₈	104
4-Bromofluorobenzene	100

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
75-15-0	Carbon disulfide	BQL
75-09-2	Methylene chloride	BQL
156-60-5	<i>trans</i> -1,2-Dichloroethene	BQL
75-34-3	1,1-Dichloroethane	BQL
67-66-3	Chloroform	BQL
71-55-6	1,1,1-Trichloroethane	24
56-23-5	Carbon tetrachloride	BQL
71-43-2	Benzene	BQL
107-06-2	1,2-Dichloroethane	BQL
79-01-6	Trichloroethene	BQL
78-87-5	1,2-Dichloropropane	BQL
75-27-4	Bromodichloromethane	BQL
10061-01-5	<i>cis</i> -1,3-Dichloropropene	BQL
108-88-3	Toluene	BQL
10061-02-6	<i>trans</i> -1,3-Dichloropropene	BQL
79-00-5	1,1,2-Trichloroethane	BQL
127-18-4	Tetrachloroethene	BQL
124-48-1	Dibromochloromethane	BQL
108-90-7	Chlorobenzene	BQL
100-41-4	Ethylbenzene	BQL
1330-20-7	Xylene (total)	BQL
100-42-5	Styrene	BQL
75-25-2	Bromoform	BQL
79-34-5	1,1,2,2-Tetrachloroethane	BQL
541-73-1	1,3-Dichlorobenzene	BQL
106-46-7	1,4-Dichlorobenzene	BQL
95-50-11	1,2-Dichlorobenzene	BQL

Quantitation Range (ng): 20 – 1,000

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-24

File ID: T1440

Sample ID: 2-2M39-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
2-Chloroethyl vinyl ether	8.47	ND	106
Chlorotrifluoromethane (Freon 13)		ND	104
<i>cis</i> -1,2-Dichloroethene		ND	97
Benzaldehyde		ND	106
Vinyl acetate		ND	86
Acetone *		ND	58
2-Butanone *		75	72
4-Methyl-2-pentanone *		ND	100
2-Hexanone *		ND	100

ND: not detected

* : Compound not completely detectable due to the scan modification. Identification and subsequent quantitation is made with the available secondary ion response. See Narrative for more details.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates

Received: 3/3/93

RTL ID: 93030302-24

File ID: T1440

Sample ID: 2-2M39-F/B

Description: VOST T/C
pair

Tentatively Identified Compounds

Compound	Retention Time (minutes)	Results (ng)	Molecular Weight (AMU)
Xenon	1.83	1600	131
Unknown hydrocarbon	21.82	18	—

Endnotes:

- a: This amount is beyond the established calibration range. Linearity should not be assumed for results which greatly exceed the calibration range.
- b: Detector saturation or data dropout occurred during the elution of this compound. The actual amount of the compound in this sample is higher. Data dropout is a precursor to MS shutdown and run abortion.

CHAIN OF CUSTODY RECORD

Project ID: LKBOBL2-2		Project Name: 2nd Year, 2nd Qtr Soil/Amb Air						
Samplers: (Signature) <i>W. Scott Pully</i>		Number of Containers: 1						
Test ID	Sample ID	Date	Time	Sampling Location	A	B	C	Remarks
	2-2F1-F	3/1/93						X
	2-2F1-B							
	2-2M2-F							
	2-2M2-B							
	2-2M4-F							
	2-2M4-B							
	2-2M5-F							
	2-2M5-B							
	2-2M6-F							
	2-2M6-B							
	2-2M9(10)-F							
	2-2M9(10)-B							
	2-2M9(20)-F							
Relinquished By: (Signature) <i>W. Scott Pully</i>		Date/Time: 5-2-93 / 1630		Received By: (Signature)		Date/Time:		
Relinquished By: (Signature)		Date/Time:		Received By: (Signature)		Date/Time:		
Relinquished By: (Signature)		Date/Time:		Received By: (Signature) <i>Wayne Jones</i>		Date/Time: 3/3/93 10:00		
Remarks: * See laboratory instructions!								

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CHAIN OF CUSTODY RECORD

Project ID: LH308L2-2		Project Name: 2nd Year, 2nd Gr. Soil/Amb LF			
Samplers: (Signature) <i>N. Smith-Miller</i>		Number of Containers: 1			
Test ID	Sample ID	Date	Time	Sampling Location	Remarks
	2-2 M9(20)-B	3/1/93			*
	2-2 M9(30)-F				
	2-2 M9(30)-B				
	2-2 M9(40)-F				
	2-2 M9(40)-B				
	2-2 M13 2-2 M13-F				
	2-2 M13-B				
	2-2 M16-F				
	2-2 M16-B				
	2-2 M21-F				
	2-2 M21-B				
	2-2 M22-F				
	2-2 M22-B				
Relinquished By: (Signature) <i>N. Smith-Miller</i>		Date/Time: 3-2-93 16:30		Received By: (Signature)	
Relinquished By: (Signature)		Date/Time:		Received By: (Signature)	
Relinquished By: (Signature)		Date/Time:		Received By: (Signature) <i>Wayne Jones</i>	
Remarks: * See laboratory instructions!		Date/Time: 3/3/93 10 AM			

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CHAIN OF CUSTODY RECORD

Project ID: <u>LK608L2-2</u>		Project Name: <u>2nd Yr. 242 Qtr. Soil/Air LK</u>						
Samplers: (Signature) <u>M. Scott Miller</u>		Number of Containers: <u>1</u>						
Test ID	Sample ID	Date	Time	Sampling Location	A	B	C	Remarks
	2-2 M28-F	3/1/93						X
	2-2 M28-B							
	2-2 M31-F							
	2-2 M31-B							
	2-2 M34-F							
	2-2 M34-B							
	2-2 M37-F							
	2-2 M37-B							
	2-2 M39-F							
	2-2 M39-B							
	2-2 A1-F	3/2/93						
	2-2 A1-B							
	2-2 A2-F							
Relinquished By: (Signature) <u>M. Scott Miller</u>		Date/Time: <u>3/2/93 1630</u>		Received By: (Signature)		Date/Time:		
Relinquished By: (Signature)		Date/Time:		Received By: (Signature)		Date/Time:		
Relinquished By: (Signature)		Date/Time:		Received By: (Signature) <u>W. J. [Signature]</u>		Date/Time: <u>3/3/93 10 AM</u>		
Remarks: <u>* See laboratory instructions!</u>								
RTP ENVIRONMENTAL ASSOCIATES, INC. 400 Post Avenue, Suite 302, Westbury, NY 11590 (516) 333-4526								

CHAIN OF CUSTODY RECORD

Project ID: LKBOBL2-2		Project Name: 2nd Yr. 2nd Qtr. Soil/Amo LF	
Samplers: (Signature) <i>M. Holt Mills</i>		Number of Containers: 7	
Test ID	Sample ID	Date	Time
	2-2A2-B	3-2-93	
	2-2A3-F		
	2-2A3-B		
	2-2A4-F		
	2-2A4-B		
	2-2TB(A)		
	2-2TB(B)		
	2-2FB(A)		
	2-2FB(B)		
Relinquished By: (Signature) <i>M. Holt Mills</i>		Date/Time: 3-2-93 / 1630	Received By: (Signature)
Relinquished By: (Signature)		Date/Time:	Received By: (Signature)
Relinquished By: (Signature)		Date/Time:	Received By: (Signature) <i>Wayne Jones</i>
Remarks: * See Laboratory Instructions!		Date/Time: 3/3/93 10 AM	

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APPENDIX E
FIELD DATA FORMS

METEOROLOGICAL EQUIPMENT SITING DATA SHEET

Project: LKBOBL, 2nd Year, 2nd Qt.

Testing Date: { 3/1/93 all soil gas wells
& pressure wells
3/1/93 to 3/2/93 ambient
air sampling.

Project Site: Oyster Bay Landfill

Operators: New: RSM & JW

Old: KTS & MB

Instrument No.1 (old)
Location: Inside camping park w. of landfill, next to 2-2A1 ambient air sampling location. About 24 yard w. of SE gate of camp ground.
Initial Battery Voltage: 9.71
Wind Dir. Reference: Use compass to measure instrument north versus magnetic north, the angle is 24°
True WD = Measured WD + (11°)
Date & Julian Day to Set Up: 3/1/93 = 60
Start Time (Local): 0810 AM
Date & Julian Day to Take Down: 3/2/93 = 61
Stop Time (Local): ~ 12:48 PM
Remarks: ① Final Voltage = 12.6 ② Compass measured instrument north is 24° ③ Consider the local declination ($\sim 13^\circ$), the angle between true north & measured north is $24^\circ - 13^\circ = 11^\circ$

Instrument No.2 (new)
Location: Atop the landfill. north end of the landfill.
Initial Battery Voltage: 12.5
Wind Dir. Reference: ① instrument positioning is 13° for + to crossarm. ② instrument easterly wind is 246° instead of 90° .
True WD = Measured WD - (156°)
Date & Julian Day to Set Up: 2/26/93. Friday. 57 J. day.
Start Time (Local):
Date & Julian Day to Take Down: 3/2/93, Tuesday, J. day 61
Stop Time (Local): 13:13 PM
Remarks: ① Final Voltage = 12.3 ② instrument positioning is 13° by compass reading on crossarm side face. ③ instrument set at 246° instead of 90° for easterly wind, 336° for southerly wind, 66° for westerly wind. ④ from ②, instrument positioning is true north for side surface of crossarm. +  ⑤ from ③, the true WD is angled by $(246^\circ - 90^\circ) = 156^\circ$ to measured WD. ⑥ Final pressure sensor connection loose, affect data?

AMBIENT AIR SAMPLING DATA SHEET

2-2A1

Project: LKBORL 2-2

Date: 1-20-95

Project Site: LANDFILL

Operators: JOHN BUTLER

General Weather Conditions: CLEAR, COLD, MOD WIND

UPWIND AMBIENT CH

Sample ID: 2-2A1 RR1

Sample Location: 24 YDS W of SEGATE CHAN GROUND

Pump ID: RTP NY H

Nominal Flow Rate: 2.7 - 3m

Sampler ID: 2-2A

Nominal Sample Volume:

TUBE 893E-25(F) 893 D-25(B)

AMB T 30°F

Initial Ambient VOC Conc. (ppm): 0.0

Leak Check: OK

Sample Start Time: 0848

Initial Rotameter Reading, (Bottom of the Ball): 90

CTR

Rotameter Reading	Total Elapse Time	Local Time
<u>90</u>	<u>198</u>	<u>1200</u>
<u>90</u>	<u>200</u>	<u>1200</u>
<u>91</u>	<u>408</u>	<u>1528</u>
<u>90</u>	<u>486</u>	<u>1654</u>
<u>91</u>	<u>630</u>	<u>1918</u>
<u>91</u>	<u>824</u>	<u>2230</u>
<u>91</u>	<u>1097</u>	<u>0305</u>

Rotameter Reading	Total Elapse Time	Local Time
<u>91</u>	<u>1333</u>	<u>0701</u>
<u>92</u>	<u>1430</u>	<u>0841</u>

SW wind

LEAK CHECK OK

Sample Stop Time: 1440

Final Rotameter Reading: 91 0848

Total Elapse Time: 1440

Final Ambient VOC Conc. (ppm): 0.0

Box T 22°-50°F

Comments: <u>CUPS BARELY TURNING ON NET STA 2200</u>
<u>0300 SAME</u>
<u>0848 WINDS LIGHT WESTERLY</u>
<u>COOLER T 36-38°F</u>
<u>MIN MAX</u>

AMBIENT AIR SAMPLING DATA SHEET

Project: ER 607 2-2 Date: 1 May 93
 Project Site: LANDFILL Operators: SKIPKA, BUTLER
 General Weather Conditions: CLEAR, COOL, 1110 NW WIND

1600 WIND A113 (H)

Sample ID: 2A2F 2A2B PRI
 Pump ID: C
 Sampler ID: 2A2F 2A2B

Sample Location: SUGAR LAND FILL
 Nominal Flow Rate: 0.9 L/min
 Nominal Sample Volume:

893E-25F 893D-25B

AIRBT 32°F

Initial Ambient VOC Conc. (ppm): 0.0

Leak Check:

Sample Start Time: 0930 0930

Initial Rotameter Reading, (Bottom of the Ball): 90

OK

Rotameter Reading	Total Elapse Time	Local Time
94	166	1210
RESET 90	168	1218
90	350	1520
91	420	1630
90	574	1904
92	707	2218
92	1042	0252

Rotameter Reading	Total Elapse Time	Local Time
92	1281	0651
92	1416	0906

LEAK CHECK OK

Sample Stop Time: 1440 0930E

Final Rotameter Reading: 92

Total Elapse Time:

Final Ambient VOC Conc. (ppm): 0.0

2220E CALM

Comments:	<u>0640E CALM</u>	<u>Max 49°C</u>
	<u>0905E WEST WIND MODERATE</u>	<u>Min 37°F</u>

AMBIENT AIR SAMPLING DATA SHEET

Project: LRBBL 2-2 Date: 1 MAR 93
 Project Site: LAND FILL Operators: SKIPP BUTLER
 General Weather Conditions: CLEAR COLD MED NW WIND

2-2 A3
 Sample ID: SAF 3AB RR2 Sample Location: SLUGATE LANDFILL
 Pump ID: 4 Nominal Flow Rate: 0.07 Lpm
 Sampler ID: 803D 803D (4) Nominal Sample Volume: _____
DEWN WIND (LOW) 32° F

Initial Ambient VOC Conc. (ppm): 0.0
 Leak Check: _____
 Sample Start Time: 0930
 Initial Rotameter Reading, (Bottom of the Ball): 51
CTR

Rotameter Reading	Total Elapse Time	Local Time
54	118	1128
51	120	1130
51	169	1220
51	351	1521
51	419	1629
50	575	1905
50	768	2219

Rotameter Reading	Total Elapse Time	Local Time
50	1044	1254
50	1282	1652
51	1417	0907

Sample Stop Time: 0930E
 Final Rotameter Reading: 51
 Total Elapse Time: 1440
 Final Ambient VOC Conc. (ppm): 0.0

Box T 22-46°F

Comments: CALM AT 2220E
0600E CALM
0900E WEST WIND MODERATE

AMBIENT AIR SAMPLING DATA SHEET

Project: LKBOBL
 Project Site: LANDFILL
 General Weather Conditions: CLEAR COLD W WINDS LIGHT VARIABLE

Date: 1 MAR 93
 Operators: SKIPPAT BUTLER

Sample ID: 4
 Pump ID: DATA RRI
 Sampler ID: NONE

Sample Location: SOUTH OF E WALL INCLINER
 Nominal Flow Rate: 2.5 L/min
 Nominal Sample Volume:

893E-25(F) 893E-25(B)

T 30°F

Initial Ambient VOC Conc. (ppm): 0.0

Leak Check: OK

Sample Start Time: 0957

Initial Rotameter Reading, (Bottom of the Ball): 90

CTR

- 2 m/s

Rotameter Reading	Total Elapse Time	Local Time
<u>97.5</u>	<u>120</u>	<u>1153</u>
<u>RE 90</u>	<u>122</u>	<u>1200</u>
<u>89</u>	<u>341</u>	<u>1537</u>
<u>89</u>	<u>383</u>	<u>1620</u>
<u>88</u>	<u>539</u>	<u>1855</u>
<u>89</u>	<u>732</u>	<u>2208</u>
<u>88</u>	<u>1006</u>	<u>0243</u>

Rotameter Reading	Total Elapse Time	Local Time
<u>89</u>	<u>1243</u>	<u>0640</u>
<u>91</u>	<u>1436</u>	<u>0953</u>

LEAK CHECK

Sample Stop Time: 1140 1440 0957E

Final Rotameter Reading: 91

Total Elapse Time: 1440

Final Ambient VOC Conc. (ppm): 0.0

Box 20-47F

Comments: 2210 - CALM WIND - 0243 STILL CALM
0645E VERY LIGHT WIND

Soil Gas
AMBIENT AIR SAMPLING DATA SHEET

Project: LKBOBL 2-2
 Project Site: Oyster Bay Landfill
 General Weather Conditions: Sunny

Date: 3/1/93
 Operators: SM JLV
NW ~ 20°F → 30°F

Sample ID: 2-2 F1 F893A
 Pump ID: RR3 F893A
 Sampler ID: Soil Gas

Sample Location: F1
 Nominal Flow Rate: 0.9 ~ 1 L/min
 Nominal Sample Volume: 10 Liters

Initial Ambient VOC Conc. (ppm): 00
 Leak Check: OK
 Sample Start Time: 9:20 AM
 Initial Rotameter Reading, (Bottom of the Ball): 114 5 steel Ball

Rotameter Reading	Total Elapse Time	Local Time
B+SS 115	5 min	9:25 AM

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: 9:30 AM
 Final Rotameter Reading: B+SS 115
 Total Elapse Time: 10 min
 Final Ambient VOC Conc. (ppm): 00 ppm

Comments: Temp below 32°F, soil frozen.
Subsequently VOC and line VOC = 0.0 ppm
Colder temp prior to start 40°F

Soil Gas
AMBIENT AIR SAMPLING DATA SHEET

Project: LK303L 2-2

Date: 3/1/93

Project Site: Oyster Bay Landfill

Operators: SM JWS

General Weather Conditions: Sunny NW

Sample ID: 2-2 M2 B 891D

Sample Location: 112

Pump ID: RR3

Nominal Flow Rate: 1 L/min

Sampler ID: Soil Gas

Nominal Sample Volume: 10 liters

Initial ^{well} Ambient VOC Conc. (ppm): 0.0
Leak Check: OK
Sample Start Time: 9:45 AM
Initial Rotameter Reading, (Bottom of the Ball): 5.5 11.5

Rotameter Reading	Total Elapse Time	Local Time
<u>Before 119</u>	<u>5 min</u>	<u>9:50 AM</u>
<u>Turn RR3 down to 115</u>	<u>6 min</u>	<u>9:51 AM</u>

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: 9:55 AM
Final Rotameter Reading: 115 13 of 55
Total Elapse Time: 12 min
Final Ambient VOC Conc. (ppm): 0.0

Comments: 40°F in area cooler prior to start

~~AMBIENT AIR SAMPLING DATA SHEET~~

Soil Gas

Project: LKB0BL2-2

Date: 3/1/93

Project Site: Onsted Bay Landfill

Operators: SM NW

General Weather Conditions:

Sunny NW

Sample ID: 2-2M4

F893A
B x 931C

Sample Location: M4

Pump ID: RR3

Nominal Flow Rate: 1 cpm

Sampler ID: Soil Gas

Nominal Sample Volume: 100

Well (ppm): 2.0
Initial Ambient VOC Conc. (ppm): 2.0

Leak Check: OK

Sample Start Time: 10:07 AM

Initial Rotameter Reading, (Bottom of the Ball): 15 SS

Rotameter Reading	Total Elapse Time	Local Time
<u>115</u>	<u>5 M</u>	<u>10:12 A</u>

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: 10:17 AM

Final Rotameter Reading: 115 SS B

Total Elapse Time: 10 min

Final Ambient VOC Conc. (ppm): 2.0

Well 2.0

Comments:

40 F
on cost 2 100

AMBIENT AIR SAMPLING DATA SHEET

Soil Gas

Project: LK30BL2-2 Date: 3/1/93
 Project Site: On-site Bore Landfill Operators: SM JW
 General Weather Conditions: Clear Sampling NW

Sample ID: 2-2M5 B593C Sample Location: M5
 Pump ID: RR3 F893C Nominal Flow Rate: 1 Lpm
 Sampler ID: Soil Gas Nominal Sample Volume: 10 L

Well
 Initial Ambient VOC Conc. (ppm): 0.0
 Leak Check: OK
 Sample Start Time: 10:25 AM
 Initial Rotameter Reading, (Bottom of the Ball): 115 g. 55

Rotameter Reading	Total Elapse Time	Local Time

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: 10:35 AM
 Final Rotameter Reading: 118
 Total Elapse Time: 10 min
 Final Ambient VOC Conc. (ppm): 0.0
Well ppm): 0.0

Comments: frozen soil, particularly covered by snow.
3/1/93 10:35 AM

AMBIENT AIR SAMPLING DATA SHEET

Soil Gas

Project: LKB&BL 2-2
 Project Site: Custer Bay Landfill
 General Weather Conditions: Smoggy, MS

Date: 3/1/93
 Operators: SM JWS

Sample ID: 2-2M6 F 893C
B 393C
 Pump ID: RR3
 Sampler ID: Soil Gas

Sample Location: M6
 Nominal Flow Rate: 1.2 l/min
 Nominal Sample Volume: 10 l

W20 6.4
 Initial Ambient VOC Conc. (ppm): 0.0
 Leak Check: OK
 Sample Start Time: 10 49 AM
 Initial Rotameter Reading, (Bottom of the Ball): 115 BASS

Rotameter Reading	Total Elapse Time	Local Time

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: 10 59 AM
 Final Rotameter Reading: 115
 Total Elapse Time: 10 min
 Final Ambient VOC Conc. (ppm): 0.0
W20 0.0

Comments: 42°F @ 10 49 M6 was unstable at 8 30 AM 3/1/93

AMBIENT AIR SAMPLING DATA SHEET

Soil Gas

Project: LKB0BL 2-2

Date: 3/1/93

Project Site: On the Bay Landfill

Operators: SM JM

General Weather Conditions: Sunny NW

Sample ID: 2-2 M13 F 893 C
B 893 C

Sample Location: M13

Pump ID: RR3

Nominal Flow Rate: 1 Lpm

Sampler ID: Soil Gas

Nominal Sample Volume: 10 L

well

Initial Ambient VOC Conc. (ppm): 0.0
0.0

Leak Check: OK

Sample Start Time: 1110 Am

Initial Rotameter Reading, (Bottom of the Ball): 115 B 4 SS

Rotameter Reading	Total Elapse Time	Local Time

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: 1120 Am

Final Rotameter Reading: 115

Total Elapse Time: 10 min

Final Ambient VOC Conc. (ppm): 0.0

well (ppm): 0.0

Comments: Diff. Trace activity while setting up, 38°F cooler temp
(moderate leak)

AMBIENT AIR SAMPLING DATA SHEET

Soil Gas

Project: LKBDL 2-2

Date: 3/1/93

Project Site: Byster Bay Landfill

Operators: SM JMT

General Weather Conditions: Sunny AM

2-2M9(10) F 893A

Sample ID: ~~2-2M16~~ B 893A

Pump ID: RR3

Sampler ID: Soil Gas

Sample Location: ~~116~~ M9(10) Blue

Nominal Flow Rate: 1.0 cfm

Nominal Sample Volume: 10 L

Well (PPM): 0.0
Initial Ambient VOC Conc. (ppm): 0.0

Leak Check: OK

Sample Start Time: 1145 AM

Initial Rotameter Reading, (Bottom of the Ball): 115 Bubbles

Rotameter Reading	Total Elapse Time	Local Time

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: 1155 AM

Final Rotameter Reading: 118

Total Elapse Time: 10 min

Final Ambient VOC Conc. (ppm): 0.0

Well (PPM): 0.2

Comments: Condition the well for 15 min at start using rotameter (SKC @ 1.2 cfm) 35°F local

AMBIENT AIR SAMPLING DATA SHEET

Soil Gas

Project: LKBOBL 2-2

Date: 3/1/93

Project Site: Austin Bay Landfill

Operators: 3m Jw

General Weather Conditions: Sunny NW

Sample ID: 2-2M9(20)

F-393A

G-393A

Sample Location: M9(20') Green

Pump ID: RR3

Nominal Flow Rate:

Sampler ID:

Nominal Sample Volume: 10 L

Initial Ambient VOC Conc. (ppm): 0.6
Well (ppm): 0.0

Leak Check: OK

Sample Start Time: 1200 noon

Initial Rotameter Reading, (Bottom of the Ball): 115 Buf SS

Rotameter Reading	Total Elapse Time	Local Time

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: 1210 PM
Final Rotameter Reading: 115
Total Elapse Time: 10 min
Final Ambient VOC Conc. (ppm): 0.0
Well (ppm): 0.8

Comments: condition well for 3' 38°F water temp

AMBIENT AIR SAMPLING DATA SHEET

Soil Gas

Project: LKB03L 2-2 Date: 3/1/93
Project Site: Oyster Bay Landfill Operators: SM JMW
General Weather Conditions: Sunny NW

Sample ID: 2-2 M4(30) F 8:30A B 8:30A Sample Location: M4(30') Ref
Pump ID: RR3 Nominal Flow Rate: 12pm
Sampler ID: Soil Gas Nominal Sample Volume: 10L

Well (PPM): 0.2
Initial Ambient VOC Conc. (ppm): 0.0
Leak Check: OK
Sample Start Time: 1214
Initial Rotameter Reading, (Bottom of the Ball): 115 B. JSS

Rotameter Reading	Total Elapse Time	Local Time

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: 1224
Final Rotameter Reading: 115
Total Elapse Time: 10min
Final Ambient VOC Conc. (ppm): 0.0
Well (PPM): 1.3

Comments: location well for 4.5 min 38-39°F cooler temp

AMBIENT AIR SAMPLING DATA SHEET

Soil Gas

Project: LKBBL 2-2 Date: 3/1/93
Project Site: Crater Bay Landfill Operators: SM JM
General Weather Conditions: Sunny NW

Sample ID: 2-2M9(40) F 8930 B 893B Sample Location: M9(40') yellow
Pump ID: RR3 Nominal Flow Rate: 1 ipm
Sampler ID: Soil Gas Nominal Sample Volume: 10 l

Initial Ambient VOC Conc. (ppm): 2.0
Leak Check: OK
Sample Start Time: 1230
Initial Rotameter Reading, (Bottom of the Ball): 115 Buf SS

Rotameter Reading	Total Elapse Time	Local Time

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: 1240
Final Rotameter Reading: 115
Total Elapse Time: 10 min
Final Ambient VOC Conc. (ppm): 2.0
W200 (ppm): 1.8

Comments: concentration was for 10 min, 35°F cooler temp

AMBIENT AIR SAMPLING DATA SHEET

Soil Gas

Project: LK30BL 2-2 Date: 3/1/93
Project Site: Buster Bay Landfill Operators: SM SM
General Weather Conditions: Bunny PM

Sample ID: 2-2M16 F 393A
Pump ID: RR3 B 393B
Sampler ID: Soil Gas Sample Location: M16
Nominal Flow Rate: 1 lpm
Nominal Sample Volume: 10 l

Initial Ambient VOC Conc. (ppm): Well (PPM): 1.5
Leak Check: OK
Sample Start Time: 1252 PM
Initial Rotameter Reading, (Bottom of the Ball): 115 B. f. 55

Rotameter Reading	Total Elapse Time	Local Time

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: 1302
Final Rotameter Reading: 115
Total Elapse Time: 10 min
Final Ambient VOC Conc. (ppm): 0.0
Well (PPM): 2 - 1.2

Comments: Temp. 37°F under temp

AMBIENT AIR SAMPLING DATA SHEET

Soil Gas

Project: LKBOBL2-2 Date: 3/1/93
Project Site: Buster Bay Landfill Operators: sm jrw
General Weather Conditions: Sunny 10:15

Sample ID: 2-2M37 F 893B Sample Location: M37
Pump ID: RR3 B 893B Nominal Flow Rate: 1.0 l/min
Sampler ID: Soil Gas Nominal Sample Volume: 10'l

Well (ppm): 0.0
Initial Ambient VOC Conc. (ppm): 0.0
Leak Check: OK
Sample Start Time: 1347 pm
Initial Rotameter Reading, (Bottom of the Ball): 115 13455

Rotameter Reading	Total Elapse Time	Local Time

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: 1357 pm
Final Rotameter Reading: 115
Total Elapse Time: 10 min
Final Ambient VOC Conc. (ppm): 0.0
Well C.C (ppm) 0.0

Comments: 11:45 F cooler
11:45

AMBIENT AIR SAMPLING DATA SHEET

Soil Gas

Project: LK B B R L 2-2

Date: 3/1/93

Project Site: Eastern Bay Landfill

Operators: sm jm

General Weather Conditions: Sunny NW

Sample ID: 2-2M 34 F 393B
B 893B

Sample Location: M 34

Pump ID: RR 3

Nominal Flow Rate: 1 cfm

Sampler ID: Soil Gas

Nominal Sample Volume: 10 L

well (ppm): 0.0
Initial Ambient VOC Conc. (ppm): 0.0
Leak Check: OK
Sample Start Time: 2:14 PM
Initial Rotameter Reading, (Bottom of the Ball): 115 B4SS

Rotameter Reading	Total Elapse Time	Local Time
118	2:17 PM →	

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: 2:24 PM
Final Rotameter Reading: 115 B4SS
Total Elapse Time: 10 min
Final Ambient VOC Conc. (ppm): 0.0
well (ppm):

Comments: cooler temp = 42°F

AMBIENT AIR SAMPLING DATA SHEET

Soil Gas

(14)

Project: LKBEBL2-2 Date: 3/1/93
 Project Site: Mystic Bay Landfill Operators: SM MR
 General Weather Conditions: Sunny NW

Sample ID: 2-2M28 F 393B Sample Location: M28
 Pump ID: RR3 Nominal Flow Rate: 1.2 pm
 Sampler ID: Soil Gas Nominal Sample Volume: 10 L

Initial Ambient VOC Conc. (ppm): well 2.0
 Leak Check: 1C
 Sample Start Time: 2:37 pm
 Initial Rotameter Reading, (Bottom of the Ball): 115 B-f SS

Rotameter Reading	Total Elapse Time	Local Time

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: 2:47 pm
 Final Rotameter Reading:
 Total Elapse Time: 10 min
 Final Ambient VOC Conc. (ppm): 3.0
well (ppm): 9.7

Comments: Cooler Temp 62°F

AMBIENT AIR SAMPLING DATA SHEET

Soil Gas

(16)

Project: LK30BL 2-2 Date: 3/1/93
 Project Site: Oyster Bay Landfill Operators: SM JM
 General Weather Conditions: Sunny MV

Sample ID: 2-2 M21 F 8930 Sample Location: M21
 Pump ID: PR3 Nominal Flow Rate: 1.2 pm
 Sampler ID: Soil Gas Nominal Sample Volume: 10L

well Initial Ambient VOC Conc. (ppm): 0.0
 Leak Check: OK
 Sample Start Time: 3:40 pm
 Initial Rotameter Reading, (Bottom of the Ball): 115 Bottom

Rotameter Reading	Total Elapse Time	Local Time

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: 3:50 pm
 Final Rotameter Reading: 115
 Total Elapse Time: 10 min
 Final Ambient VOC Conc. (ppm): 0.0
well (ppm): 0.0

Comments: Cooler temp 47°F

AMBIENT AIR SAMPLING DATA SHEET

Soil Gas

(17)

Project: LIC30BL 2-2 Date: 3/1/93
 Project Site: Custer Bay Landfill Operators: SM JW
 General Weather Conditions: Sunny NW

Sample ID: 2-2/M22 F 13:30 Sample Location: M22
 Pump ID: RR3 Nominal Flow Rate: 1.0 L/min
 Sampler ID: Soil Gas Nominal Sample Volume: 10 L

M22
 Initial Ambient VOC Conc. (ppm): 0.0
 Leak Check: OK
 Sample Start Time: 4:00 P
 Initial Rotameter Reading, (Bottom of the Ball): 115 B-455

Rotameter Reading	Total Elapse Time	Local Time

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: 4:10 PM
 Final Rotameter Reading: 115
 Total Elapse Time: 10 min
 Final Ambient VOC Conc. (ppm): 0.0 B-455
well 1 ppm 0.0

Comments: ambient temp. 48°F

AMBIENT AIR SAMPLING DATA SHEET

Soil Gas

Project: LKBBBL 2-2

Date: 3/1/93

Project Site: Oyster Bay Landfill

Operators: SM JW

General Weather Conditions:

Sunny 125

Sample ID: 2-2M39

F1391D

Sample Location:

M39

Pump ID: RR3

Nominal Flow Rate:

1 lpm

Sampler ID: Soil Gas

Nominal Sample Volume:

10 L

Well (ppm): 0.0
Initial Ambient VOC Conc. (ppm): 0.0

Leak Check: OK

Sample Start Time: 420 PM

Initial Rotameter Reading, (Bottom of the Ball): 105 B-f SS

Rotameter Reading	Total Elapse Time	Local Time

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: 430 PM

Final Rotameter Reading: 105 B-f SS

Total Elapse Time: 10 min

Final Ambient VOC Conc. (ppm): 0.0

Well (ppm): 0.0

Comments: Cooler temp 48°F

AMBIENT AIR SAMPLING DATA SHEET

Project: _____ Date: _____
Project Site: _____ Operators: _____
General Weather Conditions: _____

Sample ID: 2-2 TB(A) 3931 Sample Location: _____
Pump ID: _____ Nominal Flow Rate: _____
Sampler ID: _____ Nominal Sample Volume: _____

Initial Ambient VOC Conc. (ppm): _____
Leak Check: _____
Sample Start Time: _____
Initial Rotameter Reading, (Bottom of the Ball): _____

Rotameter Reading	Total Elapse Time	Local Time

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: _____
Final Rotameter Reading: _____
Total Elapse Time: _____
Final Ambient VOC Conc. (ppm): _____

Comments: Exet shipping tube at IN 3

AMBIENT AIR SAMPLING DATA SHEET

Project: _____ Date: _____
Project Site: _____ Operators: _____
General Weather Conditions: _____

Sample ID: 2-2 TB (13) 393D Sample Location: _____
Pump ID: _____ Nominal Flow Rate: _____
Sampler ID: _____ Nominal Sample Volume: _____

Initial Ambient VOC Conc. (ppm): _____
Leak Check: _____
Sample Start Time: _____
Initial Rotameter Reading, (Bottom of the Ball): _____

Rotameter Reading	Total Elapse Time	Local Time

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: _____
Final Rotameter Reading: _____
Total Elapse Time: _____
Final Ambient VOC Conc. (ppm): _____

Comments: label stripping tube at m3

21

AMBIENT AIR SAMPLING DATA SHEET

Project: _____
Project Site: _____
General Weather Conditions: _____

Date: _____
Operators: _____

Sample ID: 2-2FB(A) 891D
Pump ID: _____
Sampler ID: _____

Sample Location: _____
Nominal Flow Rate: _____
Nominal Sample Volume: _____

Initial Ambient VOC Conc. (ppm): _____
Leak Check: _____
Sample Start Time: _____
Initial Rotameter Reading, (Bottom of the Ball): _____

Rotameter Reading	Total Elapse Time	Local Time

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: _____
Final Rotameter Reading: _____
Total Elapse Time: _____
Final Ambient VOC Conc. (ppm): _____

Comments: collect final blank at m39, 10~15"

22

AMBIENT AIR SAMPLING DATA SHEET

Project: _____ Date: _____
 Project Site: _____ Operators: _____
 General Weather Conditions: _____

Sample ID: 2-276(6) 8⁹11) _____ Sample Location: _____
 Pump ID: _____ Nominal Flow Rate: _____
 Sampler ID: _____ Nominal Sample Volume: _____

Initial Ambient VOC Conc. (ppm): _____
 Leak Check: _____
 Sample Start Time: _____
 Initial Rotameter Reading, (Bottom of the Ball): _____

Rotameter Reading	Total Elapse Time	Local Time

Rotameter Reading	Total Elapse Time	Local Time

Sample Stop Time: _____
 Final Rotameter Reading: _____
 Total Elapse Time: _____
 Final Ambient VOC Conc. (ppm): _____

Comments: collect field blank at m39 10"-15" time fence)

Soil Gas Pressure

METEOROLOGICAL EQUIPMENT SITING DATA SHEET

Project: LAFCBL 1 MAR 93

Project Site: CAND FILL AMB PRES 29.99 1015E

Operators: SKIPKA, BUTZER

Instrument No.1 (old)	
Location:	
Initial Battery Voltage:	
Wind Dir. Reference:	
True WD = Measured WD +/- () =	
Date & Julian Day to Set Up:	
Start Time (Local):	
~~Date & Julian Day to Take Down:~~	
Stop Time (Local): <u>11035E</u>	
Remarks: <u>PW 2</u> <u>WELL PRESSURE</u>	
GRN	-0.08 $-0.02 = \text{ZERO}$
BLUE	-0.07 $-0.01 = \text{ZERO}$
<u>1135E</u>	
GRN	-0.07 0
BLUE	-0.01 -0.01
Fireman's Training Center →	
1535 1530	

Instrument No.2 (new)	
Location:	
Initial Battery Voltage:	
Wind Dir. Reference:	
True WD = Measured WD +/- () =	
Date & Julian Day to Set Up:	
Start Time (Local):	
Date & Julian Day to Take Down:	
Stop Time (Local):	
Remarks: <u>PW 1</u> <u>1045E</u> <u>WELL PRESSURE</u>	
BLUE	-0.09 $-0.02 = \text{ZERO}$ -0.07
GRN	-0.05 $+0.02 = \text{ZERO}$ -0.07
<u>1120E</u>	
GRN	-0.08 -0.01 = ZERO -0.07
<u>BLUE</u>	
<u>1125E</u>	
GRN	-0.03 $+0.01 = \text{ZERO}$ -0.04
<u>RED</u>	
GRN (-0.26" H ₂ O) -0.26 1532	
RED (-0.18" H ₂ O) -0.18 1535	

APPENDIX F
EQUIPMENT CALIBRATIONS

PUMP CALIBRATION SHEET

Project: LHRBL-2 Pre

Date: 2/17/93

Time: 1400-1422

Pump ID: E R21 A14

Barometric Pressure, (Pb): 29.90 (in-Hg)

Temperature, (T): 21.1°C (F)

Operator: 125421

_____ Pic _____
sit on the
a street

[illegible]

(C)	(In-Hg)
15	0.50
16	0.54
17	0.57
18	0.61
19	0.65
20	0.69
21	0.73
22	0.78
23	0.83
24	0.88
25	0.94
26	0.99
27	1.06
28	1.12
29	1.18
30	1.25
31	1.33
32	1.40

Remarks:

Remarks:

PUMP CALIBRATION SHEET

Project: LH 50812-2 Post

Date: 4/13/93

Time: 0930 - 0943

Pump ID: E 1321 H-16

Barometric Pressure, (Pb): 29.92 (in-Hg)

Temperature, (T): 70 (21.1C) (F)

Operator: RSM

| — Post — |

stainless steel

Rotameter Reading (Bottom of the Ball)			
85	95		
Sampling Medium			
Actual Liters Per Minutes, ALPM			
0.704	0.793		
0.704	0.793		
0.704	0.794		
0.705	0.794		
0.706	0.794		
0.706	0.794		
0.706	0.794		
0.706	0.794		
0.706	0.794		
0.706	0.794		
Avg(ALPM)			
0.705	0.794		
Average Standard Liters Per Minute, Avg(SLPM)			
$SLPM = ALPM \times \left[\left(\frac{Pb - Pv}{29.92} \right) \times \left[\frac{293}{(273 + T)} \right] \right]$ $C = (5/9) \times (F - 32)$			

(C)	(In-Hg)
15	0.50
16	0.54
17	0.57
18	0.61
19	0.65
20	0.69
21	0.73
22	0.78
23	0.83
24	0.88
25	0.94
26	0.99
27	1.06
28	1.12
29	1.18
30	1.25
31	1.33
32	1.40

Remarks:

Remarks:

PUMP CALIBRATION SHEET

Project: LK303L2-2 Pro

Date: 2/17/93

Time: 1115 - 1140

Pump ID: 4 / RR2 low flow

Barometric Pressure, (Pb): 27.98 (in-Hg)

Temperature, (T): 70 (21.1°C) (F)

Operator: 2SM

Rotameter Reading (Bottom of the Ball)					
45	51	56			
Sampling Medium					
2-T/C					
Actual Liters Per Minutes, ALPM					
0.0586	0.0705	0.0811			
0.0586	0.0705	0.0818			
0.0586	0.0705	0.0816			
0.0586	0.0705	0.0815			
0.0586	0.0705	0.0816			
0.0586	0.0705	0.0814			
0.0586	0.0705	0.0817			
0.0586	0.0705	0.0817			
0.0586	0.0705	0.0819			
0.0586	0.0705	0.0818			
Avg(ALPM)					
0.0586	0.0705	0.0816			
Average Standard Liters Per Minute, Avg(SLPM)					

SLPM = ALPM x {[(Pb-Pv)/29.92] x [293/(273+T)]}

C = (5/9) x (F-32)

(C)	(In-Hg)
15	0.50
16	0.54
17	0.57
18	0.61
19	0.65
20	0.69
21	0.73
22	0.78
23	0.83
24	0.88
25	0.94
26	0.99
27	1.06
28	1.12
29	1.18
30	1.25
31	1.33
32	1.40

Remarks:

Remarks:

PUMP CALIBRATION SHEET

Project: LKBCBL2-2 Post

Date: 4/13/93

Time: 1057-1120

Pump ID: E RR2 w/low flow module

Barometric Pressure, (Pb): 29.62 (in-Hg)

Temperature, (T): 70°F (21.1°C) (F)

Operator: RSM

1- Post -1

black

Rotameter Reading (Bottom of the Ball)					
45	55				
Sampling Medium					
Actual Liters Per Minutes, ALPM					
0.0585	0.0794				
0.0585	0.0794				
0.0585	0.0795				
0.0585	0.0795				
0.0585	0.0795				
0.0585	0.0795				
0.0585	0.0795				
0.0585	0.0796				
0.0585	0.0795				
0.0585	0.0796				
Avg(ALPM)					
0.0585	0.0795				
Average Standard Liters Per Minute, Avg(SLPM)					

$$SLPM = ALPM \times \left(\left[\frac{Pb - Pv}{29.92} \right] \times \left[\frac{293}{(273 + T)} \right] \right)$$

$$C = (5/9) \times (F - 32)$$

(C)	(In-Hg)
15	0.50
16	0.54
17	0.57
18	0.61
19	0.65
20	0.69
21	0.73
22	0.78
23	0.83
24	0.88
25	0.94
26	0.99
27	1.06
28	1.12
29	1.18
30	1.25
31	1.33
32	1.40

Remarks:

Remarks:

PUMP CALIBRATION SHEET

Project: L3CB62-2 Pre

Date: 2/17/93

Time: 1320 - 1347

Pump ID: E R23 High Flow

Barometric Pressure, (Pb): 29.98 (in-Hg)

Temperature, (T): 70 (21.1C) (F)

Operator: RS001

Die $\xrightarrow{\text{stärkungs}}$ steel

Rotameter Reading (Bottom of the Ball)					
70	80	90	100	110	120
Sampling Medium					
Actual Liters Per Minutes, ALPM					
0.588	0.681	0.771	0.863	0.971	
0.590	0.681	0.772	0.863	0.966	
0.590	0.683	0.772	0.865	0.967	
0.589	0.682	0.772	0.860	0.964	
0.589	0.683	0.770	0.860	0.968	
0.592	0.683	0.770	0.860	0.966	
0.592	0.683	0.770	0.865	0.966	
0.592	0.683	0.770	0.865	0.970	
0.590	0.683	0.771	0.867	0.966	
0.590	0.683	0.771	0.867	0.966	
Avg(ALPM)					
0.590	0.683	0.771	0.863	0.967	
Average Standard Liters Per Minute, Avg(SLPM)					
$SLPM = ALPM \times \left(\left[\frac{(P_b - P_v)}{29.92} \right] \times \left[\frac{293}{(273 + T)} \right] \right)$ $C = (5/9) \times (F - 32)$					

(C)	(in-Hg)
15	0.50
16	0.54
17	0.57
18	0.61
19	0.65
20	0.69
21	0.73
22	0.78
23	0.83
24	0.88
25	0.94
26	0.99
27	1.06
28	1.12
29	1.18
30	1.25
31	1.33
32	1.40

Remarks:

Remarks:

PUMP CALIBRATION SHEET

Project: 411R0862-2 Post
Date: 4/13/93
Time: 1128 - 1149
Pump ID: E DR3 High flow

Barometric Pressure, (Pb): 29.92 (in-Hg)
 Temperature, (T): 70°F (21.1°C) (F)
 Operator: psm

|-Post-|

stainless steel

Rotameter Reading (Bottom of the Ball)			
105	120		
Sampling Medium			
Actual Liters Per Minutes, ALPM			
0.871	1.08		
0.873	1.08		
0.873	1.08		
0.873	1.08		
0.873	1.08		
0.874	1.08		
0.874	1.08		
0.874	1.08		
0.874	1.08		
Avg(ALPM)			
0.873	1.08		
Average Standard Liters Per Minute, Avg(SLPM)			
$SLPM = ALPM \times \left(\left[\frac{P_b - P_v}{29.92} \right] \times \left[\frac{293}{(273 + T)} \right] \right)$ $C = (5/9) \times (F - 32)$			

(C)	(In-Hg)
15	0.50
16	0.54
17	0.57
18	0.61
19	0.65
20	0.69
21	0.73
22	0.78
23	0.83
24	0.88
25	0.94
26	0.99
27	1.06
28	1.12
29	1.18
30	1.25
31	1.33
32	1.40

Remarks:

Remarks:

APPENDIX G
METEOROLOGICAL MONITORING DATA

METEOROLOGICAL EQUIPMENT SITING DATA SHEET

Project: LKBOBL, 2nd Year, 2nd Qt.

Testing Date: { 3/1/93 all soil gas well
\$ pressure wells
3/1/93 to 3/2/93 ambient
air sampling.

Project Site: Oyster Bay Landfill

Operators: New: RSM & JW

Old: KTS & MB

Instrument No.1 (old)
Location: Inside camping park w. of landfill, next to 2-2A1 ambient air sampling location. About 24 yard w. of SE gate of camp ground.
Initial Battery Voltage: 9.71
Wind Dir. Reference: Use compass to measure instrument north versus magnetic north, the angle is 24°
True WD = Measured WD + (11°)
Date & Julian Day to Set Up: 3/1/93 = 60
Start Time (Local): 0810 AM
Date & Julian Day to Take Down: 3/2/93 = 61
Stop Time (Local): ~12:48 PM
Remarks: ① Final voltage = 12.6 ② Compass measured instrument north is 24° ③ Consider the local declination ($\sim 13^\circ$), the angle between true north & measured north is $24^\circ - 13^\circ = 11^\circ$

Instrument No.2 (new)
Location: Atop the landfill. north end of the landfill.
Initial Battery Voltage: 12.5
Wind Dir. Reference: ① instrument positioning is 13° for $\perp$ to crossarm. ② instrument easterly wind is 246° instead of 90°
True WD = Measured WD - (156°)
Date & Julian Day to Set Up: 2/26/93. Friday. 57 J.day.
Start Time (Local):
Date & Julian Day to Take Down: 3/2/93, Tuesday, J.day 61
Stop Time (Local): 13:13 PM
Remarks: ① Final voltage = 12.3 ② instrument positioning is 13° by compass reading on crossarm side face. ③ instrument set at 246° instead of 90° for easterly wind, 336° for southerly wind, 66° for westerly wind. ④ from ②, instrument positioning is true north for side surface of crossarm $\times$  ⑤ from ③, the true WD is angled by $(246^\circ - 90^\circ) = 156^\circ$ to measured WD. ⑥ Found pressure sensor connected loose. affect data?

1+0109.	02+0048.	03+0930.	04+0.571	05+089.7	06+34.64	07+0.018	08+072.9
9+ .31	10+29.77	11+0.000	12+12.89				
1+ 09.	02+0048.	03+0945.	04+0.500	05+089.1	06+0.000	07+0.018	08+073.2
9+ .37	10+29.78	11+0.000	12+12.85				
1+0109.	02+0048.	03+1000.	04+0.500	05+089.0	06+0.000	07+0.017	08+073.2
9+29.87	10+29.78	11+0.000	12+12.89				
1+ 21.	02+0048.	03+1000.	04+0.518	05+087.3	06+17.08	07+0.018	08+072.6
9+ .59	10+29.77	11+0.010	12+12.88				
1+ 09.	02+0048.	03+1015.	04+0.500	05+088.6	06+0.108	07+0.016	08+073.5
9+ .53	10+29.79	11+0.000	12+12.90				
1+ .59.	02+0048.	03+1030.	04+0.500	05+28.98	06+40.83	07+0.052	08+62.57
9+ 523	10+29.79	11+0.000	12+12.89				
1+ 09.	02+0048.	03+1045.	04+0.500	05+3.209	06+0.000	07+0.013	08-60.42
9-269.3	10+29.80	11+0.000	12+12.89				
1+0109.	02+0048.	03+1100.	04+0.500	05+3.205	06+0.000	07+0.011	08-60.40
9-249.2	10+29.80	11+0.000	12+12.88				
1+ 21.	02+0048.	03+1100.	04+0.500	05+28.86	06+41.24	07+0.068	08+3.805
9- .5.1	10+29.80	11+0.000	12+12.89				
1+0109.	02+0048.	03+1115.	04+0.500	05+3.199	06+0.000	07+0.011	08-60.41
9-269.2	10+29.81	11+0.000	12+12.87				
1+ .09.	02+0048.	03+1130.	04+0.500	05+3.193	06+0.000	07+0.008	08-60.40
9- 9.2	10+29.81	11+0.000	12+12.87				
1+ .09.	02+0048.	03+1145.	04+0.500	05+3.194	06+0.000	07+0.008	08-60.42
9-269.2	10+29.81	11+0.000	12+12.88				
1+0109.	02+0048.	03+1200.	04+0.500	05+3.192	06+0.000	07+0.009	08-60.41
9- .7.2	10+29.82	11+0.000	12+12.88				
1+ 21.	02+0048.	03+1200.	04+0.500	05+3.194	06+0.000	07+0.009	08-60.41
9- .09.2	10+29.81	11+0.000	12+12.88				
1+0109.	02+0048.	03+1215.	04+0.500	05+3.193	06+0.000	07+0.009	08-60.41
9-269.2	10+29.82	11+0.000	12+12.88				
1+ .09.	02+0048.	03+1230.	04+0.500	05+3.195	06+0.000	07+0.023	08-60.42
9- .7.2	10+29.81	11+0.000	12+12.89				
1+ .09.	02+0048.	03+1245.	04+0.500	05+3.194	06+0.000	07+0.028	08-60.42
9-269.2	10+29.81	11+0.000	12+12.88				
1+0109.	02+0048.	03+1300.	04+0.500	05+3.192	06+0.000	07+0.007	08-60.42
9- .7.2	10+29.82	11+0.000	12+12.87				
1+ .31.	02+0048.	03+1300.	04+0.500	05+3.193	06+0.000	07+0.034	08-60.42
9- .09.2	10+29.81	11+0.000	12+12.88				
1+0109.	02+0048.	03+1315.	04+0.500	05+3.194	06+0.000	07+0.008	08-60.41
9-269.2	10+29.82	11+0.000	12+12.87				
1+ .09.	02+0048.	03+1330.	04+0.500	05+3.193	06+0.000	07+0.009	08-60.40
9- .7.3	10+29.83	11+0.000	12+12.86				
1+ .09.	02+0048.	03+1345.	04+0.500	05+3.198	06+0.000	07+0.010	08-60.40
9-269.3	10+29.83	11+0.000	12+12.86				
1+0109.	02+0048.	03+1400.	04+0.500	05+3.194	06+0.000	07+0.012	08-60.40
9- .7.3	10+29.83	11+0.000	12+12.86				
1+ .09.	02+0048.	03+1400.	04+0.500	05+3.195	06+0.000	07+0.010	08-60.40
9-269.2	10+29.83	11+0.000	12+12.86				
1+0109.	02+0048.	03+1415.	04+0.500	05+3.193	06+0.000	07+0.036	08-60.41
9-269.2	10+29.83	11+0.000	12+12.86				
1+ .09.	02+0048.	03+1430.	04+0.500	05+3.195	06+0.000	07+0.022	08-60.41
9-269.2	10+29.84	11+0.000	12+12.86				
1+0109.	02+0048.	03+1445.	04+0.500	05+3.200	06+0.000	07+0.013	08-60.41
9-269.2	10+29.85	11+0.000	12+12.86				
1+ .09.	02+0048.	03+1500.	04+0.500	05+3.205	06+0.000	07+0.012	08-60.41
9-269.2	10+29.85	11+0.000	12+12.86				
1+ .09.	02+0048.	03+1500.	04+0.500	05+3.198	06+0.000	07+0.028	08-60.41
9-269.2	10+29.84	11+0.000	12+12.86				
1+0109.	02+0048.	03+1515.	04+0.500	05+3.206	06+0.000	07+0.012	08-60.41
9-269.2	10+29.86	11+0.000	12+12.86				
1+ .09.	02+0048.	03+1530.	04+0.500	05+3.205	06+0.000	07+0.012	08-60.41
9-269.2	10+29.85	11+0.000	12+12.87				
1+0109.	02+0048.	03+1545.	04+0.500	05+3.201	06+0.000	07+0.011	08-60.42
9-269.2	10+29.86	11+0.000	12+12.87				
1+ .09.	02+0048.	03+1600.	04+0.500	05+3.199	06+0.000	07+0.016	08-60.42
9-269.2	10+29.86	11+0.000	12+12.87				
1+ .09.	02+0048.	03+1600.	04+0.500	05+3.203	06+0.000	07+0.013	08-60.41
9-269.2	10+29.86	11+0.000	12+12.87				
1+0109.	02+0048.	03+1615.	04+0.500	05+3.197	06+0.000	07+0.034	08-60.43
9-269.2	10+29.86	11+0.000	12+12.88				
1+ .09.	02+0048.	03+1630.	04+0.500	05+3.195	06+0.000	07+0.027	08-60.42
9-269.2	10+29.86	11+0.000	12+12.90				
1+0109.	02+0048.	03+1645.	04+0.500	05+3.193	06+0.000	07+0.012	08-60.42
9-269.2	10+29.87	11+0.000	12+12.89				
1+ .09.	02+0048.	03+1700.	04+0.500	05+3.195	06+0.000	07+0.013	08-60.42
9-269.2	10+29.88	11+0.000	12+12.88				
1+0109.	02+0048.	03+1700.	04+0.500	05+3.195	06+0.000	07+0.025	08-60.42
9-269.2	10+29.87	11+0.000	12+12.89				
1+ .09.	02+0048.	03+1715.	04+0.500	05+3.194	06+0.000	07+0.013	08-60.42
9-269.2	10+29.88	11+0.000	12+12.88				
1+ .09.	02+0048.	03+1730.	04+0.500	05+3.195	06+0.000	07+0.017	08-60.42
9-269.2	10+29.88	11+0.000	12+12.89				
1+ .09.	02+0048.	03+1745.	04+0.500	05+3.195	06+0.000	07+0.035	08-60.42
9-269.2	10+29.88	11+0.000	12+12.88				
1+ .09.	02+0048.	03+1800.	04+0.500	05+3.197	06+0.000	07+0.012	08-60.42
9-269.2	10+29.88	11+0.000	12+12.87				
1+0109.	02+0048.	03+1800.	04+0.500	05+3.195	06+0.000	07+0.034	08-60.42
9-269.2	10+29.88	11+0.000	12+12.88				
1+ .09.	02+0048.	03+1815.	04+0.500	05+3.198	06+0.000	07+0.009	08-60.42

2-2 Top. dat

(3/2/93)

Collected atop the landfill

w/ new met equipment.

soil gas wells and pressure

wells were done on 3/1/93

July 2nd 60. The met tower

was taken down the next

day. WD data need adj.

09+37.59	10+14.03	11+0.000	12+12.28				
01+0109.	02+0059.	03+2130.	04+11.29	05+128.1	06+11.96	07+0.085	08+27.80
09+38.14	10+14.03	11+0.000	12+12.28				
01+0109.	02+0059.	03+2145.	04+11.35	05+127.9	06+11.52	07+0.090	08+27.44
09+38.66	10+14.03	11+0.000	12+12.27				
01+0109.	02+0059.	03+2200.	04+12.31	05+126.8	06+12.78	07+0.078	08+27.22
09+39.05	10+14.03	11+0.000	12+12.27				
01+0121.	02+0059.	03+2200.	04+11.45	05+128.7	06+12.77	07+0.087	08+27.61
09+38.36	10+14.03	11+0.000	12+12.28				
01+0109.	02+0059.	03+2215.	04+12.21	05+123.4	06+11.59	07+0.084	08+26.96
09+39.34	10+14.03	11+0.000	12+12.27				
01+0109.	02+0059.	03+2230.	04+12.08	05+120.5	06+12.48	07+0.093	08+26.73
09+39.82	10+14.03	11+0.000	12+12.27				
01+0109.	02+0059.	03+2245.	04+10.61	05+116.7	06+10.24	07+0.082	08+26.44
09+40.03	10+14.03	11+0.000	12+12.27				
01+0109.	02+0059.	03+2300.	04+11.95	05+122.6	06+11.23	07+0.084	08+26.20
09+40.03	10+14.03	11+0.000	12+12.27				
01+0121.	02+0059.	03+2300.	04+11.71	05+120.8	06+11.70	07+0.087	08+26.58
09+39.81	10+14.03	11+0.000	12+12.27				
01+0109.	02+0059.	03+2315.	04+10.77	05+118.8	06+11.06	07+0.080	08+25.81
09+40.10	10+14.03	11+0.000	12+12.27				
01+0109.	02+0059.	03+2330.	04+11.41	05+113.2	06+10.90	07+0.071	08+25.61
09+40.28	10+14.03	11+0.000	12+12.26				
01+0109.	02+0059.	03+2345.	04+12.22	05+106.5	06+08.32	07+0.069	08+25.35
09+40.32	10+14.03	11+0.000	12+12.26				
01+0109.	02+0059.	03+2400.	04+11.24	05+107.3	06+09.37	07+0.075	08+25.11
09+40.31	10+14.03	11+0.000	12+12.26				
01+0121.	02+0059.	03+2400.	04+11.41	05+111.4	06+11.15	07+0.074	08+25.47
09+40.25	10+14.03	11+0.000	12+12.26				
01+0109.	02+0060.	03+0015.	04+12.07	05+107.9	06+10.24	07+0.068	08+24.94
09+40.32	10+14.03	11+0.000	12+12.26				
01+0109.	02+0060.	03+0030.	04+12.19	05+108.7	06+09.66	07+0.068	08+24.75
09+40.19	10+14.03	11+0.000	12+12.26				
01+0109.	02+0060.	03+0045.	04+11.98	05+111.6	06+10.31	07+0.081	08+24.48
09+40.17	10+14.03	11+0.000	12+12.26				
01+0109.	02+0060.	03+0100.	04+12.31	05+109.7	06+09.99	07+0.079	08+24.19
09+40.02	10+14.03	11+0.000	12+12.25				
01+0121.	02+0060.	03+0100.	04+12.14	05+109.5	06+10.15	07+0.074	08+24.59
09+40.17	10+14.03	11+0.000	12+12.26				
01+0109.	02+0060.	03+0115.	04+12.00	05+111.7	06+10.40	07+0.084	08+23.89
09+40.07	10+14.03	11+0.000	12+12.25				
01+0109.	02+0060.	03+0130.	04+13.41	05+111.5	06+12.49	07+0.083	08+23.75
09+40.03	10+14.03	11+0.000	12+12.25				
01+0109.	02+0060.	03+0145.	04+12.20	05+113.3	06+11.82	07+0.085	08+23.56
09+39.75	10+14.03	11+0.000	12+12.25				
01+0109.	02+0060.	03+0200.	04+14.50	05+113.5	06+11.58	07+0.083	08+23.41
09+39.49	10+14.03	11+0.000	12+12.25				
01+0121.	02+0060.	03+0200.	04+13.02	05+112.5	06+11.63	07+0.085	08+23.65
09+39.84	10+14.03	11+0.000	12+12.25				
01+0109.	02+0060.	03+0215.	04+13.49	05+109.1	06+10.94	07+0.085	08+23.12
09+39.25	10+14.03	11+0.000	12+12.25				
01+0109.	02+0060.	03+0230.	04+11.97	05+119.2	06+14.74	07+0.094	08+22.85
09+39.12	10+14.03	11+0.000	12+12.25				
01+0109.	02+0060.	03+0245.	04+10.07	05+125.1	06+14.41	07+0.107	08+22.53
09+39.05	10+14.03	11+0.000	12+12.24				
01+0109.	02+0060.	03+0300.	04+12.56	05+123.0	06+11.50	07+0.081	08+22.47
09+38.95	10+14.03	11+0.000	12+12.24				
01+0121.	02+0060.	03+0300.	04+12.02	05+119.1	06+14.38	07+0.093	08+22.74
09+39.09	10+14.03	11+0.000	12+12.24				
01+0109.	02+0060.	03+0315.	04+12.20	05+116.7	06+11.69	07+0.082	08+22.34
09+38.64	10+14.03	11+0.000	12+12.24				
01+0109.	02+0060.	03+0330.	04+11.71	05+115.9	06+12.46	07+0.088	08+22.23
09+38.23	10+14.03	11+0.000	12+12.24				
01+0109.	02+0060.	03+0345.	04+11.50	05+106.2	06+12.69	07+0.073	08+21.91
09+38.13	10+14.03	11+0.000	12+12.24				
01+0109.	02+0060.	03+0400.	04+12.31	05+120.7	06+12.63	07+0.085	08+21.61
09+38.35	10+14.03	11+0.000	12+12.23				
01+0121.	02+0060.	03+0400.	04+11.93	05+114.9	06+13.46	07+0.083	08+22.02
09+38.34	10+14.03	11+0.000	12+12.24				
01+0109.	02+0060.	03+0415.	04+12.87	05+122.3	06+12.61	07+0.086	08+21.55
09+38.35	10+14.03	11+0.000	12+12.23				
01+0109.	02+0060.	03+0430.	04+10.57	05+116.0	06+11.42	07+0.090	08+21.29
09+38.35	10+14.03	11+0.000	12+12.23				
01+0109.	02+0060.	03+0445.	04+10.75	05+113.5	06+12.11	07+0.099	08+21.04
09+38.35	10+14.03	11+0.000	12+12.23				
01+0109.	02+0060.	03+0500.	04+10.19	05+125.6	06+12.72	07+0.087	08+20.86
09+38.40	10+14.03	11+0.000	12+12.23				
01+0121.	02+0060.	03+0500.	04+11.10	05+119.3	06+13.14	07+0.091	08+21.18
09+38.36	10+14.03	11+0.000	12+12.23				
01+0109.	02+0060.	03+0515.	04+10.23	05+125.9	06+13.23	07+0.094	08+20.67
09+38.75	10+14.03	11+0.000	12+12.23				
01+0109.	02+0060.	03+0530.	04+11.58	05+105.2	06+13.93	07+0.080	08+20.65
09+39.19	10+14.03	11+0.000	12+12.23				
01+0109.	02+0060.	03+0545.	04+11.03	05+101.0	06+08.97	07+0.071	08+20.14
09+39.89	10+14.03	11+0.000	12+12.23				
01+0109.	02+0060.	03+0600.	04+10.03	05+098.4	06+09.10	07+0.072	08+19.86
09+40.46	10+14.03	11+0.000	12+12.23				
01+0121.	02+0060.	03+0600.	04+10.72	05+107.5	06+15.79	07+0.081	08+20.33
09+39.58	10+14.03	11+0.000	12+12.23				

01+0109.	02+0060.	03+0615.	04+09.98	05+100.9	06+09.87	07+0.079	08+19.74
09+40.91	10+14.03	11+0.000	12+12.23				
01+0109.	02+0060.	03+0630.	04+11.27	05+106.1	06+10.16	07+0.076	08+19.82
09+41.28	10+14.03	11+0.000	12+12.22				
01+0109.	02+0060.	03+0645.	04+11.55	05+107.6	06+09.95	07+0.084	08+19.97
09+41.39	10+14.03	11+0.000	12+12.22				
01+0109.	02+0060.	03+0700.	04+10.96	05+102.8	06+09.88	07+0.072	08+20.02
09+41.65	10+14.03	11+0.000	12+12.22				
01+0121.	02+0060.	03+0700.	04+10.94	05+104.3	06+10.31	07+0.078	08+19.89
09+41.31	10+14.03	11+0.000	12+12.22				
01+0109.	02+0060.	03+0715.	04+11.95	05+103.0	06+10.35	07+0.073	08+19.88
09+42.18	10+14.03	11+0.000	12+12.22				
01+0109.	02+0060.	03+0730.	04+11.39	05+106.0	06+10.07	07+0.070	08+19.95
09+42.77	10+14.03	11+0.000	12+12.22				
01+0109.	02+0060.	03+0745.	04+11.26	05+107.0	06+11.12	07+0.080	08+20.29
09+43.26	10+14.03	11+0.000	12+12.23				
01+0109.	02+0060.	03+0800.	04+12.41	05+111.9	06+11.94	07+0.085	08+20.84
09+43.73	10+14.03	11+0.000	12+12.23				
01+0121.	02+0060.	03+0800.	04+11.76	05+106.9	06+11.35	07+0.078	08+20.24
09+42.98	10+14.03	11+0.000	12+12.22				
01+0109.	02+0060.	03+0815.	04+13.29	05+107.5	06+12.39	07+0.076	08+21.51
09+44.03	10+14.03	11+0.000	12+12.23				
01+0109.	02+0060.	03+0830.	04+14.41	05+113.8	06+12.36	07+0.082	08+22.14
09+44.18	10+14.03	11+0.000	12+12.23				
01+0109.	02+0060.	03+0845.	04+12.56	05+110.8	06+14.27	07+0.077	08+23.09
09+44.31	10+14.03	11+0.000	12+12.24				
01+0109.	02+0060.	03+0900.	04+13.15	05+108.1	06+13.31	07+0.080	08+23.86
09+44.31	10+14.03	11+0.000	12+12.24				
01+0121.	02+0060.	03+0900.	04+13.35	05+110.1	06+13.34	07+0.079	08+22.65
09+44.21	10+14.03	11+0.000	12+12.24				
01+0109.	02+0060.	03+0915.	04+15.54	05+110.9	06+11.87	07+0.085	08+24.58
09+44.25	10+14.03	11+0.000	12+12.25				
01+0109.	02+0060.	03+0930.	04+15.65	05+122.8	06+15.99	07+0.078	08+25.37
09+44.26	10+14.03	11+0.000	12+12.26				
01+0109.	02+0060.	03+0945.	04+15.07	05+114.9	06+13.40	07+0.086	08+26.11
09+44.17	10+14.03	11+0.000	12+12.27				
01+0109.	02+0060.	03+1000.	04+15.21	05+115.7	06+13.22	07+0.075	08+26.68
09+43.65	10+14.03	11+0.000	12+12.27				
01+0121.	02+0060.	03+1000.	04+15.36	05+116.0	06+14.34	07+0.081	08+25.68
09+44.08	10+14.03	11+0.000	12+12.26				
01+0109.	02+0060.	03+1015.	04+14.04	05+120.4	06+13.85	07+0.083	08+27.34
09+43.03	10+14.03	11+0.000	12+12.28				
01+0109.	02+0060.	03+1030.	04+13.84	05+110.0	06+15.69	07+0.078	08+28.10
09+42.51	10+14.03	11+0.000	12+12.29				
01+0109.	02+0060.	03+1045.	04+12.34	05+110.1	06+16.95	07+0.076	08+28.69
09+42.07	10+14.03	11+0.000	12+12.29				
01+0109.	02+0060.	03+1100.	04+11.76	05+111.6	06+17.51	07+0.078	08+29.75
09+41.62	10+14.03	11+0.000	12+12.31				
01+0121.	02+0060.	03+1100.	04+12.99	05+113.0	06+16.62	07+0.079	08+28.47
09+42.31	10+14.03	11+0.000	12+12.29				
01+0109.	02+0060.	03+1115.	04+11.64	05+137.9	06+17.37	07+0.087	08+30.68
09+40.99	10+14.03	11+0.000	12+12.31				
01+0109.	02+0060.	03+1130.	04+13.83	05+114.4	06+12.63	07+0.076	08+31.25
09+39.99	10+14.03	11+0.000	12+12.32				
01+0109.	02+0060.	03+1145.	04+13.54	05+116.2	06+18.96	07+0.077	08+31.54
09+39.14	10+14.03	11+0.000	12+12.33				
01+0109.	02+0060.	03+1200.	04+11.48	05+097.2	06+19.21	07+0.075	08+32.00
09+38.90	10+14.03	11+0.000	12+12.34				
01+0121.	02+0060.	03+1200.	04+12.62	05+116.4	06+22.44	07+0.080	08+31.37
09+39.76	10+14.03	11+0.000	12+12.32				
01+0109.	02+0060.	03+1215.	04+11.54	05+095.2	06+15.56	07+0.088	08+32.33
09+38.58	10+14.03	11+0.000	12+12.34				
01+0109.	02+0060.	03+1230.	04+12.58	05+097.6	06+20.01	07+0.074	08+32.34
09+38.18	10+14.03	11+0.000	12+12.35				
01+0109.	02+0060.	03+1245.	04+10.88	05+095.5	06+17.49	07+0.078	08+32.37
09+38.15	10+14.03	11+0.000	12+12.35				
01+0109.	02+0060.	03+1300.	04+11.25	05+085.8	06+18.39	07+0.086	08+32.39
09+38.13	10+14.03	11+0.000	12+12.35				
01+0121.	02+0060.	03+1300.	04+11.56	05+093.5	06+18.49	07+0.082	08+32.36
09+38.26	10+14.03	11+0.000	12+12.35				
01+0109.	02+0060.	03+1315.	04+12.30	05+089.9	06+15.08	07+0.073	08+32.54
09+37.71	10+14.03	11+0.000	12+12.35				
01+0109.	02+0060.	03+1330.	04+11.75	05+086.6	06+21.27	07+0.082	08+33.18
09+37.82	10+14.03	11+0.000	12+12.35				
01+0109.	02+0060.	03+1345.	04+12.42	05+093.6	06+13.84	07+0.070	08+33.78
09+37.87	10+14.03	11+0.000	12+12.35				
01+0109.	02+0060.	03+1400.	04+11.84	05+111.3	06+11.96	07+0.078	08+34.29
09+37.46	10+14.03	11+0.000	12+12.36				
01+0121.	02+0060.	03+1400.	04+12.08	05+095.4	06+18.52	07+0.077	08+33.45
09+37.72	10+14.03	11+0.000	12+12.35				
01+0109.	02+0060.	03+1415.	04+12.81	05+099.6	06+12.80	07+0.072	08+34.86
09+36.89	10+14.02	11+0.000	12+12.36				
01+0109.	02+0060.	03+1430.	04+11.40	05+096.8	06+12.99	07+0.072	08+35.11
09+36.60	10+14.03	11+0.000	12+12.37				
01+0109.	02+0060.	03+1445.	04+10.34	05+092.7	06+16.33	07+0.075	08+35.96
09+36.37	10+14.03	11+0.000	12+12.37				
01+0109.	02+0060.	03+1500.	04+10.37	05+094.8	06+22.00	07+0.072	08+36.19
09+35.94	10+14.03	11+0.000	12+12.37				
01+0121.	02+0060.	03+1500.	04+11.23	05+096.0	06+16.61	07+0.075	08+35.53

collective stops
 low-silhouette



09+36.45	10+14.03	11+0.000	12+12.37				
01+0109.	02+0060.	03+1515.	04+10.30	05+087.3	06+16.06	07+0.079	08+36.25
09+35.66	10+14.03	11+0.000	12+12.37				
01+0109.	02+0060.	03+1530.	04+08.53	05+088.0	06+18.04	07+0.081	08+37.24
09+35.24	10+14.03	11+0.000	12+12.37				
01+0109.	02+0060.	03+1545.	04+08.57	05+081.3	06+21.17	07+0.080	08+37.93
09+34.58	10+14.02	11+0.000	12+12.37				
01+0109.	02+0060.	03+1600.	04+6.514	05+074.7	06+19.34	07+0.114	08+38.57
09+34.16	10+14.03	11+0.000	12+12.37				
01+0121.	02+0060.	03+1600.	04+08.48	05+082.9	06+19.48	07+0.093	08+37.50
09+34.91	10+14.03	11+0.000	12+12.37				
01+0109.	02+0060.	03+1615.	04+08.64	05+54.25	06+14.58	07+0.089	08+38.89
09+33.73	10+14.03	11+0.000	12+12.37				
01+0109.	02+0060.	03+1630.	04+10.07	05+65.24	06+12.03	07+0.070	08+38.71
09+33.32	10+14.03	11+0.000	12+12.37				
01+0109.	02+0060.	03+1645.	04+07.68	05+078.1	06+12.10	07+0.074	08+38.74
09+33.19	10+14.03	11+0.000	12+12.37				
01+0109.	02+0060.	03+1700.	04+6.703	05+073.3	06+11.09	07+0.062	08+38.43
09+33.21	10+14.03	11+0.000	12+12.37				
01+0121.	02+0060.	03+1700.	04+08.27	05+67.77	06+15.40	07+0.079	08+38.69
09+33.36	10+14.03	11+0.000	12+12.37				
01+0109.	02+0060.	03+1715.	04+4.797	05+63.38	06+21.32	07+0.096	08+38.22
09+33.44	10+14.02	11+0.000	12+12.36				
01+0109.	02+0060.	03+1730.	04+5.324	05+13.78	06+10.69	07+0.050	08+36.78
09+36.46	10+14.03	11+0.000	12+12.35				
01+0109.	02+0060.	03+1745.	04+6.271	05+65.97	06+13.55	07+0.056	08+37.00
09+38.10	10+14.03	11+0.000	12+12.34				
01+0109.	02+0060.	03+1800.	04+6.346	05+62.91	06+6.683	07+0.037	08+36.67
09+37.99	10+14.03	11+0.000	12+12.33				
01+0121.	02+0060.	03+1800.	04+5.685	05+51.98	06+26.00	07+0.075	08+37.17
09+36.50	10+14.03	11+0.000	12+12.35				
01+0109.	02+0060.	03+1815.	04+4.844	05+51.64	06+08.10	07+0.036	08+36.12
09+38.49	10+14.03	11+0.000	12+12.32				
01+0109.	02+0060.	03+1830.	04+4.003	05+42.81	06+6.993	07+0.032	08+35.60
09+38.98	10+14.03	11+0.000	12+12.31				
01+0109.	02+0060.	03+1845.	04+6.550	05+48.43	06+5.340	07+0.055	08+35.35
09+39.78	10+14.03	11+0.000	12+12.31				
01+0109.	02+0060.	03+1900.	04+09.29	05+51.55	06+6.241	07+0.052	08+35.16
09+41.18	10+14.03	11+0.000	12+12.30				
01+0121.	02+0060.	03+1900.	04+6.173	05+48.61	06+07.64	07+0.076	08+35.56
09+39.61	10+14.03	11+0.000	12+12.31				
01+0109.	02+0060.	03+1915.	04+09.73	05+52.17	06+6.488	07+0.048	08+35.37
09+42.02	10+14.03	11+0.000	12+12.30				
01+0109.	02+0060.	03+1930.	04+10.91	05+55.48	06+5.708	07+0.046	08+35.58
09+42.18	10+14.03	11+0.000	12+12.29				
01+0109.	02+0060.	03+1945.	04+10.98	05+56.93	06+6.954	07+0.052	08+35.50
09+42.51	10+14.03	11+0.000	12+12.29				
01+0109.	02+0060.	03+2000.	04+10.10	05+52.60	06+07.00	07+0.056	08+35.48
09+43.25	10+14.03	11+0.000	12+12.28				
01+0121.	02+0060.	03+2000.	04+10.43	05+54.30	06+6.851	07+0.051	08+35.48
09+42.49	10+14.03	11+0.000	12+12.29				
01+0109.	02+0060.	03+2015.	04+12.41	05+56.24	06+6.013	07+0.054	08+35.73
09+44.06	10+14.03	11+0.000	12+12.28				
01+0109.	02+0060.	03+2030.	04+09.59	05+54.20	06+07.10	07+0.053	08+35.51
09+44.80	10+14.03	11+0.000	12+12.28				
01+0109.	02+0060.	03+2045.	04+08.88	05+54.08	06+5.501	07+0.042	08+35.24
09+45.57	10+14.03	11+0.000	12+12.27				
01+0109.	02+0060.	03+2100.	04+6.948	05+54.37	06+5.604	07+0.041	08+34.77
09+46.34	10+14.03	11+0.000	12+12.27				
01+0121.	02+0060.	03+2100.	04+09.46	05+54.72	06+6.150	07+0.057	08+35.31
09+45.19	10+14.03	11+0.000	12+12.27				
01+0109.	02+0060.	03+2115.	04+6.977	05+57.04	06+4.551	07+0.036	08+34.61
09+47.10	10+14.03	11+0.000	12+12.27				
01+0109.	02+0060.	03+2130.	04+07.07	05+57.02	06+5.399	07+0.035	08+34.51
09+47.75	10+14.03	11+0.000	12+12.27				
01+0109.	02+0060.	03+2145.	04+07.32	05+56.25	06+4.486	07+0.034	08+34.44
09+48.35	10+14.03	11+0.000	12+12.27				
01+0109.	02+0060.	03+2200.	04+07.06	05+60.21	06+5.438	07+0.035	08+34.22
09+48.94	10+14.03	11+0.000	12+12.26				
01+0121.	02+0060.	03+2200.	04+07.11	05+57.63	06+5.216	07+0.035	08+34.44
09+48.04	10+14.03	11+0.000	12+12.27				
01+0109.	02+0060.	03+2215.	04+07.06	05+51.59	06+4.708	07+0.032	08+34.05
09+49.68	10+14.03	11+0.000	12+12.26				
01+0109.	02+0060.	03+2230.	04+07.99	05+56.71	06+5.736	07+0.039	08+34.29
09+50.35	10+14.03	11+0.000	12+12.26				
01+0109.	02+0060.	03+2245.	04+07.18	05+073.9	06+6.617	07+0.051	08+34.63
09+50.54	10+14.03	11+0.000	12+12.26				
01+0109.	02+0060.	03+2300.	04+07.31	05+076.1	06+6.550	07+0.045	08+34.30
09+50.79	10+14.03	11+0.000	12+12.26				
01+0121.	02+0060.	03+2300.	04+07.39	05+64.58	06+12.17	07+0.043	08+34.32
09+50.34	10+14.03	11+0.000	12+12.26				
01+0109.	02+0060.	03+2315.	04+08.24	05+076.1	06+07.30	07+0.039	08+34.12
09+51.20	10+14.03	11+0.000	12+12.25				
01+0109.	02+0060.	03+2330.	04+08.38	05+092.9	06+5.885	07+0.038	08+34.03
09+51.38	10+14.02	11+0.000	12+12.25				
01+0109.	02+0060.	03+2345.	04+08.61	05+090.2	06+6.345	07+0.053	08+33.62
09+51.60	10+14.03	11+0.000	12+12.25				
01+0109.	02+0060.	03+2400.	04+07.28	05+079.3	06+08.87	07+0.061	08+33.26
09+51.86	10+14.03	11+0.000	12+12.25				

01+0121.	02+0060.	03+2400.	04+08.13	05+084.6	06+10.09	07+0.051	08+33.75
09+51.51	10+14.03	11+0.000	12+12.25				
01+0109.	02+0061.	03+0015.	04+6.648	05+072.2	06+09.85	07+0.059	08+32.72
09+52.29	10+14.03	11+0.000	12+12.25				
01+0109.	02+0061.	03+0030.	04+6.428	05+073.4	06+6.986	07+0.041	08+32.26
09+52.96	10+14.03	11+0.000	12+12.25				
01+0109.	02+0061.	03+0045.	04+5.592	05+67.47	06+11.17	07+0.039	08+32.15
09+53.48	10+14.03	11+0.000	12+12.25				
01+0109.	02+0061.	03+0100.	04+07.36	05+085.8	06+3.897	07+0.036	08+32.39
09+53.67	10+14.03	11+0.000	12+12.25				
01+0121.	02+0061.	03+0100.	04+6.507	05+074.8	06+10.82	07+0.053	08+32.38
09+53.10	10+14.03	11+0.000	12+12.25				
01+0109.	02+0061.	03+0115.	04+6.934	05+085.4	06+6.382	07+0.032	08+32.52
09+53.50	10+14.03	11+0.000	12+12.24				
01+0109.	02+0061.	03+0130.	04+5.286	05+070.0	06+6.399	07+0.032	08+32.29
09+53.44	10+14.03	11+0.000	12+12.24				
01+0109.	02+0061.	03+0145.	04+5.295	05+64.29	06+07.08	07+0.033	08+31.82
09+53.81	10+14.03	11+0.000	12+12.24				
01+0109.	02+0061.	03+0200.	04+6.576	05+54.58	06+4.037	07+0.038	08+31.91
09+54.05	10+14.03	11+0.000	12+12.24				
01+0121.	02+0061.	03+0200.	04+6.023	05+68.55	06+12.72	07+0.043	08+32.13
09+53.70	10+14.03	11+0.000	12+12.24				
01+0109.	02+0061.	03+0215.	04+5.677	05+52.17	06+3.764	07+0.027	08+32.05
09+53.97	10+14.03	11+0.000	12+12.24				
01+0109.	02+0061.	03+0230.	04+5.522	05+47.86	06+3.873	07+0.025	08+31.82
09+53.95	10+14.03	11+0.000	12+12.24				
01+0109.	02+0061.	03+0245.	04+6.823	05+51.26	06+4.479	07+0.024	08+32.02
09+53.95	10+14.03	11+0.000	12+12.23				
01+0109.	02+0061.	03+0300.	04+6.843	05+48.22	06+3.461	07+0.024	08+31.75
09+54.07	10+14.03	11+0.000	12+12.23				
01+0121.	02+0061.	03+0300.	04+6.216	05+49.88	06+4.336	07+0.028	08+31.91
09+53.99	10+14.03	11+0.000	12+12.24				
01+0109.	02+0061.	03+0315.	04+6.546	05+45.69	06+4.498	07+0.025	08+31.32
09+54.72	10+14.02	11+0.000	12+12.23				
01+0109.	02+0061.	03+0330.	04+5.168	05+47.18	06+5.493	07+0.027	08+31.13
09+55.90	10+14.03	11+0.000	12+12.23				
01+0109.	02+0061.	03+0345.	04+4.593	05+49.03	06+4.053	07+0.024	08+30.66
09+57.24	10+14.03	11+0.000	12+12.23				
01+0109.	02+0061.	03+0400.	04+4.176	05+61.09	06+5.952	07+0.019	08+30.55
09+58.41	10+14.03	11+0.000	12+12.23				
01+0121.	02+0061.	03+0400.	04+5.121	05+50.73	06+07.91	07+0.032	08+30.92
09+56.57	10+14.03	11+0.000	12+12.23				
01+0109.	02+0061.	03+0415.	04+4.316	05+66.48	06+4.659	07+0.025	08+30.68
09+59.16	10+14.03	11+0.000	12+12.23				
01+0109.	02+0061.	03+0430.	04+4.066	05+076.2	06+6.704	07+0.040	08+30.66
09+60.02	10+14.03	11+0.000	12+12.23				
01+0109.	02+0061.	03+0445.	04+3.933	05+072.2	06+10.25	07+0.033	08+30.67
09+60.77	10+14.03	11+0.000	12+12.23				
01+0109.	02+0061.	03+0500.	04+4.682	05+078.5	06+11.95	07+0.038	08+30.54
09+61.50	10+14.03	11+0.000	12+12.23				
01+0121.	02+0061.	03+0500.	04+4.249	05+073.3	06+09.96	07+0.041	08+30.64
09+60.36	10+14.03	11+0.000	12+12.23				
01+0109.	02+0061.	03+0515.	04+5.262	05+083.2	06+07.84	07+0.046	08+30.09
09+61.84	10+14.03	11+0.000	12+12.22				
01+0109.	02+0061.	03+0530.	04+07.24	05+079.0	06+07.40	07+0.032	08+29.99
09+62.55	10+14.03	11+0.000	12+12.22				
01+0109.	02+0061.	03+0545.	04+07.22	05+69.65	06+3.876	07+0.030	08+29.59
09+63.44	10+14.03	11+0.000	12+12.22				
01+0109.	02+0061.	03+0600.	04+07.18	05+071.7	06+3.661	07+0.029	08+29.78
09+64.47	10+14.03	11+0.000	12+12.22				
01+0121.	02+0061.	03+0600.	04+6.723	05+075.9	06+08.13	07+0.041	08+29.86
09+63.08	10+14.03	11+0.000	12+12.22				
01+0109.	02+0061.	03+0615.	04+07.35	05+66.07	06+3.844	07+0.026	08+29.60
09+65.34	10+14.03	11+0.000	12+12.22				
01+0109.	02+0061.	03+0630.	04+6.848	05+61.64	06+3.080	07+0.023	08+29.28
09+66.54	10+14.03	11+0.000	12+12.22				
01+0109.	02+0061.	03+0645.	04+6.414	05+67.35	06+4.426	07+0.024	08+29.47
09+67.56	10+14.03	11+0.000	12+12.22				
01+0109.	02+0061.	03+0700.	04+6.550	05+54.76	06+07.43	07+0.026	08+29.67
09+68.32	10+14.03	11+0.000	12+12.22				
01+0121.	02+0061.	03+0700.	04+6.791	05+62.47	06+6.991	07+0.028	08+29.51
09+66.94	10+14.03	11+0.000	12+12.22				
01+0109.	02+0061.	03+0715.	04+5.874	05+46.21	06+5.020	07+0.031	08+29.60
09+69.11	10+14.03	11+0.000	12+12.22				
01+0109.	02+0061.	03+0730.	04+5.049	05+47.86	06+4.978	07+0.034	08+30.33
09+69.58	10+14.03	11+0.000	12+12.22				
01+0109.	02+0061.	03+0745.	04+4.604	05+45.05	06+07.03	07+0.043	08+30.77
09+69.86	10+14.03	11+0.000	12+12.22				
01+0109.	02+0061.	03+0800.	04+6.280	05+55.14	06+08.51	07+0.050	08+31.58
09+69.93	10+14.03	11+0.000	12+12.23				
01+0121.	02+0061.	03+0800.	04+5.452	05+48.55	06+07.63	07+0.045	08+30.57
09+69.62	10+14.03	11+0.000	12+12.22				
01+0109.	02+0061.	03+0815.	04+07.36	05+67.77	06+07.72	07+0.061	08+32.67
09+69.64	10+14.03	11+0.000	12+12.23				
01+0109.	02+0061.	03+0830.	04+07.51	05+071.4	06+07.52	07+0.054	08+34.18
09+68.50	10+14.03	11+0.000	12+12.23				
01+0109.	02+0061.	03+0845.	04+6.514	05+080.3	06+12.25	07+0.081	08+36.27
09+66.85	10+14.03	11+0.000	12+12.24				
01+0109.	02+0061.	03+0900.	04+09.92	05+085.4	06+13.51	07+0.104	08+38.09

09+64.73	10+14.03	11+0.000	12+12.25				
01+0121.	02+0061.	03+0900.	04+07.83	05+076.1	06+12.67	07+0.089	08+35.30
09+67.43	10+14.03	11+0.000	12+12.24				
01+0109.	02+0061.	03+0915.	04+13.84	05+096.9	06+13.00	07+0.065	08+38.62
09+62.94	10+14.03	11+0.000	12+12.25				
01+0109.	02+0061.	03+0930.	04+14.36	05+089.7	06+12.94	07+0.077	08+38.78
09+61.90	10+14.03	11+0.000	12+12.26				
01+0109.	02+0061.	03+0945.	04+13.97	05+101.1	06+13.26	07+0.078	08+39.22
09+61.44	10+14.03	11+0.000	12+12.26				
01+0109.	02+0061.	03+1000.	04+16.29	05+087.9	06+13.98	07+0.079	08+39.28
09+61.21	10+14.03	11+0.000	12+12.27				
01+0121.	02+0061.	03+1000.	04+14.62	05+093.9	06+14.32	07+0.077	08+38.98
09+61.87	10+14.03	11+0.000	12+12.26				
01+0109.	02+0061.	03+1015.	04+13.88	05+096.7	06+14.89	07+0.079	08+39.72
09+61.18	10+14.03	11+0.000	12+12.28				
01+0109.	02+0061.	03+1030.	04+17.12	05+094.9	06+12.73	07+0.073	08+39.68
09+60.76	10+14.03	11+0.000	12+12.28				
01+0109.	02+0061.	03+1045.	04+17.82	05+089.5	06+11.80	07+0.076	08+39.81
09+60.75	10+14.03	11+0.000	12+12.29				
01+0109.	02+0061.	03+1100.	04+19.81	05+096.5	06+10.97	07+0.072	08+39.80
09+60.72	10+14.03	11+0.000	12+12.29				
01+0121.	02+0061.	03+1100.	04+17.16	05+094.4	06+13.01	07+0.077	08+39.75
09+60.85	10+14.03	11+0.000	12+12.28				
01+0109.	02+0061.	03+1115.	04+16.92	05+090.6	06+13.48	07+0.065	08+39.71
09+60.90	10+14.03	11+0.000	12+12.29				
01+0109.	02+0061.	03+1130.	04+16.52	05+082.0	06+15.99	07+0.068	08+39.20
09+61.10	10+14.03	11+0.000	12+12.30				
01+0109.	02+0061.	03+1145.	04+16.10	05+090.2	06+10.23	07+0.073	08+38.96
09+61.34	10+14.03	11+0.000	12+12.30				
01+0109.	02+0061.	03+1200.	04+16.12	05+087.3	06+13.95	07+0.079	08+39.14
09+61.50	10+14.03	11+0.000	12+12.30				
01+0121.	02+0061.	03+1200.	04+16.41	05+087.5	06+13.99	07+0.071	08+39.25
09+61.21	10+14.03	11+0.000	12+12.30				
01+0109.	02+0061.	03+1215.	04+15.21	05+093.4	06+13.23	07+0.082	08+39.95
09+61.27	10+14.03	11+0.000	12+12.30				
01+0109.	02+0061.	03+1230.	04+15.91	05+094.6	06+15.36	07+0.082	08+40.30
09+60.82	10+14.03	11+0.000	12+12.30				
01+0109.	02+0061.	03+1245.	04+15.57	05+095.2	06+14.25	07+0.090	08+41.00
09+60.51	10+14.03	11+0.000	12+12.31				
01+0109.	02+0061.	03+1300.	04+19.65	05+093.2	06+15.27	07+0.081	08+40.98
09+60.06	10+14.03	11+0.000	12+12.31				
01+0121.	02+0061.	03+1300.	04+16.59	05+094.1	06+14.57	07+0.087	08+40.56
09+60.67	10+14.03	11+0.000	12+12.31				
01+0109.	02+0061.	03+1315.	04+19.34	05+095.4	06+11.42	07+0.072	08+41.34
09+59.86	10+14.03	11+0.000	12+12.32				



2-2 up. dat

(3/2/93)

Collected at camp ground
next to 2-2A1 ambient air
upwind sampler by old met

Testing date for amb. air
is between 3/1/93 and
3/2/93. Julian day 60 to
61. WD data need adj.

0109.	02+0048.	03+0930.	04+0.500	05+1.171	06+0.426	07+070.6	08+21.75
29.96	10+0.000	11+14.25					
0109.	02+0048.	03+0945.	04+0.500	05+1.423	06+0.123	07+071.1	08+21.32
29+29.97	10+0.000	11+14.26					
01+0109.	02+0048.	03+1000.	04+0.500	05+1.785	06+0.267	07+071.5	08+21.02
29.98	10+0.000	11+14.26					
0115.	02+0048.	03+1000.	04+0.514	05+14.82	06+34.95	07+070.8	08+21.39
29.97	10+0.000	11+14.26					
109.	02+0048.	03+1015.	04+0.500	05+2.896	06+2.509	07+071.8	08+20.90
29.99	10+0.010	11+14.26					
0109.	02+0048.	03+1030.	04+0.500	05+08.86	06+0.148	07+072.1	08+20.76
29.99	10+0.000	11+14.26					
01+0109.	02+0048.	03+1045.	04+0.500	05+08.87	06+0.113	07+072.3	08+20.74
29+30.00	10+0.000	11+14.26					
0109.	02+0048.	03+1100.	04+0.500	05+08.94	06+0.000	07+072.5	08+20.67
30.00	10+0.000	11+14.25					
0115.	02+0048.	03+1100.	04+0.500	05+07.39	06+2.915	07+072.2	08+20.77
29+29.99	10+0.010	11+14.25					
01+0109.	02+0048.	03+1115.	04+0.500	05+08.95	06+0.000	07+072.7	08+20.56
30.01	10+0.000	11+14.25					
0109.	02+0048.	03+1130.	04+0.500	05+08.95	06+0.000	07+072.8	08+20.37
30.01	10+0.000	11+14.25					
01+0109.	02+0048.	03+1145.	04+0.500	05+08.95	06+0.000	07+072.9	08+20.19
29+30.01	10+0.000	11+14.25					
0109.	02+0048.	03+1200.	04+0.500	05+08.96	06+0.000	07+072.9	08+20.03
30.02	10+0.000	11+14.26					
0115.	02+0048.	03+1200.	04+0.500	05+08.95	06+0.434	07+072.8	08+20.29
29+30.01	10+0.000	11+14.26					
01+0109.	02+0048.	03+1215.	04+0.500	05+08.96	06+0.000	07+073.0	08+19.89
30.01	10+0.000	11+14.25					
0109.	02+0048.	03+1230.	04+0.500	05+08.96	06+0.000	07+073.0	08+19.57
30.01	10+0.000	11+14.26					
01+0109.	02+0048.	03+1245.	04+0.500	05+08.97	06+0.000	07+073.0	08+19.23
29+30.01	10+0.000	11+14.25					
0109.	02+0048.	03+1300.	04+0.500	05+08.97	06+0.000	07+073.1	08+18.93
30.02	10+0.000	11+14.25					
0115.	02+0048.	03+1300.	04+0.500	05+08.97	06+0.428	07+073.0	08+19.41
29+30.01	10+0.000	11+14.25					
01+0109.	02+0048.	03+1315.	04+0.500	05+08.98	06+0.053	07+073.0	08+18.73
30.02	10+0.000	11+14.24					
0109.	02+0048.	03+1330.	04+0.500	05+08.98	06+0.087	07+073.0	08+18.55
29+30.02	10+0.000	11+14.24					
01+0109.	02+0048.	03+1345.	04+0.500	05+08.98	06+0.083	07+073.0	08+18.48
30.02	10+0.000	11+14.25					
0109.	02+0048.	03+1400.	04+0.500	05+08.98	06+0.110	07+073.0	08+18.42
30.03	10+0.000	11+14.24					
01+0115.	02+0048.	03+1400.	04+0.500	05+08.98	06+0.432	07+073.0	08+18.55
29+30.02	10+0.000	11+14.24					
0109.	02+0048.	03+1415.	04+0.500	05+08.98	06+0.103	07+073.0	08+18.26
30.03	10+0.000	11+14.25					
01+0109.	02+0048.	03+1430.	04+0.500	05+08.99	06+0.109	07+073.0	08+17.93
29+30.04	10+0.000	11+14.25					
01+0109.	02+0048.	03+1445.	04+0.500	05+08.98	06+0.115	07+073.0	08+17.61
30.04	10+0.000	11+14.24					
0109.	02+0048.	03+1500.	04+0.500	05+09.00	06+0.184	07+073.1	08+17.52
30.05	10+0.000	11+14.24					
01+0115.	02+0048.	03+1500.	04+0.500	05+08.99	06+0.431	07+073.0	08+17.83
29+30.04	10+0.000	11+14.24					
0109.	02+0048.	03+1515.	04+0.500	05+08.99	06+0.143	07+073.2	08+17.47
30.05	10+0.000	11+14.24					
01+0109.	02+0048.	03+1530.	04+0.500	05+09.04	06+0.355	07+073.3	08+17.30
29+30.05	10+0.000	11+14.25					
01+0109.	02+0048.	03+1545.	04+0.500	05+09.07	06+0.246	07+073.3	08+16.72
30.06	10+0.000	11+14.24					
0109.	02+0048.	03+1600.	04+0.500	05+09.05	06+0.223	07+073.3	08+16.15
29+30.06	10+0.000	11+14.24					
01+0115.	02+0048.	03+1600.	04+0.500	05+09.04	06+0.423	07+073.3	08+16.91
29+30.05	10+0.000	11+14.24					
0109.	02+0048.	03+1615.	04+0.500	05+09.06	06+0.236	07+073.4	08+15.91
29+30.06	10+0.000	11+14.25					
01+0109.	02+0048.	03+1630.	04+0.500	05+09.08	06+0.228	07+073.3	08+15.83
29+30.06	10+0.000	11+14.24					
0109.	02+0048.	03+1645.	04+0.500	05+09.08	06+0.215	07+073.4	08+15.71
30.07	10+0.000	11+14.24					
0109.	02+0048.	03+1700.	04+0.500	05+09.08	06+0.223	07+073.3	08+15.57
29+30.07	10+0.000	11+14.24					
01+0115.	02+0048.	03+1700.	04+0.500	05+09.08	06+0.395	07+073.4	08+15.75
29+30.06	10+0.000	11+14.24					
0109.	02+0048.	03+1715.	04+0.500	05+09.14	06+0.258	07+073.3	08+15.46
29+30.08	10+0.000	11+14.24					
0109.	02+0048.	03+1730.	04+0.500	05+09.06	06+0.232	07+073.3	08+15.30
30.07	10+0.000	11+14.24					
0109.	02+0048.	03+1745.	04+0.500	05+09.13	06+0.273	07+073.3	08+15.26
30.08	10+0.000	11+14.23					
01+0109.	02+0048.	03+1800.	04+0.500	05+09.18	06+0.249	07+073.3	08+15.18
29+30.08	10+0.000	11+14.24					
01+0115.	02+0048.	03+1800.	04+0.500	05+09.13	06+0.339	07+073.3	08+15.30
29+30.08	10+0.000	11+14.24					

01+0109.	02+0059.	03+2115.	04+0.500	05+09.43	06+0.204	07+075.5	08+12.43
09+30.14	10+0.000	11+14.21					
01+0109.	02+0059.	03+2130.	04+0.500	05+09.43	06+0.201	07+075.5	08+12.43
09+30.14	10+0.000	11+14.22					
01+0109.	02+0059.	03+2145.	04+0.500	05+09.43	06+0.204	07+075.5	08+12.41
09+30.13	10+0.000	11+14.21					
01+0109.	02+0059.	03+2200.	04+0.500	05+09.43	06+0.198	07+075.6	08+12.41
09+30.13	10+0.000	11+14.21					
01+0115.	02+0059.	03+2200.	04+0.500	05+09.43	06+0.000	07+075.5	08+12.42
09+30.13	10+0.000	11+14.21					
01+0109.	02+0059.	03+2215.	04+0.500	05+09.43	06+0.208	07+075.6	08+12.41
09+30.13	10+0.000	11+14.21					
01+0109.	02+0059.	03+2230.	04+0.500	05+09.43	06+0.209	07+075.6	08+12.41
09+30.12	10+0.000	11+14.22					
01+0109.	02+0059.	03+2245.	04+0.500	05+09.44	06+0.215	07+075.7	08+12.39
09+30.12	10+0.000	11+14.22					
01+0109.	02+0059.	03+2300.	04+0.500	05+09.43	06+0.211	07+075.7	08+12.38
09+30.12	10+0.000	11+14.21					
01+0115.	02+0059.	03+2300.	04+0.500	05+09.43	06+0.000	07+075.6	08+12.40
09+30.12	10+0.000	11+14.21					
01+0109.	02+0059.	03+2315.	04+0.500	05+09.43	06+0.203	07+075.7	08+12.39
09+30.12	10+0.000	11+14.22					
01+0109.	02+0059.	03+2330.	04+0.500	05+09.43	06+0.203	07+075.7	08+12.37
09+30.11	10+0.000	11+14.21					
01+0109.	02+0059.	03+2345.	04+0.500	05+09.44	06+0.206	07+075.9	08+12.35
09+30.11	10+0.000	11+14.21					
01+0109.	02+0059.	03+2400.	04+0.500	05+09.44	06+0.211	07+075.8	08+12.35
09+30.11	10+0.000	11+14.21					
01+0115.	02+0059.	03+2400.	04+0.500	05+09.44	06+0.000	07+075.8	08+12.37
09+30.11	10+0.000	11+14.21					
01+0109.	02+0060.	03+0015.	04+0.500	05+09.45	06+0.219	07+075.8	08+12.35
09+30.11	10+0.000	11+14.21					
01+0109.	02+0060.	03+0030.	04+0.500	05+09.45	06+0.216	07+075.8	08+12.35
09+30.11	10+0.000	11+14.21					
01+0109.	02+0060.	03+0045.	04+0.500	05+09.46	06+0.231	07+075.9	08+12.34
09+30.11	10+0.000	11+14.21					
01+0109.	02+0060.	03+0100.	04+0.500	05+09.45	06+0.208	07+075.9	08+12.33
09+30.11	10+0.000	11+14.21					
01+0115.	02+0060.	03+0100.	04+0.500	05+09.45	06+0.000	07+075.9	08+12.34
09+30.11	10+0.000	11+14.21					
01+0109.	02+0060.	03+0115.	04+0.500	05+09.45	06+0.225	07+075.8	08+12.34
09+30.11	10+0.000	11+14.21					
01+0109.	02+0060.	03+0130.	04+0.500	05+09.47	06+0.212	07+075.9	08+12.35
09+30.11	10+0.000	11+14.22					
01+0109.	02+0060.	03+0145.	04+0.500	05+09.47	06+0.218	07+075.8	08+12.35
09+30.11	10+0.000	11+14.21					
01+0109.	02+0060.	03+0200.	04+0.500	05+09.46	06+0.234	07+075.7	08+12.37
09+30.11	10+0.000	11+14.21					
01+0115.	02+0060.	03+0200.	04+0.500	05+09.46	06+0.000	07+075.8	08+12.35
09+30.11	10+0.000	11+14.21					
01+0109.	02+0060.	03+0215.	04+0.500	05+09.46	06+0.217	07+075.7	08+12.38
09+30.11	10+0.000	11+14.21					
01+0109.	02+0060.	03+0230.	04+0.500	05+09.47	06+0.249	07+075.7	08+12.39
09+30.10	10+0.000	11+14.21					
01+0109.	02+0060.	03+0245.	04+0.500	05+09.46	06+0.210	07+075.7	08+12.38
09+30.09	10+0.000	11+14.21					
01+0109.	02+0060.	03+0300.	04+0.500	05+09.47	06+0.219	07+075.8	08+12.35
09+30.09	10+0.000	11+14.22					
01+0115.	02+0060.	03+0300.	04+0.500	05+09.46	06+0.000	07+075.7	08+12.37
09+30.10	10+0.000	11+14.22					
01+0109.	02+0060.	03+0315.	04+0.500	05+09.47	06+0.233	07+075.8	08+12.33
09+30.09	10+0.000	11+14.21					
01+0109.	02+0060.	03+0330.	04+0.500	05+09.46	06+0.214	07+075.9	08+12.31
09+30.09	10+0.000	11+14.22					
01+0109.	02+0060.	03+0345.	04+0.500	05+09.46	06+0.224	07+076.0	08+12.30
09+30.09	10+0.000	11+14.21					
01+0109.	02+0060.	03+0400.	04+0.500	05+09.48	06+0.249	07+076.0	08+12.27
09+30.09	10+0.000	11+14.22					
01+0115.	02+0060.	03+0400.	04+0.500	05+09.47	06+0.000	07+076.0	08+12.30
09+30.09	10+0.000	11+14.22					
01+0109.	02+0060.	03+0415.	04+0.500	05+09.51	06+0.234	07+076.1	08+12.28
09+30.09	10+0.000	11+14.21					
01+0109.	02+0060.	03+0430.	04+0.500	05+09.48	06+0.227	07+076.1	08+12.24
09+30.10	10+0.000	11+14.21					
01+0109.	02+0060.	03+0445.	04+0.500	05+09.51	06+0.261	07+076.2	08+12.25
09+30.11	10+0.000	11+14.21					
01+0109.	02+0060.	03+0500.	04+0.500	05+09.51	06+0.271	07+076.2	08+12.26
09+30.10	10+0.000	11+14.21					
01+0115.	02+0060.	03+0500.	04+0.500	05+09.50	06+0.000	07+076.2	08+12.26
09+30.10	10+0.000	11+14.21					
01+0109.	02+0060.	03+0515.	04+0.500	05+09.50	06+0.268	07+076.2	08+12.25
09+30.10	10+0.000	11+14.21					
01+0109.	02+0060.	03+0530.	04+0.500	05+09.54	06+0.295	07+076.2	08+12.25
09+30.11	10+0.000	11+14.21					
01+0109.	02+0060.	03+0545.	04+0.500	05+09.47	06+0.251	07+076.1	08+12.24
09+30.11	10+0.000	11+14.20					
01+0109.	02+0060.	03+0600.	04+0.500	05+09.52	06+0.268	07+076.1	08+12.26
09+30.11	10+0.000	11+14.21					
01+0115.	02+0060.	03+0600.	04+0.500	05+09.51	06+0.000	07+076.2	08+12.25

09+30.11	10+0.000	11+14.21					
01+0109.	02+0060.	03+0615.	04+0.500	05+09.52	06+0.261	07+076.1	08+12.27
09+30.11	10+0.000	11+14.21					
01+0109.	02+0060.	03+0630.	04+0.500	05+09.52	06+0.267	07+076.0	08+12.28
09+30.11	10+0.000	11+14.21					
01+0109.	02+0060.	03+0645.	04+0.500	05+09.51	06+0.268	07+076.0	08+12.29
09+30.11	10+0.000	11+14.21					
01+0109.	02+0060.	03+0700.	04+0.500	05+09.52	06+0.265	07+075.9	08+12.30
09+30.12	10+0.000	11+14.20					
01+0115.	02+0060.	03+0700.	04+0.500	05+09.52	06+0.000	07+076.0	08+12.29
09+30.11	10+0.000	11+14.20					
01+0109.	02+0060.	03+0715.	04+0.500	05+09.50	06+0.258	07+075.9	08+12.30
09+30.13	10+0.000	11+14.21					
01+0109.	02+0060.	03+0730.	04+0.500	05+09.47	06+0.431	07+69.76	08+13.52
09+30.13	10+0.000	11+13.58					
01+0109.	02+0060.	03+0745.	04+0.500	05+09.33	06+0.244	07+39.61	08+19.63
09+30.12	10+0.000	11+13.25					
01+0109.	02+0060.	03+0800.	04+0.500	05+08.82	06+1.666	07+32.38	08+22.36
09+30.06	10+0.010	11+12.98					
01+0115.	02+0060.	03+0800.	04+0.500	05+09.28	06+0.918	07+54.40	08+16.95
09+30.11	10+0.010	11+12.98					
01+0109.	02+0060.	03+0815.	04+5.448	05+327.1	06+32.02	07+24.59	08+25.59
09+30.02	10+0.000	11+12.74					
01+0109.	02+0060.	03+0830.	04+6.475	05+331.1	06+22.77	07+22.99	08+28.01
09+29.98	10+0.000	11+12.61					
01+0109.	02+0060.	03+0845.	04+6.185	05+309.4	06+21.22	07+24.02	08+29.15
09+29.98	10+0.000	11+12.63					
01+0109.	02+0060.	03+0900.	04+6.901	05+321.5	06+25.20	07+24.73	08+29.12
09+29.99	10+0.000	11+12.65					
01+0115.	02+0060.	03+0900.	04+6.252	05+322.2	06+26.86	07+24.08	08+27.97
09+29.99	10+0.000	11+12.65					
01+0109.	02+0060.	03+0915.	04+07.59	05+325.4	06+24.84	07+25.81	08+29.23
09+29.99	10+0.000	11+12.65					
01+0109.	02+0060.	03+0930.	04+08.15	05+325.8	06+22.47	07+26.38	08+29.30
09+29.98	10+0.000	11+12.65					
01+0109.	02+0060.	03+0945.	04+07.82	05+333.6	06+24.72	07+27.13	08+29.21
09+29.98	10+0.000	11+12.65					
01+0109.	02+0060.	03+1000.	04+07.69	05+330.1	06+24.35	07+27.95	08+28.63
09+29.98	10+0.000	11+12.64					
01+0115.	02+0060.	03+1000.	04+07.81	05+328.7	06+24.34	07+26.82	08+29.09
09+29.98	10+0.000	11+12.64					
01+0109.	02+0060.	03+1015.	04+6.677	05+339.0	06+22.54	07+28.70	08+28.07
09+29.98	10+0.000	11+12.64					
01+0109.	02+0060.	03+1030.	04+6.746	05+317.4	06+25.77	07+29.48	08+27.89
09+29.97	10+0.000	11+12.64					
01+0109.	02+0060.	03+1045.	04+6.749	05+314.4	06+27.07	07+29.89	08+27.54
09+29.96	10+0.000	11+12.64					
01+0109.	02+0060.	03+1100.	04+6.669	05+311.9	06+23.18	07+30.66	08+27.12
09+29.96	10+0.000	11+12.65					
01+0115.	02+0060.	03+1100.	04+6.710	05+320.7	06+26.95	07+29.68	08+27.65
09+29.97	10+0.000	11+12.65					
01+0109.	02+0060.	03+1115.	04+07.36	05+342.3	06+24.28	07+31.37	08+26.35
09+29.95	10+0.000	11+12.65					
01+0109.	02+0060.	03+1130.	04+07.96	05+335.2	06+23.23	07+32.36	08+25.60
09+29.95	10+0.000	11+12.65					
01+0109.	02+0060.	03+1145.	04+6.956	05+322.4	06+27.57	07+32.88	08+25.57
09+29.95	10+0.000	11+12.65					
01+0109.	02+0060.	03+1200.	04+6.086	05+294.0	06+24.78	07+32.96	08+25.72
09+29.94	10+0.000	11+12.66					
01+0115.	02+0060.	03+1200.	04+07.09	05+323.8	06+31.09	07+32.39	08+25.81
09+29.95	10+0.000	11+12.66					
01+0109.	02+0060.	03+1215.	04+6.095	05+295.7	06+20.40	07+33.33	08+25.43
09+29.94	10+0.000	11+12.66					
01+0109.	02+0060.	03+1230.	04+6.399	05+295.9	06+23.98	07+33.33	08+25.39
09+29.93	10+0.000	11+12.67					
01+0109.	02+0060.	03+1245.	04+5.331	05+299.0	06+31.93	07+33.39	08+25.62
09+29.93	10+0.000	11+12.67					
01+0109.	02+0060.	03+1300.	04+5.177	05+286.6	06+29.97	07+33.49	08+25.66
09+29.92	10+0.000	11+12.67					
01+0115.	02+0060.	03+1300.	04+5.750	05+294.3	06+27.26	07+33.38	08+25.52
09+29.93	10+0.000	11+12.67					
01+0109.	02+0060.	03+1315.	04+5.912	05+289.9	06+26.86	07+33.55	08+25.17
09+29.91	10+0.000	11+12.67					
01+0109.	02+0060.	03+1330.	04+6.100	05+284.3	06+33.62	07+34.19	08+25.75
09+29.90	10+0.000	11+12.67					
01+0109.	02+0060.	03+1345.	04+6.005	05+304.3	06+26.36	07+34.84	08+25.53
09+29.89	10+0.000	11+12.68					
01+0109.	02+0060.	03+1400.	04+5.313	05+320.5	06+30.08	07+35.62	08+25.29
09+29.89	10+0.000	11+12.69					
01+0115.	02+0060.	03+1400.	04+5.833	05+299.8	06+32.48	07+34.55	08+25.44
09+29.90	10+0.000	11+12.69					
01+0109.	02+0060.	03+1415.	04+5.978	05+308.0	06+22.31	07+36.08	08+24.55
09+29.89	10+0.000	11+12.69					
01+0109.	02+0060.	03+1430.	04+5.212	05+299.5	06+25.90	07+36.47	08+24.92
09+29.88	10+0.000	11+12.69					
01+0109.	02+0060.	03+1445.	04+4.946	05+300.4	06+23.32	07+36.84	08+24.17
09+29.87	10+0.000	11+12.69					
01+0109.	02+0060.	03+1500.	04+4.776	05+292.4	06+31.78	07+37.35	08+24.15
09+29.87	10+0.000	11+12.70					

01+0115.	02+0060.	03+1500.	04+5.228	05+300.2	06+26.59	07+36.69	08+24.45
09+29.87	10+0.000	11+12.70					
01+0109.	02+0060.	03+1515.	04+5.029	05+279.4	06+28.48	07+37.15	08+23.82
09+29.86	10+0.000	11+12.70					
01+0109.	02+0060.	03+1530.	04+4.553	05+286.8	06+37.26	07+37.80	08+23.50
09+29.85	10+0.000	11+12.70					
01+0109.	02+0060.	03+1545.	04+4.232	05+278.7	06+28.92	07+38.72	08+23.19
09+29.84	10+0.000	11+12.70					
01+0109.	02+0060.	03+1600.	04+3.246	05+255.8	06+42.25	07+39.56	08+23.18
09+29.84	10+0.000	11+12.71					
01+0115.	02+0060.	03+1600.	04+4.265	05+275.7	06+36.30	07+38.31	08+23.42
09+29.85	10+0.000	11+12.71					
01+0109.	02+0060.	03+1615.	04+3.840	05+250.2	06+25.58	07+40.07	08+23.15
09+29.84	10+0.000	11+12.71					
01+0109.	02+0060.	03+1630.	04+4.686	05+265.3	06+22.06	07+39.61	08+22.79
09+29.83	10+0.000	11+12.71					
01+0109.	02+0060.	03+1645.	04+3.219	05+277.3	06+25.31	07+39.55	08+22.85
09+29.83	10+0.000	11+12.70					
01+0109.	02+0060.	03+1700.	04+2.406	05+269.1	06+20.39	07+38.71	08+23.18
09+29.83	10+0.000	11+12.69					
01+0115.	02+0060.	03+1700.	04+3.538	05+265.5	06+25.36	07+39.48	08+22.99
09+29.83	10+0.000	11+12.69					
01+0109.	02+0060.	03+1715.	04+2.290	05+233.4	06+33.95	07+38.11	08+23.83
09+29.83	10+0.000	11+12.68					
01+0109.	02+0060.	03+1730.	04+2.063	05+212.1	06+22.87	07+36.99	08+30.54
09+29.82	10+0.000	11+12.67					
01+0109.	02+0060.	03+1745.	04+1.758	05+263.3	06+23.16	07+35.98	08+29.90
09+29.82	10+0.000	11+12.67					
01+0109.	02+0060.	03+1800.	04+2.150	05+246.3	06+15.76	07+35.59	08+28.20
09+29.82	10+0.000	11+12.66					
01+0115.	02+0060.	03+1800.	04+2.065	05+239.0	06+31.00	07+36.67	08+28.12
09+29.82	10+0.000	11+12.66					
01+0109.	02+0060.	03+1815.	04+1.632	05+238.7	06+32.59	07+34.33	08+30.47
09+29.82	10+0.000	11+12.64					
01+0109.	02+0060.	03+1830.	04+1.203	05+238.4	06+085.5	07+33.07	08+36.31
09+29.82	10+0.000	11+12.64					
01+0109.	02+0060.	03+1845.	04+1.582	05+261.2	06+23.80	07+30.83	08+46.80
09+29.82	10+0.000	11+12.63					
01+0109.	02+0060.	03+1900.	04+3.663	05+227.5	06+10.11	07+32.33	08+45.71
09+29.81	10+0.000	11+12.62					
01+0115.	02+0060.	03+1900.	04+2.020	05+241.8	06+45.12	07+32.64	08+39.82
09+29.82	10+0.000	11+12.62					
01+0109.	02+0060.	03+1915.	04+3.794	05+233.7	06+09.29	07+33.98	08+42.71
09+29.81	10+0.000	11+12.61					
01+0109.	02+0060.	03+1930.	04+3.953	05+239.2	06+10.74	07+34.24	08+41.64
09+29.81	10+0.000	11+12.61					
01+0109.	02+0060.	03+1945.	04+3.914	05+238.9	06+13.79	07+34.50	08+41.43
09+29.81	10+0.000	11+12.61					
01+0109.	02+0060.	03+2000.	04+4.381	05+234.8	06+11.88	07+34.52	08+42.27
09+29.81	10+0.000	11+12.60					
01+0115.	02+0060.	03+2000.	04+4.010	05+236.6	06+11.79	07+34.31	08+42.01
09+29.81	10+0.000	11+12.60					
01+0109.	02+0060.	03+2015.	04+4.580	05+242.5	06+12.49	07+34.77	08+42.82
09+29.81	10+0.000	11+12.60					
01+0109.	02+0060.	03+2030.	04+3.593	05+234.4	06+10.23	07+34.70	08+43.30
09+29.81	10+0.000	11+12.59					
01+0109.	02+0060.	03+2045.	04+3.081	05+232.9	06+10.24	07+34.27	08+43.77
09+29.81	10+0.000	11+12.59					
01+0109.	02+0060.	03+2100.	04+2.229	05+236.4	06+11.84	07+33.50	08+44.92
09+29.82	10+0.000	11+12.60					
01+0115.	02+0060.	03+2100.	04+3.371	05+236.5	06+11.81	07+34.31	08+43.70
09+29.81	10+0.000	11+12.60					
01+0109.	02+0060.	03+2115.	04+1.492	05+232.0	06+15.27	07+32.28	08+46.40
09+29.82	10+0.000	11+12.59					
01+0109.	02+0060.	03+2130.	04+1.429	05+223.7	06+11.65	07+31.23	08+48.54
09+29.81	10+0.000	11+12.59					
01+0109.	02+0060.	03+2145.	04+1.899	05+211.1	06+07.91	07+30.88	08+51.17
09+29.81	10+0.000	11+12.58					
01+0109.	02+0060.	03+2200.	04+1.785	05+215.5	06+11.65	07+30.59	08+54.63
09+29.81	10+0.000	11+12.57					
01+0115.	02+0060.	03+2200.	04+1.651	05+220.5	06+14.32	07+31.25	08+50.19
09+29.81	10+0.000	11+12.57					
01+0109.	02+0060.	03+2215.	04+2.065	05+215.8	06+10.60	07+30.70	08+55.46
09+29.81	10+0.000	11+12.57					
01+0109.	02+0060.	03+2230.	04+1.989	05+220.1	06+12.64	07+30.65	08+57.97
09+29.81	10+0.000	11+12.57					
01+0109.	02+0060.	03+2245.	04+1.318	05+231.1	06+20.40	07+31.43	08+55.81
09+29.81	10+0.000	11+12.57					
01+0109.	02+0060.	03+2300.	04+1.898	05+226.9	06+20.13	07+31.05	08+55.75
09+29.80	10+0.000	11+12.57					
01+0115.	02+0060.	03+2300.	04+1.818	05+223.3	06+17.52	07+30.96	08+56.25
09+29.81	10+0.000	11+12.57					
01+0109.	02+0060.	03+2315.	04+2.076	05+251.9	06+32.90	07+31.00	08+55.86
09+29.80	10+0.000	11+12.56					
01+0109.	02+0060.	03+2330.	04+1.516	05+302.4	06+31.38	07+31.39	08+54.55
09+29.80	10+0.000	11+12.56					
01+0109.	02+0060.	03+2345.	04+1.801	05+284.1	06+40.59	07+32.00	08+53.11
09+29.79	10+0.000	11+12.56					
01+0109.	02+0060.	03+2400.	04+1.817	05+238.9	06+23.85	07+31.96	08+52.66

09+29.79	10+0.000	11+12.56					
01+0115.	02+0060.	03+2400.	04+1.803	05+268.4	06+41.53	07+31.59	08+54.05
09+29.80	10+0.000	11+12.56					
01+0109.	02+0061.	03+0015.	04+2.232	05+211.8	06+15.43	07+31.36	08+53.90
09+29.80	10+0.000	11+12.56					
01+0109.	02+0061.	03+0030.	04+1.823	05+213.8	06+13.86	07+30.44	08+55.85
09+29.80	10+0.000	11+12.56					
01+0109.	02+0061.	03+0045.	04+1.442	05+208.7	06+086.3	07+29.77	08+56.22
09+29.80	10+0.000	11+12.56					
01+0109.	02+0061.	03+0100.	04+1.119	05+327.7	06+28.43	07+27.63	08+61.28
09+29.80	10+0.000	11+12.55					
01+0115.	02+0061.	03+0100.	04+1.654	05+236.2	06+66.61	07+29.80	08+56.81
09+29.80	10+0.000	11+12.55					
01+0109.	02+0061.	03+0115.	04+0.787	05+278.1	06+37.98	07+27.65	08+62.97
09+29.79	10+0.000	11+12.55					
01+0109.	02+0061.	03+0130.	04+0.818	05+265.0	06+28.80	07+26.64	08+69.56
09+29.79	10+0.000	11+12.55					
01+0109.	02+0061.	03+0145.	04+0.833	05+250.2	06+37.01	07+25.82	08+075.6
09+29.78	10+0.000	11+12.54					
01+0109.	02+0061.	03+0200.	04+1.198	05+228.7	06+19.02	07+25.38	08+079.9
09+29.78	10+0.000	11+12.54					
01+0115.	02+0061.	03+0200.	04+0.909	05+254.6	06+36.51	07+26.37	08+072.0
09+29.79	10+0.000	11+12.54					
01+0109.	02+0061.	03+0215.	04+0.762	05+209.3	06+64.99	07+25.09	08+080.5
09+29.77	10+0.000	11+12.54					
01+0109.	02+0061.	03+0230.	04+1.189	05+279.1	06+26.29	07+24.98	08+079.7
09+29.76	10+0.000	11+12.53					
01+0109.	02+0061.	03+0245.	04+1.064	05+235.1	06+20.13	07+24.65	08+082.2
09+29.75	10+0.000	11+12.53					
01+0109.	02+0061.	03+0300.	04+1.346	05+244.8	06+10.04	07+24.41	08+081.7
09+29.75	10+0.000	11+12.53					
01+0115.	02+0061.	03+0300.	04+1.090	05+245.7	06+41.45	07+24.78	08+081.0
09+29.76	10+0.000	11+12.53					
01+0109.	02+0061.	03+0315.	04+1.170	05+253.8	06+18.18	07+24.24	08+082.8
09+29.74	10+0.000	11+12.53					
01+0109.	02+0061.	03+0330.	04+0.579	05+230.8	06+50.07	07+24.50	08+082.2
09+29.74	10+0.000	11+12.53					
01+0109.	02+0061.	03+0345.	04+0.714	05+299.4	06+5.492	07+24.68	08+081.2
09+29.73	10+0.000	11+12.53					
01+0109.	02+0061.	03+0400.	04+0.645	05+313.7	06+6.177	07+24.74	08+081.0
09+29.73	10+0.000	11+12.53					
01+0115.	02+0061.	03+0400.	04+0.777	05+279.0	06+41.67	07+24.54	08+081.8
09+29.74	10+0.000	11+12.53					
01+0109.	02+0061.	03+0415.	04+0.774	05+313.7	06+20.24	07+24.44	08+082.0
09+29.73	10+0.000	11+12.52					
01+0109.	02+0061.	03+0430.	04+0.691	05+346.6	06+14.59	07+24.18	08+083.9
09+29.73	10+0.000	11+12.52					
01+0109.	02+0061.	03+0445.	04+0.777	05+320.5	06+37.18	07+24.25	08+084.4
09+29.74	10+0.000	11+12.52					
01+0109.	02+0061.	03+0500.	04+0.846	05+282.1	06+46.89	07+23.79	08+086.5
09+29.74	10+0.000	11+12.52					
01+0115.	02+0061.	03+0500.	04+0.772	05+318.2	06+38.84	07+24.17	08+084.2
09+29.73	10+0.000	11+12.52					
01+0109.	02+0061.	03+0515.	04+0.894	05+248.2	06+21.19	07+23.35	08+087.7
09+29.75	10+0.000	11+12.51					
01+0109.	02+0061.	03+0530.	04+1.400	05+242.1	06+21.50	07+22.99	08+089.8
09+29.75	10+0.000	11+12.52					
01+0109.	02+0061.	03+0545.	04+1.456	05+246.6	06+21.03	07+23.04	08+091.5
09+29.75	10+0.000	11+12.51					
01+0109.	02+0061.	03+0600.	04+1.124	05+264.6	06+24.41	07+23.13	08+092.7
09+29.75	10+0.000	11+12.51					
01+0115.	02+0061.	03+0600.	04+1.218	05+250.3	06+23.62	07+23.13	08+090.4
09+29.75	10+0.000	11+12.51					
01+0109.	02+0061.	03+0615.	04+1.625	05+242.2	06+16.92	07+23.08	08+093.2
09+29.75	10+0.000	11+12.51					
01+0109.	02+0061.	03+0630.	04+1.439	05+237.6	06+08.38	07+22.71	08+094.1
09+29.75	10+0.000	11+12.51					
01+0109.	02+0061.	03+0645.	04+1.209	05+263.2	06+20.23	07+22.97	08+095.7
09+29.75	10+0.000	11+12.51					
01+0109.	02+0061.	03+0700.	04+1.801	05+224.9	06+11.42	07+23.77	08+096.3
09+29.75	10+0.000	11+12.51					
01+0115.	02+0061.	03+0700.	04+1.519	05+241.7	06+20.26	07+23.13	08+094.8
09+29.75	10+0.000	11+12.51					
01+0109.	02+0061.	03+0715.	04+1.357	05+251.5	06+27.08	07+24.68	08+096.0
09+29.76	10+0.000	11+12.51					
01+0109.	02+0061.	03+0730.	04+1.690	05+247.6	06+10.97	07+26.70	08+095.6
09+29.77	10+0.000	11+12.51					
01+0109.	02+0061.	03+0745.	04+2.582	05+242.4	06+09.17	07+29.45	08+090.2
09+29.77	10+0.000	11+12.51					
01+0109.	02+0061.	03+0800.	04+2.933	05+244.7	06+11.71	07+31.13	08+084.6
09+29.78	10+0.000	11+12.53					
01+0115.	02+0061.	03+0800.	04+2.140	05+246.4	06+16.57	07+27.99	08+091.6
09+29.77	10+0.000	11+12.53					
01+0109.	02+0061.	03+0815.	04+3.007	05+262.2	06+18.71	07+32.72	08+079.5
09+29.78	10+0.000	11+12.53					
01+0109.	02+0061.	03+0830.	04+2.868	05+267.5	06+26.32	07+34.43	08+074.6
09+29.78	10+0.000	11+12.54					
01+0109.	02+0061.	03+0845.	04+3.001	05+287.8	06+26.05	07+36.46	08+69.86
09+29.79	10+0.000	11+12.55					

01+0109.	02+0061.	03+0900.	04+4.580	05+289.5	06+31.16	07+38.45	08+65.48
09+29.79	10+0.000	11+12.57					
01+0115.	02+0061.	03+0900.	04+3.364	05+276.4	06+28.55	07+35.52	08+072.4
09+29.79	10+0.000	11+12.57					
01+0109.	02+0061.	03+0915.	04+5.858	05+299.7	06+26.92	07+39.41	08+62.79
09+29.80	10+0.000	11+12.57					
01+0109.	02+0061.	03+0930.	04+5.775	05+290.8	06+27.52	07+39.63	08+61.50
09+29.80	10+0.000	11+12.59					
01+0109.	02+0061.	03+0945.	04+6.086	05+301.3	06+29.78	07+40.17	08+61.40
09+29.80	10+0.000	11+12.59					
01+0109.	02+0061.	03+1000.	04+07.96	05+284.5	06+25.41	07+40.15	08+61.21
09+29.80	10+0.000	11+12.60					
01+0115.	02+0061.	03+1000.	04+6.421	05+294.0	06+28.27	07+39.84	08+61.72
09+29.80	10+0.000	11+12.60					
01+0109.	02+0061.	03+1015.	04+5.851	05+299.2	06+24.52	07+40.65	08+61.38
09+29.79	10+0.000	11+12.61					
01+0109.	02+0061.	03+1030.	04+07.39	05+301.6	06+23.79	07+40.81	08+60.94
09+29.79	10+0.000	11+12.61					
01+0109.	02+0061.	03+1045.	04+08.03	05+294.2	06+24.71	07+40.83	08+61.05
09+29.79	10+0.000	11+12.61					
01+0109.	02+0061.	03+1100.	04+08.47	05+303.5	06+22.73	07+40.78	08+61.01
09+29.79	10+0.000	11+12.61					
01+0115.	02+0061.	03+1100.	04+07.44	05+299.7	06+24.20	07+40.77	08+61.10
09+29.79	10+0.000	11+12.61					
01+0109.	02+0061.	03+1115.	04+6.993	05+284.5	06+29.97	07+40.58	08+61.30
09+29.78	10+0.000	11+12.62					
01+0109.	02+0061.	03+1130.	04+07.14	05+291.3	06+30.72	07+40.08	08+61.67
09+29.78	10+0.000	11+12.62					
01+0109.	02+0061.	03+1145.	04+6.738	05+295.5	06+26.19	07+39.80	08+62.09
09+29.77	10+0.000	11+12.62					
01+0109.	02+0061.	03+1200.	04+6.700	05+292.9	06+25.62	07+40.06	08+62.29
09+29.76	10+0.000	11+12.63					
01+0115.	02+0061.	03+1200.	04+6.893	05+291.1	06+28.48	07+40.13	08+61.84
09+29.77	10+0.000	11+12.63					
01+0109.	02+0061.	03+1215.	04+6.532	05+290.5	06+29.16	07+41.09	08+62.06
09+29.76	10+0.000	11+12.63					
01+0109.	02+0061.	03+1230.	04+6.378	05+302.6	06+25.45	07+41.66	08+61.32
09+29.75	10+0.000	11+12.63					
01+0109.	02+0061.	03+1245.	04+07.17	05+299.6	06+27.19	07+42.14	08+61.01
09+29.75	10+0.000	11+12.63					

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

Second Year of Monitoring

Third Quarter Report

Prepared for:

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

Prepared by:

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JANUARY 1994

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

SECOND YEAR OF MONITORING

THIRD QUARTER REPORT

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

SECOND YEAR OF MONITORING

THIRD QUARTER REPORT

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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, soil gas and soil gas pressure in areas at and surrounding the 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 Consent Decree.

As stipulated in the Consent Decree, the ambient air quality, soil gas quality and soil gas pressure were to be monitored at several positions around the landfill. The samples were to be analyzed using approved protocols and the results were to be tabulated. Four sampling events were conducted during the initial year of the program and four monitoring events are scheduled for the second year.

This report contains the results of the third quarter sampling effort of the second year of monitoring (second year, third quarter sampling event). The sampling effort was conducted on May 26 and 27, 1993. Sections 2.0 and 3.0 of this report contain the sampling protocol and investigation methodology for air and soil gas including sample collection, sample handling and analytical procedures applied for this program. Section 4.0 provides a discussion of results. Section 5 contains the soil gas pressure sampling procedures and test results.

The tetrachloroethene Annual Guideline Concentration (AGC) value of 0.075 ug/m³ stated in the latest New York State Department of Environmental Conservation (DEC) Air Guide-1 document (1991 Edition) has been changed by the DEC to 1.2 ug/m³. This change is reflected in this report. The second year, first quarter tetrachloroethene results will be reevaluated with the new AGC value and presented later in the second year annual ambient air and soil gas quality monitoring summary report.

2.0 METHODOLOGY AND PROTOCOLS

2.1 PROGRAM DEFINITION

In conformance with the Remedial Action Plan (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 provides data and analyses for four of the components listed in the RAP: (1) ambient air sampling; (2) 30" deep subsurface gas sampling; (3) subsurface gas sampling at various depths; and (4) soil gas pressure readings. The ambient air, soil gas and well pressure sampling procedures follow those developed during the first year of sampling.

The primary objective of the sampling program is to examine the ambient air concentration of trace volatile organic compounds (VOCs) in the vicinity of the Old Bethpage Landfill. During the second year third quarter 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 the fifteen locations specified in the Consent Decree. Soil gas pressure readings were taken at three locations. All of these locations are provided on the attached Figure 2.1.

The program also involves the collection of meteorological parameters from atop the landfill and at the upwind ambient air sampling location. This data is used 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 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

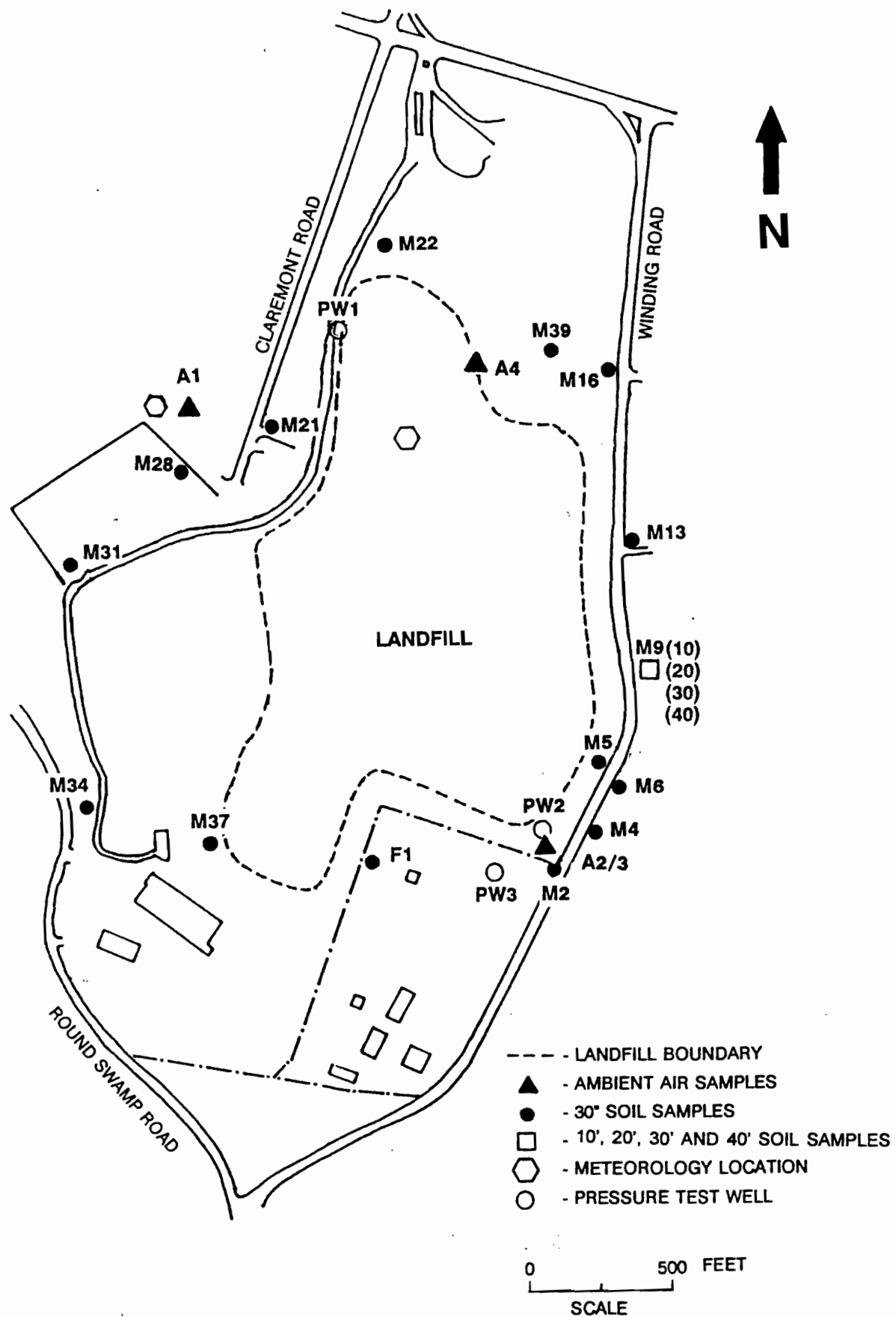


FIGURE 2.1: AMBIENT AIR AND SOIL GAS MONITORING SITES AT OBSWDC

of the program. Sampling is to continue on a quarterly basis, unless the monitoring program is modified by a change to the Consent Decree. The ambient air samples are to be analyzed for VOCs.

The sample collection program was modified as discussed in the reports for the first year. Changes were made to the ambient air sampling scope stated in the 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 24-hour ambient air samples. The reason for collecting two samples at a single site (A2/A3) was to provide two flow ranges. The first rounds of sampling have identified considerable ranges in ambient concentrations of various VOCs. Therefore, the two ranges of sample volumes were necessary to avoid mass loading limits on the samples and to achieve acceptable analytical sensitivity for the target compound list.

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. Again, the second year monitoring program also contains quarterly soil gas sample collection. In this second year 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 requires 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 was required on a quarterly basis during the initial year of the program. The second year monitoring program also includes quarterly sampling at well M9 at all four depths.

As in the initial year of sampling, 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 less than

68°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 Methodology for the collection of large volumes was developed to identify low VOC concentrations in ambient air.
- 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 in the initial year and deemed unacceptable because of low total volume capacity, potential leaks and contamination.
- 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 can be evaluated by using the modified VOST methodology is presented in Table 2.1 along with corresponding New York State Department of Environmental Conservation (NYSDEC) ambient air guidelines. This target compound list (TCL) for the second year of monitoring is consistent with the VOC constituents being evaluated in the thermal oxidizer testing portion of the Consent Decree. Third quarter target compound list changes (ketones now tentatively identified) reflect GC/MS program alterations (MS mass 44 scan delay) detailed in Section 3.4. Vinyl acetate is no longer quantifiable due to the modified scan range where vinyl acetate's two (2) significant ions for identification fall below mass 45. Also, the contract laboratory, Research Triangle Laboratories (RTL) has updated their TCL to include dibromomethane, dichlorodifluoromethane and iodomethane.

TABLE 2.1

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

PROGRAM TARGET COMPOUND LIST WITH
NYSDEC AMBIENT AIR GUIDELINES

VOC COMPOUND NAME	TOXICITY	CURRENT SGC (ug/m3)		CURRENT AGC (ug/m3)		FORMER AGC (ug/m3)
Benzene	H	30	(p)	0.12	(E,U)	100
Bromodichloromethane	H			0.02	(D)	0.03*
Bromoform	M	1,200	(t)	12	(T)	11.9*
Bromomethane						
Carbon Disulfide	M	710	(r)	7	(D)	100
Carbon Tetrachloride	H	1,300	(r)	0.07	(E,U)	100
Chlorobenzene	M	11,000	(p)	20	(E)	1,170
Chloroethane	L	630,000	(t)	63,000	(T)	52,000
Chloroform	M	980	(r)	23	(R)	167
Chloromethane	M	22,000	(d)	770	(D)	2,100
Dibromochloromethane	M			0.1	(D)	0.03*
Dibromomethane						
1,2-Dichlorobenzene (o)	M	30,000	(t)	200	(E)	1,000
1,3-Dichlorobenzene (m)	M	30,000	(a)	200	(A)	714*
1,4-Dichlorobenzene (p)	M*	110,000*		700*		
Dichlorodifluoromethane						
1,1-Dichloroethane	L	190,000	(t)	500	(E)	9,524*
1,2-Dichloroethane	M	950	(r)	0.039	(E,U)	0.2
1,1-Dichloroethene	H	2,000	(t)	0.02	(E,U)	66.7
trans-1,2-Dichloroethene	M			360	(D)	360*
1,2-Dichloropropane	M	83,000	(t)	0.15	(D)	833*
cis-1,3-Dichloropropene						
trans-1,3-Dichloropropene						
Ethylbenzene	M	100,000	(t)	1,000	(T)	1,450
Iodomethane						
Methylene Chloride	M	41,000	(t)	27	(D,U)	1,170
Styrene	M	51,000	(t)	510	(T)	716
1,1,2,2-Tetrachloroethane	M	1,600	(t)	0.02	(E,U)	23.2
Tetrachloroethene	M	81,000	(t)	1.2**	(D,U)	1,120
Toluene	L	89,000	(r)	2,000	(I)	7,500
1,1,1-Trichloroethane	L	450,000	(t)	1,000	(E)	38,000
1,1,2-Trichloroethane	M	13,000	(t)	0.06	(E,U)	150
Trichloroethene	M	33,000	(r)	0.45	(D,U)	900
Trichlorofluoromethane	L	560,000	(t)	700	(E)	
Vinyl Chloride	H	1,300	(t)	0.02	(E,U)	0.4
Xylenes (Total)	M	100,000	(t)	300	(I)	1,450***

TABLE 2.1
Continued

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

**PROGRAM TARGET COMPOUND LIST WITH
NYSDEC AMBIENT AIR GUIDELINES**

TENTATIVELY IDENTIFIED COMPOUNDS****	TOXICITY	CURRENT SGC (ug/m3)	CURRENT AGC (ug/m3)	FORMER AGC (ug/m3)
Acetone	L	140,000 (r)	14,000 (R)	35,600
Benzaldehyde				
2-Butanone	M	140,000 (t)	300 (E)	1967
2-Chloroethyl Vinyl Ether				
cis-1,2-Dichloroethene	M	190,000 (a)	1,900 (A)	1,880*
Freon 13	L	43,000 (a)	530 (A)	133,333*
2-Hexanone				
4-Methyl-2-Pentanone	M	48,000 (r)	480 (R)	683

FOOTNOTES:

SGC - Short-term guideline concentration (current as of June 1991).

AGC - Annual guideline concentration (current as of June 1991, former as of 1986, 9/89 Edition).

*Proposed Value.

**Tetrachloroethene AGC current as of November 22, 1991.

***1450 total for ortho and para xylenes and 1450 total for meta xylene.

****Tentatively Identified Compound (TIC) using EPA SW846 Method 8240. Six additional non-target compound GC/MS peaks with the largest analytical response were also targeted per VOST analysis.

Toxicity - H for High; M for moderate; and L for low by NYSDEC.

(a) - SGC based on NYSDEC structure-activity analogy.

(d) - SGC derived by NYSDEC, Division of Air Resources, Bureau of Air Toxics, Toxics Assessment Section.

(p) - SGC derived from proposed ACGIH TLV-TWA (1990-1991).

(r) - SGC derived from NIOSH REL-TWA (1988).

(t) - SGC derived from ACGIH TLV-TWA (1990-1991).

(A) - AGC based on NYSDEC structure-activity analogy.

(D) - AGC derived from NYSDEC, Division of Air Resources, Bureau of Air Toxics, Toxics Assessment Section.

(E) - AGC based on derivation by USEPA.

(I) - AGC based on RFC developed by USEPA - Integrated Risk Information System (IRIS), input pending.

(R) - AGC derived from NIOSH REL-TWA (1988).

(T) - AGC derived from ACGIH TLV-TWA (1990-1991).

(U) - AGC is the ambient air concentration which corresponds to an excess cancer risk of one in one million after lifetime exposure.

2.2.2 Modified VOST Sampler

The Volatile Organic Sampling Train (VOST) is one of three EPA methods identified to collect VOCs from stacks. 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 degrees centigrade (°C) 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.

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, two pre-conditioned VOST Tenax/Charcoal sorbent traps, condensate impinger, aluminum tube holder, ice bath and ice pack, sampling cane and cooler enclosure. The VOST Tenax/Charcoal sorbent traps 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 dry gas meter. The ice bath, ice pack and condensate impinger were used instead of two condensers in the EPA reference method. Two Tenax/Charcoal traps were used in order to account for possible breakthrough in the high volume samples and were used throughout the program for method uniformity among all sources.

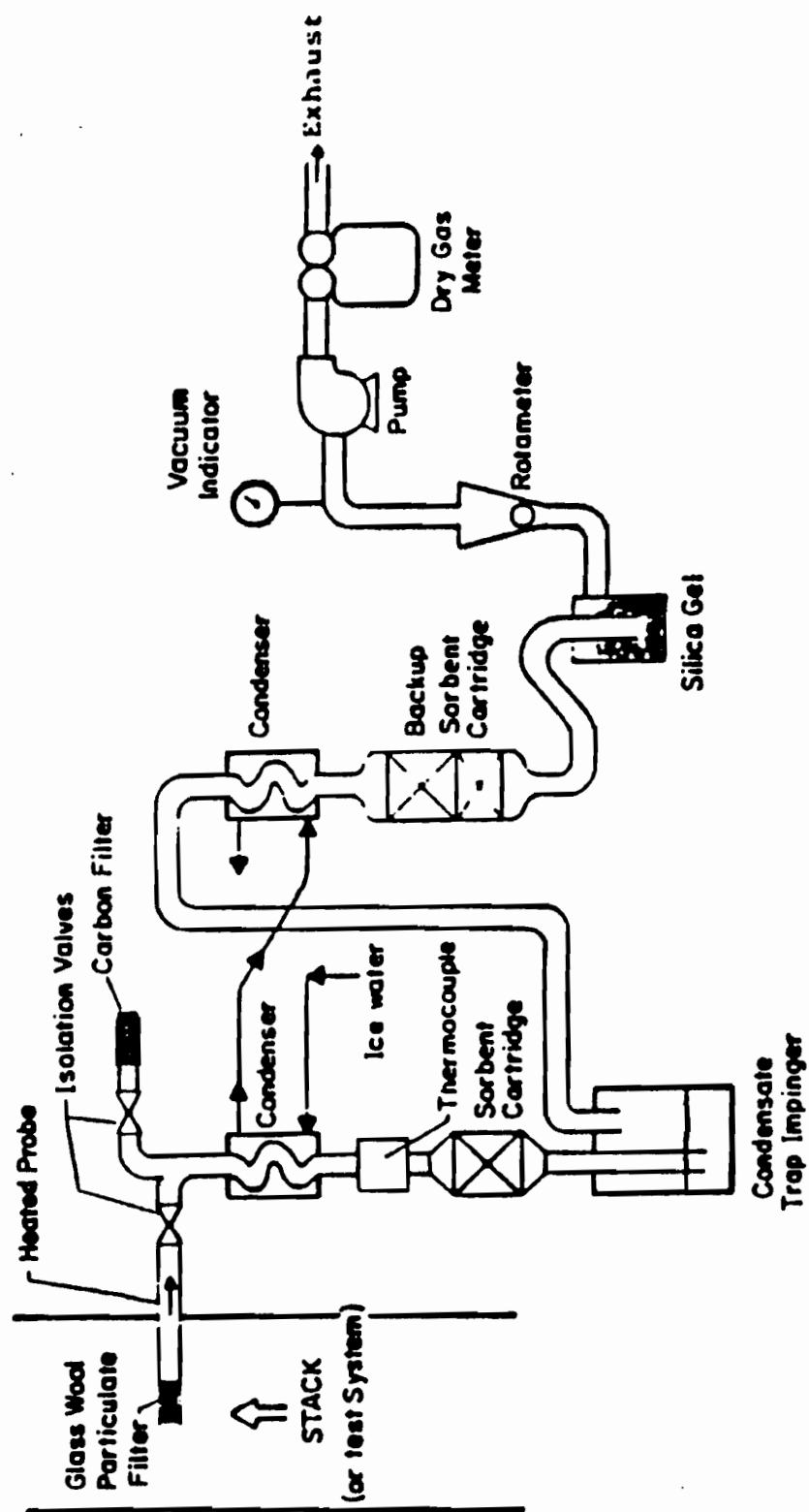


FIGURE 2.2: SCHEMATIC OF EPA REFERENCED
VOLATILE ORGANIC SAMPLING TRAIN
(VOST)

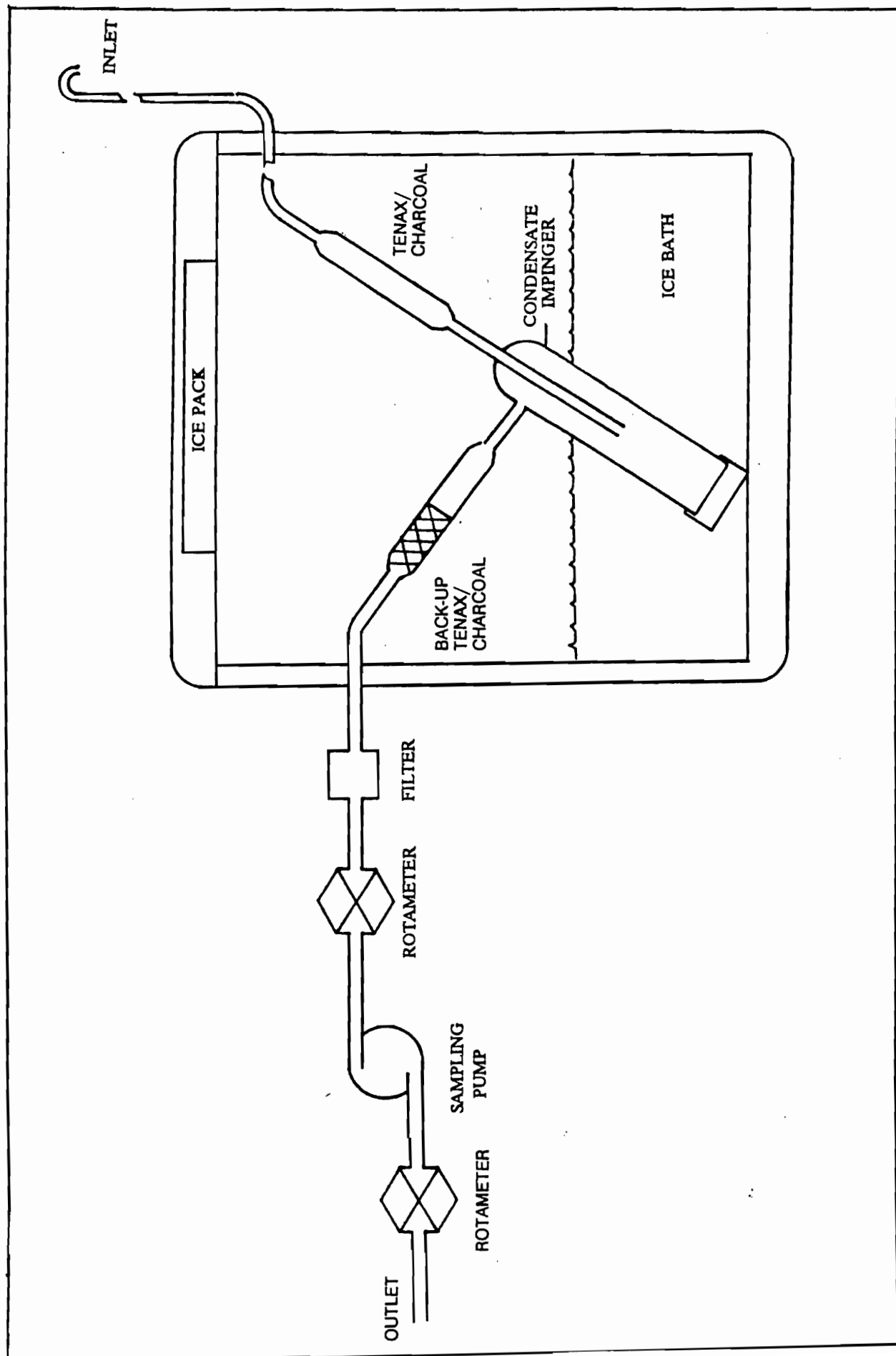


FIGURE 2.3: MODIFIED VOST SAMPLER

2.2.3 Sample Volume Selection

The selection of sample volumes for both air and soil gas samples for this study were 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 quantitation is based on nanogram concentrations of constituents, appropriate sample volumes were necessary to provide the desired analytical sensitivity.

In general, analytical instruments can detect between a few nanograms to thousands of nanograms of individual constituents in a sample. The analytical instrument's lower quantitation limit range for this case was set between 20 and 260 nanograms. The upper quantitation limit (calibration limit) was nominally set at approximately 50 times the lower quantitation limit. 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 (approximately 1000 liters) and low volume (approximately 100 liters) sample sizes were selected.

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. 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 preassigned time period. This capability

TABLE 2.2

**OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX**

**GENERAL RELATIONSHIP BETWEEN MICRO-TIP
READINGS AND SAMPLE VOLUME**

MICRO-TIP READINGS (ppm)*	SAMPLE VOLUME (liters)
<0.1 to 0.5	1,000 to 10
0.5 to 2	10 to 1
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.

is particularly important in the ambient air sampling event. It is possible to collect ambient air samples 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, thus providing a greater sampling time.

SKC electronic calibrator Model 712 is used before and after each sampling event to calibrate two (2) Supelco rotameters (one high flow (0.7 Lpm), one low flow (0.070 Lpm) to a desired nominal flow rate. It is also used prior to testing to establish a relationship between actual pump volume flow rates and their corresponding rotameter readings. Inconsistencies between both rotameters could reveal a pump leak. These calibration data together with the Supelco rotameter readings recorded during sampling, are then used after all monitoring events to establish the sample volumes collected during each test. The 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 and the Supelco rotameters is around $\pm 2\%$.

A Photovac Micro-Tip meter was also used during the monitoring program before and after each sampling event to measure the total VOC concentration. It is a hand held instantaneously reading analyzer that measures the total concentration of all ionizable compounds (in ppm). The 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 an 8 and a 12 foot meteorological tower, each containing a 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 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 each 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 second year third quarterly 24-hour ambient air sampling event was conducted on May 26 and 27, 1993. 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 sampling parameters are summarized in Table 3.1.

TABLE 3.1

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Third Quarter

SUMMARY OF AMBIENT AIR SAMPLING

SITE ID*	SAMPLE ID	TESTING DATE	DURATION (minutes)	SAMPLING HEIGHT (inches)	NOMINAL FLOWRATE (l/min)	DESIRED QUANTITY (liter)	ACTUAL QUANTITY** (liter)
A-1	2-3A1	5/26-27/93	1,440	40	0.7	1,000	1,050
A-2	2-3A2	5/26-27/93	1,440	40	0.7	1,000	995
A-3	2-3A3	5/26-27/93	1,440	40	0.07	100	114
A-4	2-3A4	5/26-27/93	1,445	40	0.7	1,000	1,010

SUMMARY OF SUBSURFACE SOIL GAS SAMPLING

SITE ID*	SAMPLE ID	TESTING DATE	DURATION (minutes)	SAMPLING DEPTH (inches)	NOMINAL FLOWRATE (l/min)	DESIRED QUANTITY (liter)	ACTUAL QUANTITY** (liter)
F1	2-3F1	5/26/93	10	30	1.0	10	8.72
M2	2-3M2	5/26/93	10	30	1.0	10	8.97
M4	2-3M4	5/26/93	10	30	1.0	10	8.83
M5	2-3M5	5/26/93	10	30	1.0	10	8.94
M6	2-3M6	5/26/93	10	30	1.0	10	9.11
M9 (10')	2-3M9(10)	5/26/93	10	10 feet	1.0	10	8.83
M9 (20')	2-3M9(20)	5/26/93	10	20 feet	1.0	10	9.17
M9 (30')	2-3M9(30)	5/26/93	10	30 feet	1.0	10	8.96
M9 (40')	2-3M9(40)	5/26/93	10	40 feet	1.0	10	9.06
M13	2-3M13	5/26/93	10	30	1.0	10	8.72
M16	2-3M16	5/26/93	10	30	1.0	10	8.95
M21	2-3M21	5/26/93	10	30	1.0	10	9.03
M22	2-3M22	5/26/93	10	30	1.0	10	7.98
M28	2-3M28	5/26/93	10	30	1.0	10	8.97
M31	2-3M31	5/26/93	10	30	1.0	10	9.19
M34	2-3M34	5/26/93	10	30	1.0	10	9.40
M37	2-3M37	5/26/93	10	30	1.0	10	9.19
M39	2-3M39	5/26/93	10	30	1.0	10	9.03

*See Figure 2.1 for ambient air and soil gas sampling locations.

A1: High volume ambient upwind sample collected at the Battle Row Campground (50 feet west and 30 feet south of the southeast campground gate).

A2: High volume ambient downwind sample collected 20 feet southwest of the southeast landfill gate.

A3: Low volume ambient downwind (A2 duplicate) sample collected 20 feet southwest of the southeast landfill gate.

A4: High volume ambient downwind sample collected 220 feet south of well M39.

**Corrected to ambient conditions.

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 to the west of the landfill at the Battle Row Campground as shown in Figure 2.1. Sampler A4 was positioned on the north side of the landfill to the south of soil gas well M39. Samplers at both A1 and A4 were set to continuously collect at a 0.7 Lpm nominal flow rate over a 24-hour period. These settings would allow for the collection of two 1,000 liter samples on each at A1 and A4. The reason the pump was set at 0.7 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 liters over the 24-hour period. Samplers A-1 and A-4 began sampling at 0847 EDT and 0938 EDT on May 26, 1993 respectively.

Samplers A-2 and A-3 were set up southeast of the landfill. Sampler A-2 was set to continuously collect a 1,000 liter integrated sample at 0.7 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, a sampling manifold was constructed with two (2) SKC single stage universal constant-flow controllers in parallel. A Supelco low flow rotameter was positioned in line with one of the constant-flow controllers downstream of the sorbent traps prior to the SKC pump inlet. The remaining constant-flow controller was opened to atmosphere and connected in parallel with the other flow controller immediately upstream of the SKC pump inlet. The adjustment pod to the constant-flow controller connected to the sorbent traps was turned to register the desired 0.07 Lpm flow rate on the in-line rotameter. The remaining constant-flow controller was adjusted to maintain the total flow to the SKC sampling pump within the operating range mentioned earlier. This would allow for the continuous collection of an integrated 100 liter sample over the 24-hour sampling period. Samplers A-2 and A-3 both began sampling at 0924 EDT on May 26, 1993.

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. Based on the above ambient concentrations, flow rates were set at 0.7 Lpm for A1, A2 and A4 and 0.07 Lpm for A3. 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 nine to ten times during the 24-hour sampling period. Rotameter readings during these site checks were within established ranges. Sampling proceeded according to plan over the 24-hour sampling periods for sites A1, A2 and A3. However, when site A4 was to be taken off-line, the front Tenax/Charcoal sorbent trap was found disconnected from the sample inlet line. The duration of time that A4 was sampling the headspace inside the ambient VOST sampling cooler instead of ambient air outside the cooler could not be determined, therefore sample A4 was not analyzed.

The VOC final ambient concentrations at the A2/A3 collected site was 0.0 ppm based on the Micro-Tip reading. However, the final ambient VOC concentrations at sites A1 and A4 were both found to be 0.2 ppm. Pump elapsed run time readings were recorded, VOST traps were removed, and the condensate (if available) was collected in a Tenax/Charcoal trap. All sorbent trap shipping 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 sorbent traps 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. The RTL analytical report is provided in Appendix D. Field data forms and equipment calibrations are provided in Appendix E and F, respectively. Meteorological data is provided in Appendix G.

3.3 SOIL GAS SAMPLING

The soil gas sampling elements of the Consent Decree require soil gas samples to be extracted from several 30" deep subsurface gas wells and from 10', 20' 30' and 40' deep subsurface gas wells at M9.

The decree does not specify the sample volume, 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 elements of the work scope in the Consent Decree, RAP Attachment 2, RTP developed the protocols and procedures outlined in Section 2.3 of this report 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 probe that was attached to the sampler inlet line in place of the sampling cane. Prior to use, the stainless steel sample probe was heated to purge any organics attached to the probe surfaces. After purging, the probes were capped to prevent inadvertent exposure to trace VOCs. The sampling 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 with 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 teflon tape, tygon tubing and a 1/4" open bore bulk head union with a brass screw-on cap 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 brass screw-on cap 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 screw-on nut and ferrul. The Micro-Tip was turned on and operated for approximately 30 seconds to extract the stagnant well gases. 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 traps at each well. At the end of the sample, the Micro-Tip was again 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. The RTL analytical report is provided in Appendix D. Field data forms and equipment calibrations are provided in Appendix E and F, respectively. Meteorological data is provided in Appendix G.

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 VOCs that were initially identified as the target compound list for this monitoring program. RTP's laboratory instructions required reported sample splitting and breakthrough results for a limited set of trap pairs prior to analyzing the remaining samples. RTL was instructed to perform a splitless analysis of the low volume downwind ambient sample (A3) (front and back traps combined as one sample) and a 10:1 split analysis of the soil gas sample from well M2 (front and back traps combined as one sample) and to report mass loading results to RTP. RTL experienced fairly high concentrations of several compounds including dichlorodifluoromethane, trichlorofluoromethane, ethylbenzene, toluene, xylenes, benzene, tetrachloroethene, and methylene chloride in A3 as well as in all other ambient air samples (A1 and A2). Upon reviewing A3's mass loading RTP instructed RTL to split the high volume downwind ambient sample A2 and upwind high volume ambient sample A1 both at 5:1. As mentioned in Section 3.2 sample A4 was not analyzed due to sampling train failure. The soil gas sample M2 mass loading was found low enough to discontinue analytical splitting for all remaining soil gas samples. The initial round of analyses included the above mentioned limited sample splitting activities in order to identify maximum mass loadings for each sample set (ambient air and soil gas) and to assign analytical splitting requirements for the remaining samples (avoiding detector saturation and GC/MS run abortion) at the same time maximizing analytical sensitivity.

In the second year, first quarter analytical effort, high levels of carbon dioxide had in a few cases obscured early eluting target compound peaks. To avoid this RTP has recommend to RTL that a MS mass 44 scan delay be implemented. The mass 44 scan delay will allow for the analysis of all targeted compounds but may not allow for (semi-) quantitation of tentatively identified compounds with molecular weights less than or equal to 44. The laboratory report (Appendix D) provides a complete description of the analysis of samples. As a result of the scan delay, major data capture and confidence improvements for dichlorodifluoromethane, chloromethane, vinyl chloride, bromomethane, chloroethane and trichlorofluoromethane were made. Target ketones (acetone, 2-butanone, 2-hexanone and 4-methyl-2-pentanone) were tentatively identified when detected by using secondary ion matches at the expected retention time. Caution was given with this ID procedure due to the lack of available confirmation ion ratios. Quantitation of the ketone levels detected are also considered estimates due to calibrations using the primary ion versus the sample using, in some cases, its secondary ion for identification. It should be noted that any ion ratio quantitation made with a single ion integration is much more accurate than a total ion quantitation as specified by the procedure used to calculate tentatively identified compounds (TICs). Also, vinyl acetate (pass target compound) and non targeted TICs with primary and secondary ion matches below mass 45 can not be identified. This procedure was deemed acceptable by RTP given the significance of the early eluting compounds versus targeted ketones relative to AGC values and observed first year concentrations.

Ambient air high volume downwind sample A2 and soil gas well sample M5 were previously estimated to have the highest mass loadings of the ambient air and soil gas sample sets and therefore, were analyzed for breakthrough. Mass loading estimates were made relative to sampler position (downwind) and sample volume (high) for the ambient air samples. The maximum soil gas sample VOC mass loading was estimated by identifying the highest final total hydrocarbon reading (Micro-Tip) of all soil gas samples where moisture in the well was not suspected.

Separate front and back trap analyses on sample A2 revealed 94% dichlorodifluoromethane (new target compound), 30% trichlorofluoromethane and 35% methylene chloride breakthrough. RTP has not encountered significant (> 25%) breakthrough levels for this program until this effort. In examining these levels, RTP has exhausted all possible laboratory analytical procedures and sampling activities which may have biased these values high (i.e. GC/MS system contamination/carry over, mislabeling, GC/MS malfunction, etc.). RTP has not identified a clear explanation for sample A2 breakthrough

with the exception that condensate may have been recovered onto the back trap by mistake. Unfortunately RTP was not notified of the Sample A2 breakthrough results at which Sample A1 breakthrough analysis would have been requested. In case of reoccurring breakthrough in the second year fourth quarter effort, RTP will collect co-location EPA Method TO-14 summa cannisters for compariosn to Sample A2/A3 ambient VOST sample results.

Significant breakthrough, based on the Sample M5 target compound report, was not observed, however, elevated levels of 2-butanone (a reported TIC) suggested otherwise. The high level of 2-butanone observed in the M5 back trap was identified by RTL as GC/MS system contamination/carryover from an earlier sample (M2), therefore breakthrough for sample M5 was not significant. The RTL report is presented in Appendix D.

4.0 DISCUSSION OF RESULTS

4.1 AMBIENT AIR CONCENTRATIONS

For the second year third quarter sampling event at the Old Bethpage Landfill, the ambient air concentrations at selected sites were monitored over a 24-hour period on May 26 and 27, 1993. The sites have been identified and the monitoring and analysis methods are 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 for the air samples collected at the Old Bethpage Landfill. These values are in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and have been adjusted for flow volumes (as calibrated from the digital flow meter), temperature and barometric pressure. That is, samples A1 and A2 are adjusted to total sample volumes of 1050, and 995, respectively. Sample A3 was a low volume sample with a total sample volume of 114 liters. The table includes the lower quantitation limit for each sample. VOC concentration differences between A2 and A3 (co-located samplers) may be due to one or more of the following: variable and/or localized VOC releases and/or analytical inaccuracies inherent with sample splitting (Sample A2 only). All ambient air sample concentrations have been adjusted for trip and field blank concentrations.

TABLE 4.1

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Third Quarter

AMBIENT AIR VOST SAMPLE RESULTS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION*	A1	A2	A3	A4	FB	TB	AGC	AGC
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)		(ug/m3)	(ug/m3)
Benzene	0.667	0.523	2.28	NA			0.12	100
Bromodichloromethane				NA			0.02	0.03**
Bromoform				NA			12	11.9**
Bromomethane				NA				
Carbon Disulfide				NA			7	100
Carbon Tetrachloride	0.219	0.191	0.509	NA			0.07	100
Chlorobenzene				NA			20	1,170
Chloroethane				NA			63,000	52,000
Chloroform				NA			23	167
Chloromethane			175***	NA			770	2,100
Dibromochloromethane				NA			0.1	0.03**
Dibromomethane				NA				
1,2-Dichlorobenzene (o)				NA			200	1,000
1,3-Dichlorobenzene (m)				NA			200	714**
1,4-Dichlorobenzene (p)	0.305	0.271	0.342	NA			700**	
Dichlorodifluoromethane	0.762	2.77	7.02	NA				
1,1-Dichloroethane				NA			500	9,524**
1,2-Dichloroethane				NA			0.039	0.2
1,1-Dichloroethene				NA			0.02	66.7
trans-1,2-Dichloroethene				NA			360	360**
1,2-Dichloropropane				NA			0.15	833**
cis-1,3-Dichloropropene				NA				
trans-1,3-Dichloropropene				NA				
Ethylbenzene	0.952	0.824	0.965	NA			1,000	1,450
Iodomethane				NA				
Methylene Chloride	0.619	0.432	0.737	NA			27	1,170
Styrene				NA			510	716
1,1,2,2-Tetrachloroethane				NA			0.02	23.2
Tetrachloroethene	1.90	1.11	1.32	NA			1.2****	1,120
Toluene	6.57	6.05	4.30	NA			2,000	7,500
1,1,1-Trichloroethane	0.686	0.553	1.58	NA			1,000	38,000
1,1,2-Trichloroethane				NA			0.06	150
Trichloroethene	0.114	0.111	0.316	NA			0.45	900
Trichlorofluoromethane	1.05	1.16	2.11	NA			700	
Vinyl Chloride				NA			0.02	0.4
Xylenes (Total)	4.95	4.12	4.82	NA			300	1,450

TABLE 4.1
Continued

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Third Quarter

AMBIENT AIR VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION*	A1	A2	A3	A4	FB	TB	AGC	AGC
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)		(ug/m3)	(ug/m3)
Acetone				NA			14,000	35,600
Benzaldehyde				NA				
2-Butanone			0.184	NA			300	1,967
2-Chloroethyl Vinyl Ether				NA				
cis-1,2-Dichloroethene				NA			1,900	1,880**
Freon 13				NA			530	133,333**
2-Hexanone				NA				
4-Methyl-2-Pentanone	0.143			NA			480	683

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION*	A1	A2	A3	A4	FB	TB	AGC	AGC
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)		(ug/m3)	(ug/m3)
Ethylmethylbenzene Isomer	3.14	3.72	2.46	NA			0.1	0.03**
Freon 113	1.62	0.121		NA			90,000	90,476**
Hexachloroethane			1.58	NA				
Trimethylbenzene Isomer	2.29	1.91		NA			290	
Undecane			2.02	NA				

*Sample Identification: (see Figure 2.1)

A1: High volume ambient upwind sample collected at the Battle Row Campground (50 feet west and 30 feet south of the southeast campground gate).

A2: High volume ambient downwind sample collected 20 feet southwest of the southeast landfill gate.

A3: Low volume ambient downwind (A2 duplicate) sample collected 20 feet southwest of the southeast landfill gate.

A4: High volume ambient downwind sample collected 220 feet south of well M39.

FB: Field Blank

TB: Trip Blank

**Proposed Value.

***Suspect data (see text).

****Current ambient air Annual Guideline Concentration (AGC) for tetrachloroethene as of November 1991.

NA - Value not available for A4. The A4 sampling train malfunctioned during the test and therefore the samples from A4 were not analyzed.

All values are reported as ug/m3 except for field blank (FB) and trip blank (TB) mass loading results reported as nanograms (ng).

Shaded in values exceed the level of the current (as of June 1991 or November 1991 for tetrachloroethene) and/or previous AGC values.

All blank values are less than the lower quantitation limit. The lower quantitation limit for each sample is:

A1 = 0.0952 ug/m3

A2 = 0.101 ug/m3, 0.0201 ug/m3 for back trap (break through analysis).

A3 = 0.175 ug/m3

A4 = NA

FB = 20 ng

TB = 20 ng

As noted in Table 4.1, three target VOCs were measured to exceed the level of their assigned current (as of June 1991) annual guideline concentration (AGC) value at both upwind and downwind ambient air sampling locations. These were benzene, carbon tetrachloride and tetrachloroethene. Also one tentatively identified compound, ethylmethylbenzene (isomer), was noted as exceeding its assigned AGC. This single occurrence should not be interpreted as an exceedance of the ambient air guideline. Note that other target compounds may have existed in levels exceeding their assigned AGC value, yet may have gone "undetected" (below the lower quantitation limit) since the lower quantitation limits (from 0.0952 to 0.175 ug/m³) are greater, in some cases, than some target compound AGC limits ($\geq$ 0.02 ug/m³).

The chloroethane level detected in sample A3 is considered suspect. RTP believes that this value may have been biased high or reported as a false hit by peak distortion /GC column saturation as a result of various coeluting compounds and unscanned carbon dioxide.

4.2 SOIL GAS CONCENTRATIONS

Soil gas concentrations were monitored on May 26, 1993 at all selected soil gas well sites identified in the Consent Decree. Table 4.2 provides a summary of soil gas well VOC concentrations. These concentration values are reported in micrograms per cubic meter (ug/m³) of soil gas. The table also includes the lower quantitation limit for each sample. All soil gas sample concentrations were adjusted for field blank mass loadings.

There are no state or federal guidelines for permissible soil gas concentrations of VOC. For a relative comparison, Table 4.2 provides the AGCs for ambient air quality. The shaded values indicate soil gas concentrations that exceed the level of the current (as of June 1991) NYSDEC AGC for ambient air. A single occurrence of a value in excess of the AGC should not be interpreted as an exceedance of the ambient air guideline.

As noted in Table 4.2, four target VOCs (1,2-dichloroethane, tetrachloroethene, 1,1,2-trichloroethane and trichloroethene) were measured in excess of the level of the current ambient air (as of June 1991) AGC limit at several soil gas well locations. 1,2-dichloroethane was found in excess of the level of the current (as of June 1991) AGC value at soil gas wells M9 (10,20 and 30). Tetrachloroethene levels

TABLE 4.2

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
Second Year, Third Quarter
SOIL GAS VOST SAMPLE RESULTS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	2.29	11.1	2.27	2.24	2.20	2.27	2.18	2.23	2.21	2.29	2.23	2.21	2.51	2.23	2.18	2.13	2.18	2.21	AGC	AGC
VOC COMPOUND NAME																				
Benzene																			0.12	100
Bromodichloromethane																			0.02	0.03*
Bromoform																			12	11.9
Bromomethane																				
Carbon Disulfide																			7	100
Carbon Tetrachloride																			0.07	100
Chlorobenzene																			20	1,170
Chloroethane																			63,000	52,000
Chloroform														2.34					23	167
Chloromethane																			770	2,100
Dibromochloromethane																			0.1	0.03*
Dibromomethane																				
1,2-Dichlorobenzene (o)																			200	1,000
1,3-Dichlorobenzene (m)																			200	714*
1,4-Dichlorobenzene (p)																			700*	
Dichlorodifluoromethane	2.75					3.40	8.18	12.3	2.32					4.12			17.4		500	9,524*
1,1-Dichloroethane						16.9	17.4	6.25	3.31										0.039	0.2
1,2-Dichloroethane																			0.02	66.7
1,1-Dichloroethene																			360	360*
trans-1,2-Dichloroethene																			0.15	833*
1,2-Dichloropropane																				
cis-1,3-Dichloropropene																				
trans-1,3-Dichloropropene																				
Ethylbenzene																				
Iodomethane																			1,000	1,450
Methylene Chloride																			27	1,170
Styrene																			510	716
1,1,2,2-Tetrachloroethane																			0.02	23.3
Tetrachloroethene	4.36			11.1		6.57	5.02	4.80	3.42	12.6**	16.8	7.30	12.3	3.15			8.01	16.6	1.2***	1,120
Toluene		24.5																	2,000	7,500
1,1,1-Trichloroethane									19.9										1,000	38,000
1,1,2-Trichloroethane									5.85										0.06	150
Trichloroethene									2.21										0.45	900
Trichlorofluoromethane							3.93	32.4	6.62										700	
Vinyl Chloride																			0.02	0.40
Xylenes (Total)	<6.88	<6.69	<6.80	<6.71	<6.59	<6.80	<6.54	<6.70	<6.62	<6.88	<6.70	<6.64	<7.52	<6.69	<6.53	<6.38	<6.53	<6.64	300	1,450*

TABLE 4.2
(Continued)

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Third Quarter

SOIL GAS VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	2.29	11.1	2.27	2.24	2.20	2.27	2.18	2.23	2.21	2.29	2.23	2.21	2.51	2.23	2.18	2.13	2.18	2.21	AGC	AGC
VOC COMPOUND NAME																				
Acetone																			14,000	35,600
Benzaldehyde																				
2-Butanone		5.470**		772**	32.9							9.30	5.89					26.6	300	1,967
2-Chloroethyl Vinyl Ether																				
cis-1,2-Dichloroethene																			1,900	1,880*
Freon 13																			530	133,333*
2-Hexanone			3.74																	
4-Methyl-2-Pentanone																			480	683

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	2.29	11.1	2.27	2.24	2.20	2.27	2.18	2.23	2.21	2.29	2.23	2.21	2.51	2.23	2.18	2.13	2.18	2.21	AGC	AGC
VOC COMPOUND NAME																				
Caryophyllene							8.18													
Cyclohexanone				28.0															240	238*
2,2-Dimethylbicyclo[2.2.1]heptane					121		8.18													
Hexachloroethane	10.7		4.64	12.3						2.98	16.8	16.6		4.57				11.0		
Methylmethyl ethylbenzene isomer													3.76							
Methylpropylnonane isomer													7.52				66.4			
4-Methylene-1-(1-methylethyl)cyclohexene													5.51							
beta-Myrcene													46.4							
alpha-Pinene																				
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon113)									41.9										90,000	90,476*
2,2,3-Trimethylbicyclo[2.2.1]heptane isomer																	31.6			
2,2,6-Trimethyldecane																	35.9	29.9		
Undecane																				

All values are reported in micrograms per cubic meter (ug/m3).

All blank values are less than the lower quantitation limit reported for each sample.

Values in shaded areas exceed the level of the current (as of 6/91 or 11/91 for Tetrachloroethene) and/or previous ambient air Annual Guideline Concentration (AGC) values.

*Proposed Value

**Suspect data (see text).

***Current AGC for Tetrachloroethene as of November 1991.

exceeded current (as of June 1991) AGC value at soil gas wells F1, M5, M9(10'), M9(20'), M9(30'), M9(40'), M13, M16, M21, M28, M31, M37 and M39. Trichloroethene and 1,1,2-trichloroethane were both measured in excess of the current ambient air (as of June 1991) AGC value at soil gas well M9(40'). Also one tentatively identified compound, 2-butanone, was reported as potentially exceeding the current AGC in soil gas wells M5 and M2. As mentioned in Section 3.4, 2-butanone found in M5 was believed due to GC system contamination/carry over from sample M2. The M2 soil gas probe was replaced the day before the soil gas test and could have been contaminated prior to installation resulting in the observed high 2-butanone level. Note that since the lower quantitation limits exceed several AGCs, other wells may exceed AGC levels of 1,2 dichloroethane, tetrachloroethene, 1,1,2-trichloroethane, trichloroethene and other compounds with a low ($<11.1 \text{ ug/m}^3$) AGC value. Unfortunately, larger soil gas volumes can not be extracted to improve the lower quantitation limits because of the volume limits within the wells.

In addition to suspect M2 and M5 2-butanone data, RTP has questioned the M13 tetrachloroethene results. RTP believes and RTL has confirmed that it is likely that the GC system contamination/carryover of M9 (40') tetrachloroethene biased the M13 tetrachloroethene values high.

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 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, (2) southeast of the landfill between TGV-1 and LGV-9 and (3) south of the landfill at either F-6 or F-9. 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. Soil gas pressure readings are being continued for the second year of monitoring on a quarterly basis.

A quarterly soil gas pressure measurement was conducted on May 27, 1993. A 10 inch inclined manometer, manufactured by Dwyer Instruments, Inc. was used to monitor soil gas pressures at each well. The 0-1 inch inclined portion is divided into 0.01 inch increments with the remaining portion (1-10 inches) marked in 0.1 inch increments. There are two soil gas pressure 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 1030 EDT and 1200 EDT on May 27, 1993. Table 5.1 provides a summary of the soil gas pressure tests. The readings indicate that most pressure probes were under zero or negative pressure at the time of the test. The upper well at PW2 had a zero reading, however, it is believed that it 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

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Third Quarter

SUMMARY OF SOIL GAS PRESSURE TESTS

SAMPLE ID	DATE (m/d/yr)	TIME (EDT)	WELL ID	WELL LOCATION	WELL DEPTH (feet)	READINGS (INCHES H ₂ O)	SPECIAL NOTES
P1	5/27/93	1030	PW2	SE of landfill	10	0.00	1
P2	5/27/93	1033	PW2	SE of landfill	20	-0.14	
P3	5/27/93	1040	PW1	NW of landfill by haul road	10	-0.10	
P4	5/27/93	1044	PW1	NW of landfill by haul road	20	-0.07	
P5	5/27/93	1050	PW1	NW of landfill by haul road	10	-0.09	
P6	5/27/93	1055	PW1	NW of landfill by haul road	20	-0.07	
P7	5/27/93	1105	PW2	SE of landfill	10	0.00	1
P8	5/27/93	1110	PW2	SE of landfill	20	-0.14	
P9	5/27/93	1140	PW3	S of landfill inside FTC	10	-0.37	
P10	5/27/93	1145	PW3	S of landfill inside FTC	20	-0.44	
P11	5/27/93	1155	PW3	S of landfill inside FTC	10	-0.35	
P12	5/27/93	1200	PW3	S of landfill inside FTC	20	-0.44	

FTC - Firemen's Training Center

1- The upper well (10 feet) at PW2 may have been flooded with water resulting in the zero reading.

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-13). 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 be 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

**MONITORING PROTOCOLS AND
SAMPLING EQUIPMENT DESCRIPTIONS**

AMBIENT AIR SAMPLING PROTOCOL

1. Obtain pre-conditioned VOST tubes from analytical laboratory and refrigerate with blue ice in the shipping cooler. Prior to testing, inspect the condition of the 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 both a high flow (0.70 Lpm) and low flow (0.07 Lpm) Supelco rotameter and set the desired SKC sampling pump flowrate according to manufacturer's specifications.
 - o Attach precalibrated SKC sampling pump and additional battery pack to the exterior of the sampling cooler. For the low flow ambient air sampling train only, attach the two (2) SKC single stage universal flow controllers, in parallel, connecting the pre-set (0.07 Lpm) controller in line with the pump, low flow rotameter and sample line downstream of the sorbent traps.
 - o Install aluminum trap holder and partially fill the cooler (1/4 full) with ice.
 - o Close the cooler lid, cap the sample line inlet and transport the sampling assembly and VOST traps to the selected sampling site.
3. Remove a pair of VOST traps from the shipping container and follow USEPA VOST procedures augmented as follows. Label each trap shipping container with sample number/location. Using precleaned wrenches, install the traps in the modified VOST sampling train.
4. Monitor total VOC concentrations with the portable Photovac Micro-Tip (Micro-Tip) and determine the acceptability of the precalibrated flow rates. Adjust the flow rate according to the Micro-Tip reading. Reading of zero for total VOCs indicates that 1000 liter volume on high flow samples is appropriate. For readings greater than zero, adjust high flow rate sampling interval to accumulate no more than 100 ug of total VOC on a pair of sorbent traps.

5. Perform a system leak check by drawing a vacuum across the entire sampling train by capping the sample inlet. Turn on the pump. Pump failure should occur within 40 seconds. If not, identify and repair the air leak and repeat.
6. Remove cap from sample inlet, start the sampling event by turning on the SKC pump and record the starting time.
7. Examine the pump operation for proper cycling and record rotameter reading, elapsed time, sample location, sample ID and other observations such as Micro-Tip 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. Note elapsed and clock times for each observation.
9. At the conclusion of 24-hour sampling period, record sample elapsed and clock times and check sample lines, ice levels, Micro-Tip reading and record observations in the field log. Perform a system leak check as per Item 5 above and note results.
10. Open the sampler lid and remove VOST shipping tubes from the storage/shipping container. Remove the VOST traps, from the sampling train, wrench tighten VOST caps and place in the pre-labeled (Item 3) shipping tubes. Remove the impinger trap, pour contents into a clean septum vial and top off with HPLC water. Label and place in storage/shipping container. Place the VOST shipping tubes in an air freight container with manifest.
11. Disassemble the sampling trains, clean and return to storage.
12. Send the sampling traps and vials to laboratory for analysis.

SOIL GAS SAMPLING PROTOCOL

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

1. Inspect all soil gas wells for damage and/or leaks and cap. Assemble a soil gas sampling probe consisting of a precleaned stainless steel tube and teflon sampling line and substitute for ambient air probe calibrate a high flow (1.0 Lpm) supelco rotameter.
2. Transport the sampling tubes and sampling train to the field sampling locations.
3. Record the well site ambient VOC reading.
4. Remove the cap from sampling well, insert sampling probe connected to the Micro-Tip and draw sufficient volume of sample to clear lines and sampling probe and well. Record the average and highest VOC reading during line clearing procedure by using the Micro-Tip.
5. Using the last recorded VOC value, determine the sample volume that would effectively place 10 to 100 ug of total VOC's into the VOST traps.
6. Remove the VOST trap pair from the shipping container, label trap and shipping container with sample number and location. Reconnect the soil gas sample probe to the modified VOST unit.
7. Turn on the sampling pump with a 0.5 Lpm to 1.0 Lpm sample rate for 10 minutes if the Micro-Tip reading is zero or for calculated sampling rate and interval if the Micro-Tip provides a non-zero result. Record the starting time and any abnormalities onsite.
8. Record the sampling ending time/rotameter reading. Turn off pump. Record the ambient total VOC reading at the end of the test.
9. Remove the sample VOST traps as per the ambient air sampling procedure.

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

METEOROLOGICAL MONITORING PROTOCOL

1. Establish the weather conditions appropriate for conducting the ambient air and soil gas survey. (Falling atmospheric pressure, steady wind direction over 24-hour period, rainfall less than 30 percent chance).
2. Assemble the 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 the sites 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 the end of test period and remove equipment. Note all problems/conditions that could influence data accuracy, quality or test results.
6. Prepare a data base in a format suitable for inclusion in the ambient air/soil gas survey.

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. 102 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 $\pm 5\%$ 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 continuously for 1,440 minutes at 0.70 Lpm (nominal). A GEL CEL battery was connected in parallel to the pump battery to provide sufficient power for the 24-hour period. The planned sample was 1,000 liters. Low flow samplers were scheduled to run continuously for the 1440 minute test period. The desired total sample volume was 100 liters.

Pre-calibrated Supelco rotameters were used for visual flow checks during sampling. The Supelco rotameters were calibrated using an 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 sampling units when using the VOST traps.

PUMP CALIBRATOR

An SKC Model 712 Electronic Calibrator (Digital Film Flowmeter) was used to pre-calibrate the nominal flow rate for all Supelco rotameters for field use in determining the pump flow rates during sample collection.

The 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 for both the pump calibrator and Supelco rotameter is stated at $\pm 2\%$.

The operator calibrated the Supelco rotameters prior to the test. A pre and post calibration and a comparison check on the rotameters was completed.

Wind Mark III Wind Sensors

- Low Threshold
- Low Cost
- Low Power CMOS Design
- Lightweight
- Optional External Heaters

Climatronics' Wind Mark III (WM-III) Wind Sensors combine accuracy and reliability with low cost.

The WM-III sensors meet Environmental Protection Agency's (EPA) Prevention of Significant Deterioration (PSD) requirements. They are also well suited for general wind monitoring applications.

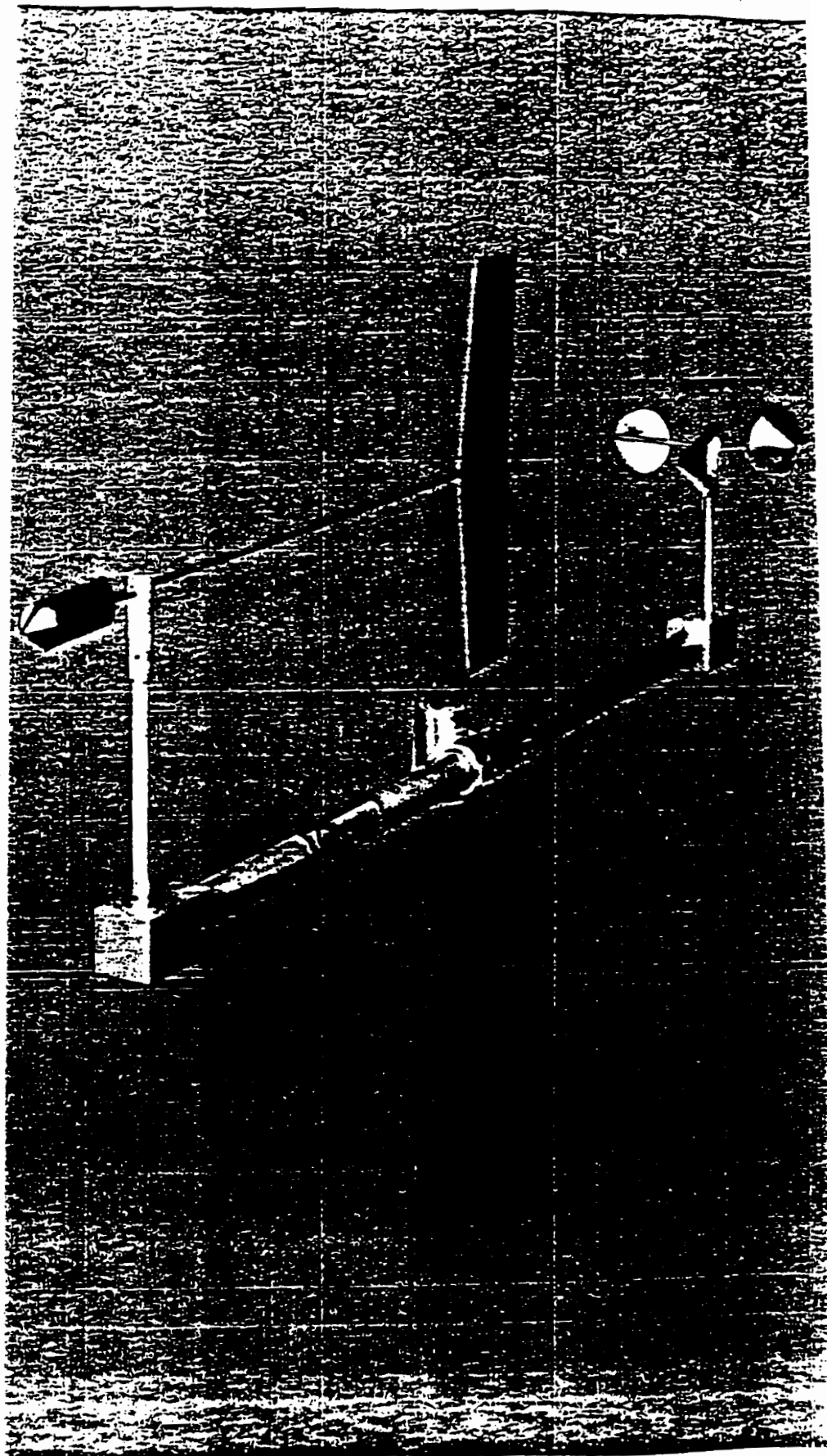
Wind speed is sensed by a three-cup anemometer and is converted to an electrical signal by a 20-hole photochopper, which uses a solid state light source for maximum reliability. Wind direction is sensed by a counterbalanced wind vane coupled to a precision, low-torque potentiometer. Both the wind speed and wind direction sensors use stainless steel precision ball bearings for maximum life and low threshold. Traceability to NBS is available as an option for each anemometer cup assembly by comparison testing against an NBS transfer standard in our wind tunnel test facility.

The sensors and their crossarm are an integral unit. The prewired crossarm mounts on a 3/4-inch IPS vertical pipe stub (1.05 inch O.D.). Orientation of the crossarm is along an East-West plane.

Optional external heaters for both sensors are available. These heaters consume approximately 40 watts of power and are thermostatically controlled.

The WM-III sensor is also available as a wind speed only (P/N 100108-1) or wind direction only (P/N 100108-2) instrument.

Recently, an improved, ruggedized aluminum cup (P/N 101286) and magnesium vane (P/N 101292) combination has been made part of the WM-III sensor package. The original stainless steel cups (P/N 100160) and windward vane (P/N 100107) can still be provided as options. To safely transport the WM-III sensors with cups and vane, a transit case (P/N 100255) is available.



signal conditioners for the WM-III sensors are available in modular form with a variety of full scale ranges, engineering units, outputs, and several other options. Please consult the Modular Meteorological System (MMS) and the Remote Meteorological System (RMS) bulletins for more details.

The WM-III sensors are standard equipment in the Utility Wind System and the Electronic Weather Station (EWS). Please consult these bulletins for additional information.

SENSOR SPECIFICATIONS

PERFORMANCE	WM-III WIND SPEED	WM-III WIND DIRECTION
Accuracy	± 0.11 m/s (± 0.25 mph) or $\pm 1.5\%$	$\pm 3^\circ$
Threshold	< 0.45 m/s (< 1.00 mph)	< 0.45 m/s (< 1.00 mph)
Distance Constant	4.6m (15.0 ft.) of air max. 2.4m (8.0 ft.) of air max. - optional	4.6m (15.0 ft.) of air max. 2.4m (8.0 ft.) of air max. - optional
Damping Ratio		0.4 to 0.6 at 10° initial angle of attack
Operating Range	0-55 m/s (0-125 mph)	0° to 360° — mechanical 0° to 355° — electrical

ELECTRICAL SPECIFICATIONS

Signal Output	Nominal 2.0 Vpp into 4.7 K ohm, frequency proportional to wind speed, amplitude dependent on supply voltage	Variable DC voltage, magnitude proportional to wind direction.
Power Requirements*	6-12 Vdc at 1 mA nominal	Max. 5 mA through 2 K ohms

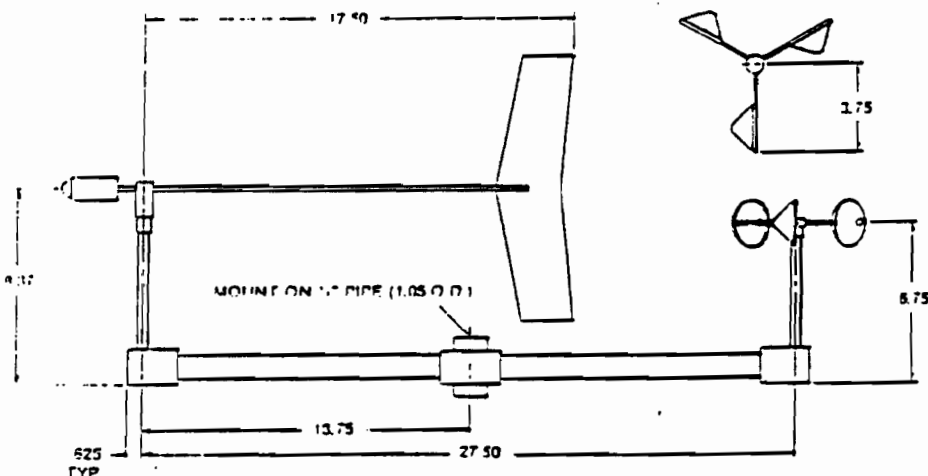
*Proper power provided by Climatronics' signal conditioner.

PHYSICAL SPECIFICATIONS

Weight	Less than 0.9 kg. (2 lbs.)	Less than 0.9 kg. (2 lbs.)
Turning Radius	9.5 cm (3.75 inch)	41.9 cm (17.5 inch)
Operating Temperature	-40° to 60° C (-40° to 140° F)	-40° to 60° C (-40° to 140° F)
Use with Signal Conditioner	P/N 100161 (MMS) P/N 100778 (RMS)	P/N 100161 (MMS) P/N 100779 (RMS)

SENSOR HEATER SPECIFICATIONS

Power Requirements	115 Vac, 60 Hz, 20 Watts per sensor (P/N 101234)



CLIMA CORPORATION

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Jama, New York 11716

516-567-7200
516-5101007569
516-567-7585

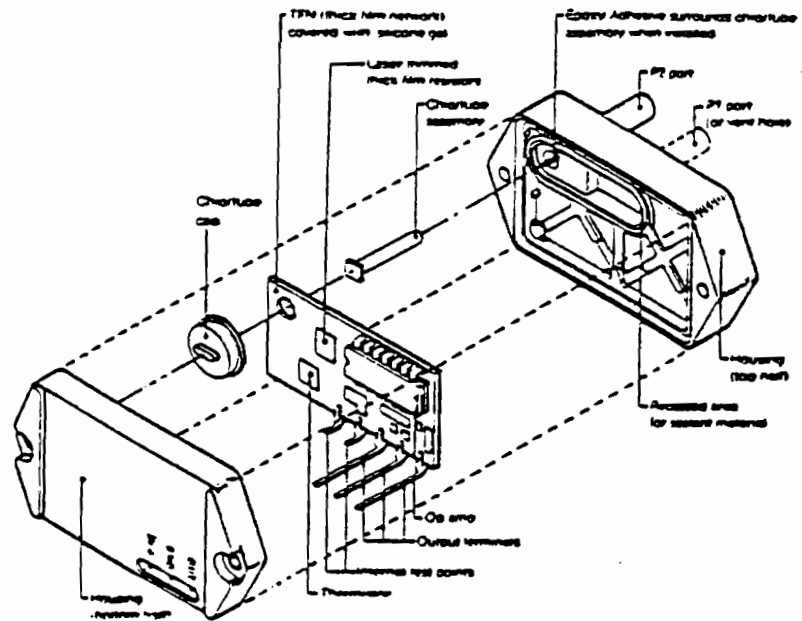
SOLID-STATE BAROMETRIC PRESSURE SENSOR

Climatronics' Solid-State Barometric Pressure Sensor (P/N 101448) uses a piezoresistive device to measure atmospheric pressure and is ideally suited to applications requiring exact measurement of pressure where the benefits of repeatability, low hysteresis and long-term stability are important. It offers state-of-the-art benefits of hybrid IC devices, including compactness, ruggedness, and reliability. Internal circuitry provides temperature compensation as an integral part of each device and is optimized on each unit as part of the calibration procedure.

The heart of the Solid-State Barometric Pressure Sensor is a small, square silicon chip with an integral sensing diaphragm and implanted piezoresistors. Pressure applied on the diaphragm causes it to flex, inducing a stress or strain in the buried resistors. The resistor values will change depending on the amount of pressure applied to the diaphragm. By providing a precisely-controlled reference voltage to the sensor's resistive network, an output voltage signal is produced which is proportional to the ambient pressure. Because of the unique construction, this output is very predictable, providing an ideal sensing element for barometric pressure sensors.

The range of this Solid-State Barometric Pressure Sensor is 00-1100mb. It can be used with Climatronics' modular signal conditioners or interfaced directly to a Remote Terminal Unit (RTU) for direct digital data acquisition.

EXPLODED VIEW



SPECIFICATIONS

Range	600mb to 1100mb (17.72" Hg. to 32.48" Hg.)
Accuracy (includes temperature, co- efficient, hys- teresis, and linearity)	±1.5mb
Resolution	Infinite
Temperature Range Compensated	-18°C to 63°C (0°F to 145°F)
Operating	-40°C to 85°C (-40°F to 185°F)
Elevation Range	Sea Level to 14,000 ft. Sea Level to 4265m
Input Voltage	+12 Vdc (nominal)
Output Voltage	1 to 5 Vdc
Power Required	0.18 Va
Size - Sensor Enclosure (Optional)	3"L x 2"W x 1½"H 7 1/8"L x 4½" W x 5 1/8" H



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SENSOR SPECIFICATIONS — P/N 100108

	<u>WM-III Wind Speed</u> (P/N 100108-1)	<u>WM-III Wind Direction</u> (P/N 100108-2)
Performance		
Accuracy	± 0.11 m/s (0.25 mph) or $\pm 1.5\%$	$\pm 2^\circ$
Threshold	0.34 m/s (0.75 mph)	0.34 m/s (0.75 mph)
Distance Constant	4.6m (15.0 ft.) of air max. 2.4m (8.0 ft.) of air max. - optional	4.6m (15.0 ft.) of air max. 2.4m (8.0 ft.) of air max. - optional
Damping Ratio		0.4 to 0.6 at 10° initial angle of attack
Operating Range	0-55 m/s (0-125 mph)	0° to 360° — mechanical 0° to 340° — electrical

ELECTRICAL SPECIFICATIONS

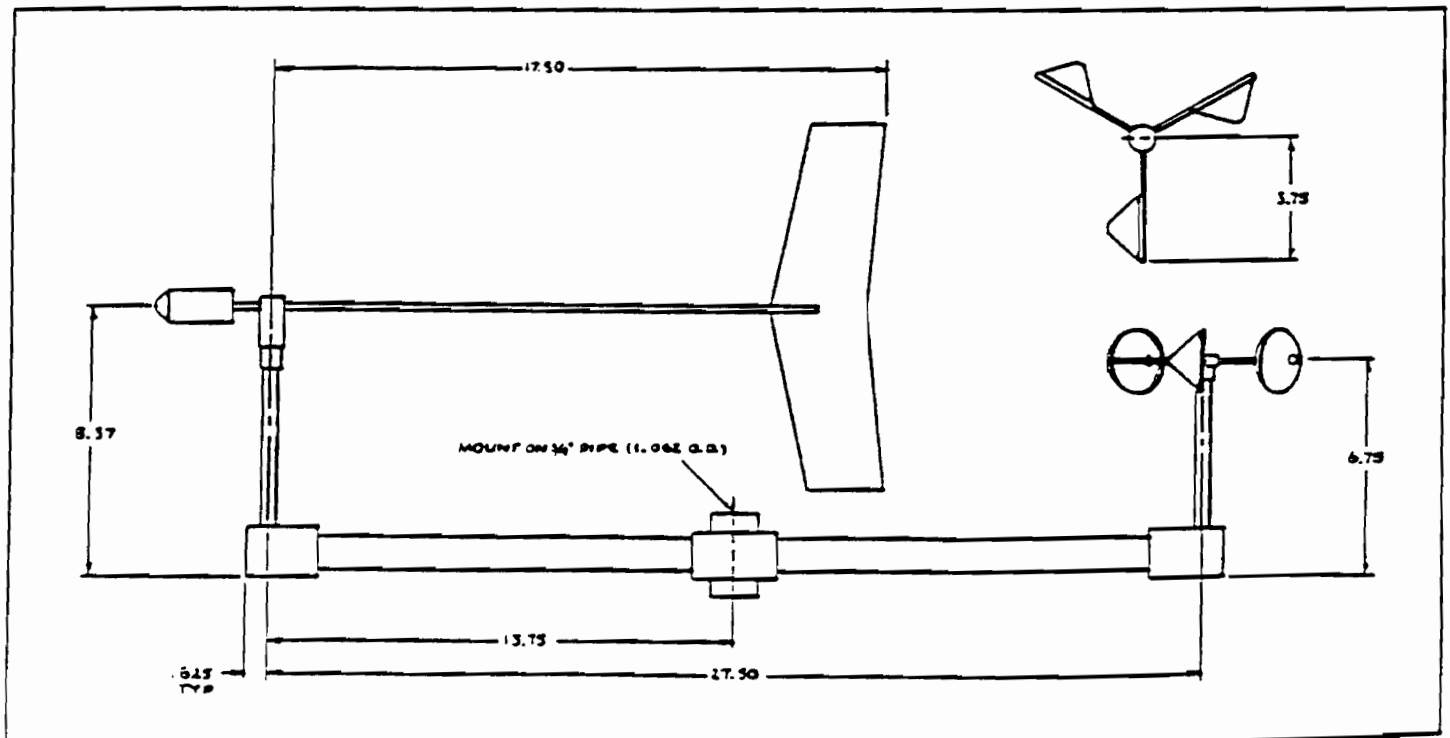
Signal Output	Nominal 2.0 Vpp into 4.7 K ohm, frequency proportional to wind speed, amplitude dependent on supply voltage	Variable DC voltage, magnitude proportional to wind direction
Power Requirements	6-12 Vdc at 1 mA* nominal	Max. 5 mA through 2 K ohms*
*Proper power provided by translator module.		

PHYSICAL SPECIFICATIONS

Weight	Less than 0.9 kg. (2 lbs.)	Less than 0.9 kg. (2 lbs.)
Turning Radius	9.5 cm (3.75 inch)	41.9 cm (16.5 inch)
Operating Temperature	-40° to 60° C (-40° to 140° F)	-40° to 60° C (-40° to 140° F)
Use with Translator	P/N 100163 (MMS) P/N 100778 (RMS)	P/N 100163 (MMS) P/N 100779 (RMS)

SENSOR HEATER SPECIFICATIONS

Power Requirements	P/N 101235 115 Vac; 60 Hz, 40 Watts per sensor





IMP-860 DATALOGGER

- o Direct sensor inputs
- o Control outputs
- o User programmable
- o Built-in data instruction set
- o Large internal data storage
- o Solid-state data cartridges
- o Phone line, dedicated line or radio telemetry
- o PC compatible
- o Low power
- o Choice of enclosures
- o Built-in surge protection

The IMP-860 Datalogger is an extremely versatile, state-of-the-art, digital data acquisition system designed for environmental monitoring applications. It can function as a remote, stand-alone station or can be operated with a central computer either by itself or in a network with other units.

Sensor inputs are accepted directly by the IMP-860, thereby eliminating the need for additional signal conditioning equipment. The signals will be processed as necessary, computations will be performed as required, and the data will be stored in internal memory for later retrieval by a remote computer or on a removable storage medium for manual retrieval.

User programming of the IMP-860 is easily accomplished using either an IBM PC-compatible computer or an operational, portable keyboard/display unit. A comprehensive set of programming instructions is included which allows a multitude of calculations to be performed on any desired channel, including interactions between channels. A standard program is available and can be modified by the user at any time.

Following electrical specifications are valid for an ambient temperature range of -25 °C to +50 °C unless otherwise specified.

ANALOG INPUTS

NUMBER OF CHANNELS: 12 single ended or 5 differential with any combination software selectable

CHANNEL EXPANSION: Increments of 32 channels multiplexed through a single IMP-860 channel with the Model CAM32 Relay Scanner. Maximum of 5 CAM32s possible.

ACCURACY OF VOLTAGE MEASUREMENTS AND ANALOG OUTPUT VOLTAGES: 0.2% of FSR, 0.1% of FSR (0 to 40 °C).

RANGE AND RESOLUTION: Ranges are software selectable for any channel. Resolution for single ended measurements is twice the value shown.

Full Scale Range	Resolution
± 2.50 volts	333. microvolts
± 0.25 volts	33.3 microvolts
± 25.0 millivolts	3.33 microvolts
± 7.5 millivolts	1.00 microvolts
± 2.5 millivolts	0.33 microvolts

INPUT SAMPLE RATES: The fast or slow A/D conversion uses a 250 us or 16.666 ms signal integration time (16.666 ms is one AC power line cycle). Differential measurements include a second sampling with reversed input polarity to reduce thermal offset and common mode errors. Input sample rates are the time required to measure and convert the result to engineering units. Times do not include the self-calibration measurement which occurs once per instruction.

Fast single ended voltage: 2.4 ms
Fast differential voltage: 3.7 ms
Slow single ended voltage: 18.8 ms
Slow differential voltage: 37.0 ms
Fast dif. thermocouple: 8.3 ms

INPUT NOISE VOLTAGE:
Fast differential — 0.83 microvolts RMS
Slow differential — 0.10 microvolts RMS

COMMON MODE RANGE: ±2.5 volts.

DC COMMON MODE REJECTION: >140 dB.

NORMAL MODE REJECTION: 70 dB (60 Hz with slow differential measurement).

INPUT CURRENT: 3 nanoamps max.

INPUT RESISTANCE: 200 gighms.

EXCITATION OUTPUTS

DESCRIPTION: The IMP-860 has 3 switched excitations, active only during measurement, with only one output active at any time. The off state is high impedance.

RANGE: ±2.5 volts.

RESOLUTION: 0.67 millivolts.

ACCURACY: Same as voltage input.

OUTPUT CURRENT: 20 mA @ ± 2.5 V, 35 mA @ ± 2.0 V, 50 mA @ ± 1.5 V.

FREQUENCY SWEEP FUNCTION: A swept frequency square wave output between 0 and 2.5 volts is provided for vibrating wire transducers. Timing and frequency range are specified by the instruction.

PERIOD AVERAGING MEASUREMENTS

DEFINITION: The time period for a specified number of cycles of an input frequency is measured, then divided by the number of cycles to obtain the average period of a single cycle.

INPUTS: Any single ended analog channel with configuration defined in the user program. Signal dividing may be required to eliminate interference with measurements on adjacent channels.

INPUT FREQUENCY RANGE:

Range Code	Preamplifier Gain	Input Hysteresis	Maximum Frequency
4	1	10 mV	200 kHz
3	10	1 mV	50 kHz
2	33	300 uV	20 kHz
1	100	100 uV	8 kHz

REFERENCE ACCURACY: ±20 ppm.

RESOLUTION: ±50 nanoseconds divided by the number of cycles measured. Resolution is reduced by signal noise and for signals with a slow transition through the zero voltage threshold.

TIME REQUIRED FOR MEASUREMENT: Signal period times the number of cycles measured plus 1.5 cycles; minimum measurement time is 2 ms.

RESISTANCE AND CONDUCTIVITY MEASUREMENTS

ACCURACY: 0.015% of full scale bridge output, limited by the matching bridge resistors. The excitation voltage should be programmed so the bridge output matches the full scale input voltage range.

MEASUREMENT TYPES: 5 wire and 4 wire full bridge; 4 wire, 3 wire, and 2 wire half bridge. Bridge measurements are ratio-metric and dual polarity to eliminate thermal emfs. AC resistance measurements use a dual polarity 750 us excitation pulse for ionic depolarization, with the signal integration occurring over the last 250 us.

PULSE COUNTERS

NUMBER OF PULSE COUNTER CHANNELS: 2 eight bit or 1 sixteen bit selectable.

MAXIMUM COUNT RATE: 2000 Hz, eight bit counters; 250 kHz, sixteen bit counters. Pulse counter channels scanned at 8 Hz.

MODES: Switch closure, high frequency pulse, and low level AC.

SWITCH CLOSURE MODE

Minimum Switch Closed Time: 5 ms.
Minimum Switch Open Time: 8 ms.
Maximum Bounce Time: 1 ms open without count.

HIGH FREQUENCY PULSE MODE

Minimum Pulse Width: 2 us.
Maximum Input Frequency: 250 kHz.
Voltage Thresholds: Count upon transition from below 1.5 V to above 3.5 V.
Maximum Input Voltage: ±20 V.

LOW LEVEL AC MODE

(Typical of magnetic pulse flow sensors, selected anemometers, etc.)

Min. AC Input Voltage: 5 mV RMS.
Input Hysteresis: 11 mV.
Max. AC Input Voltage: 20 V RMS.

Frequency Range:

AC Input (RMS)	Range
20 millivolts	1 Hz to 100 Hz
50 millivolts	0.5 Hz to 400 Hz
150 millivolts to 20 V	0.3 Hz to 1000 Hz

(Consult factory if higher frequencies are desired.)

DIGITAL I/O PORTS

3 ports, software selectable as binary inputs or control outputs.

OUTPUT VOLTAGES (no load):

high — 5 V ± 0.1 V; low — < 0.1 V.

OUTPUT RESISTANCE: 500 ohms.

INPUT STATE: high — > 3 V; low — < 0.3 V.

INPUT RESISTANCE: 100 kohms.

TRANSIENT PROTECTION

All input and output connections to the IMP-860 module are protected using RC filters or transzors connected to a heavy copper bar between the circuit card and the case. The IMP-860 Wiring Panel includes additional spark gap and transzoro protection.

CPU AND INTERFACE

PROCESSOR: Hitachi 6303.

MEMORY: 32k ROM, 16k RAM expandable to 64k.

DISPLAY: 8 digit LCD (0.5" digits).

PERIPHERAL INTERFACE: 9 pin D-type connector for keyboard/display, storage module, cassette, modem, printer, and RS232 adapter. Baud rates selectable at 300, 1200, 9600, and 76,800.

CLOCK ACCURACY: ±1 minute per month.

MAXIMUM PROGRAM EXECUTION RATE: System tasks initiated in sync with real-time up to 64 Hz. One measurement with tape transfer is possible at this rate without interruption.

SYSTEM POWER REQUIREMENTS

VOLTAGE: 9.6 to 16 volts.

TYPICAL CURRENT DRAIN: 0.5 mA quiescent, 13 mA during processing, and 35 mA during analog measurement.

BATTERIES: 7.5 Ahr alkaline D-cells or 5 Ahr rechargeable lead acid batteries, standard.

PHYSICAL SPECIFICATIONS

SIZE: 7.5" x 3.5" x 1.5"; 9" x 3.5" x 2.9" with IMP-860 Wiring Panel. Input connectors extend length 0.15".

WEIGHT: 2 lbs.

WARRANTY

Two years against defects in materials and workmanship.



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PRECIPITATION GAUGES

- RELIABLE AND ACCURATE
- TIPPING AND WEIGHING BUCKETS
- ENGLISH OR METRIC MEASURE
- OPTIONAL ELECTRIC/PROPANE HEAT

Climatronics offers a variety of precipitation gauges, which are all accurate and durable. Models are available for both AC and DC powered systems, with or without heaters.



Tipping Bucket Gauges are available with screened funnels of 6 or 8-inch diameter. Precipitation is channeled to a triangular bucket which tips for every 0.01 inch of water collected. When the bucket empties it activates a sealed reed switch; which sends an event message to the signal conditioner. Upon tipping, the accumulated water is drained.

Both tipping bucket sensors can be provided with optional electric heaters for AC powered systems. In addition, the 8 inch version can accommodate a propane heater for DC powered systems. The heaters prevent data loss during freezing conditions and melt snow so the water content may be measured by the tipping bucket. Either type of gauge is easy to install; requiring a level piece of ground that is free from obstruction. Signal conditioners are available in modular form with an input range of 0-1 inch (0-2.5 cm) or 0-10 inch (0-25 cm), corresponding standard output ranges of 0-1 or 0-5 Vdc.

A wind shield is available to prevent undue turbulence near the sensor funnel, insuring a representative data capture.

SENSOR SPECIFICATIONS

	<u>*6" Tipping Bucket</u> <u>P/N 100508</u>	<u>**3" Tipping Bucket</u> <u>P/N 100097</u>
ACCURACY	±1% up to 7.5 cm/hr (3 inch/hr.)	±3% for rain rates of 2.54 to 15.24 cm/hr (1 to 6 inch/hr.)
	±5% up to 25 cm/hr (10 inch/hr)	
RESOLUTION (Sensitivity)	0.025 cm (0.01 in.)	0.025 cm (0.01 in.)

ELECTRICAL SPECIFICATIONS

	<u>*6" Tipping Bucket</u> <u>P/N 100508</u>	<u>**3" Tipping Bucket</u> <u>P/N 100097</u>
POWER REQUIREMENTS (Without Heat)	1 None	1 None
OUTPUT	Switch Closure	Switch Closure
CONTACT RATING	2 amps @ 12 Vdc	3 amps @ 50 Vdc

PHYSICAL SPECIFICATIONS

	<u>*6" Tipping Bucket</u> <u>P/N 100508</u>	<u>**3" Tipping Bucket</u> <u>P/N 100097</u>
SIZE	26.0 H x 15.9 cm Dia. (10.25 H x 6.25 in Dia.)	46.3 H x 20.3 cm Dia. (18.25 H x 8 in Dia.)
WEIGHT	1.1 Kg (2.5 lbs)	11.4 Kg (25 lbs)
OPERATING TEMPERATURE (Heated)	-40°C to +60°C (-40°F to +140°F)	-40°C to +60°C (-40°F to +140°F)
USE WITH SIGNAL CONDITIONER	P/N 100747 (MMS) P/N 100840 (RMS)	P/N 100747 (MMS) P/N 100840 (RMS)

- 1 Power supplied by Signal Conditioner
* Electric Heat Available, 40 watts
** Electric and Propane Heat Available
(Electric Heat, 200 watts)



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0588

APPENDIX C

CHRONOLOGY

AMBIENT AIR, SOIL GAS AND WELL PRESSURE SAMPLING EVENTS

CHRONOLOGY - AMBIENT AIR SAMPLING

SAMPLE 2-3A1

- MAY 26, 1993

Sample 2-3A1 was a high volume, upwind ambient air sample. Sampler A1 and the SKC pump C were used for collecting this sample. Precalibrated rotameter three (3) (R3) was used to set the initial sampling rate and to check the sampling rate during the entire sampling period. The nominal flow rate was 0.7 liters per minute (Lpm). The sampler was programmed to run 24 hours continuously (1440 min.) to collect a nominal 1000 liter sample. The sampling location was A1 as shown in Figure 2.1. This location is outside the landfill property at an open area on the east end of the Battle Row Campground about 50 feet west and 30 feet south of the southeast campground gate. The campground is located west of the landfill. Prior to the start of the test, an initial ambient VOC reading was taken, a leak check was performed and a maximum and minimum temperature thermometer (max/min thermometer) was set inside the sampler to record the temperature change. The initial VOC reading was 0.0 ppm and no leak was found. The sampler was started at 0847 EDT with an initial rotameter reading of 87 units at the bottom of the stainless steel ball of R3.

Rotameter readings were recorded at 0855 EDT, 1047 EDT and 1107 EDT. The readings were 87 units, 86 units and 87 units. For the recorded total elapsed times of 8 minutes, 120 minutes and 140 minutes, respectively. At 110 EDT, the operator checked the sampler interior, reset the max/min thermometer and observed an overcast sky condition.

The operator checked the sampler again at 1318 EDT, 1447 EDT, 1708 EDT, 1913 EDT and 2246 EDT. The rotameter readings were at 90, 89, 88, 87 and 86 units at the bottom of the stainless steel ball of R3. For the recorded total elapsed times of 270, 359, 502, 620 and 839 minutes, respectively. During the inspection around 1318 EDT, the operator observed the sky condition had changed from overcast to sunny. At 1545 EDT, the operator observed that someone had dumped barbecue ash into the dumpster, which was positioned about 90 yards away and made note of it in the data sheet.

- MAY 27, 1993

The operator checked the sampler three times (0114 EDT, 0453 EDT, and 0818 EDT) and the rotameter readings were at 84, 84 and 88 units with the total elapsed times of 987, 1205 and 1412 minutes, respectively. The pump operation was normal during the whole sampling period. No unusual events were noted. The sampler was removed from service at 0847 EDT with the total elapsed time of 1440 minutes. The ambient VOC reading upon removal was taken again and the reading was 0.2 ppm. The recorded max/min temperature inside the sampling cooler were 66°F and 42°F, respectively.

SAMPLE 2-3A2

- MAY 26, 1993

Sample 2-3A2 was a high volume, downwind ambient air sample. Pump A was used along with the sampling unit A2. Precalibrated rotameter R3 was used to set the initial sampling rate and to check the flowrate during the entire sampling period. The nominal flow rate was 0.7 Lpm. The sampler was programmed to run 1440 min. continuously to collect a nominal 1000 liter sample. The sampling location was A2 (Figure 2.1) which is southeast of the landfill and northwest of the soil gas well M2. The ambient VOC concentration was 0.0 ppm prior to sampling. A max/min thermometer was set inside the sampler to measure the maximum and minimum temperatures during the sampling period. The leak check was approved before the sampler was started. The sample collection started at 0924 EDT with the initial rotameter reading of 88 units at the bottom of the stainless steel ball.

The operator checked the sampler nine (9) times before the end of the day about every one (1) to three (3) hours. At 1001 EDT, 1003 EDT, 1030 EDT, 1138 EDT, 1405 EDT, 1459 EDT, 1646 EDT, 1916 EDT and 2256 EDT, the rotameter readings at the bottom of the stainless steel ball were 93, 87, 82, 81, 83, 84, 82, 81 and 80 units, respectively; the total elapse time recorded were 36, 38, 65, 122, 280, 334, 441, 591 and 811 minutes, respectively. The operator observed the variation of rotameter readings around 1000 EDT caused by wind gusts and noted it on the data sheet. The operator also reset the thermometer at 1130 EDT. At 1650 EDT, ice was

added to sampler A2 to maintain a low sampler interior temperature. At 2300 EDT, calm wind was observed by the operator.

- MAY 27, 1993

Sampler A2 was inspected at 0122 EDT, 0500 EDT, 0758 EDT and 0917 EDT with respective rotameter readings recorded at 80, 80, 83 and 83 units. The operator observed light southwesterly winds around 0500 EDT. The sampler was removed from service according to the established protocol at 0926 EDT with a total elapse time of 1440 minutes. The final ambient VOC concentration was 0.0 ppm. The recorded max/min temperature within the A2 sampler were 62°F and 38°F, respectively. The operator observed calm winds around 0640 EDT and moderate westerly winds around 0905 EDT and noted them in the data sheet. No problems were noted.

SAMPLE 2-3A3

- MAY 26, 1993

Sample 2-3A3 was a low volume, downwind ambient air sample. Pump B and sampler A3 were used for sample collection. Precalibrated rotameter R2 (low flow rotameter) was used along with a flow splitter to set the initial sampling rate and to check sampling rate during the entire sampling period. The sampler was programmed to run 1440 minutes continuously at a nominal flow rate of 0.07 Lpm and the nominal sample volume collected was 100 liters. The sample location was also southeast of the landfill, approximately two feet from sampler A-2. The initial ambient VOC concentration was 0.0 ppm. A leak check was performed before the sampler was started and all connections were leak free. Sampler A3 was started at 0924 EDT with the initial rotameter reading of 53 units at the bottom of the black ball.

Sampler A3 was inspected again at 0957 EDT, 1030 EDT, 1138 EDT, 1407 EDT, 1501 EDT, 1647 EDT, 1917 EDT, and 2258 EDT. With respective rotameter readings of 59, 56, 55, 57,

58, 58, 56 and 56 units at the bottom of the black ball, respectively. The operator reset the max/min thermometer at 1130 EDT, added ice at 1653 EDT and observed calm winds at 2300 EDT. No problems were found.

- MAY 27, 1993

Sampler A3 was inspected at 0125 EDT, 0502 EDT, 0759 EDT, and 0918 EDT with rotameter readings of 56, 57, 56 and 54 units, respectively. The operator observed light southwesterly winds around 0500 EDT and noted them on the data sheet. The sampler was checked again at the end of sampling; all connections were in order. The sampler was removed from service at 0925 EDT according to the established protocol with a total elapsed time of 1440 minutes. The final ambient VOC reading was 0.0 ppm. The recorded max/min temperature inside the sampler were 66°F and 52°F, respectively.

SAMPLE 2-3A4

- MAY 26, 1993

Sample 2-3A4 was a second upwind high volume sample. Pump D and sampler A4 were used for sample collection. Precalibrated rotameter R3 was used again to set and check the sampling rate. Pump D was programmed to run continuously at a nominal flow rate of 0.7 Lpm for 1440 minutes to collect 1000 liters of sample. A leak check was performed before the sampler was started and no leaks were observed. The max/min thermometer was placed inside the sampler. The Micro-Tip meter indicated an initial ambient VOC concentration of 0.0 ppm. The sampler was started at 0938 EDT and the initial rotameter reading was set at 88 units at the bottom of the stainless steel ball.

Sampler A4 was inspected at 1041 EDT, 1141 EDT, 1420 EDT, 1509 EDT, 1700 EDT, 1924 EDT and 2307 EDT; the rotameter readings at the above times were at 82, 83, 83, 85, 85, 82 and 83 units at the bottom of the stainless steel ball, respectively. The operator checked the sampler and reset the max/min thermometer at 1144 EDT. The operator checked ice level at

1425 EDT and 1510 EDT, sufficient ice remained in the sampler. At 1555 EDT, the operator added ice to the sampler. At 2306 EDT and 0510 EDT, calm winds were observed.

- MAY 27, 1993

The operator checked sampler A4 at 0132 EDT, 0511 EDT and 0808 EDT. The rotameter readings were at 85, 84 and 88 units, respectively.

At 0943 EDT, operators were onsite to take the sampler out of service according to established protocol. During the final inspection, the operators noticed a disconnection of the sampling line. However, the time of disconnection was unknown. As a result, this sample was not analyzed by the lab.

CHRONOLOGY - SOIL GAS SAMPLING

MAY 26, 1993

- SAMPLE 2-3F1

Sample 2-3F1 was collected from well F1 (30"deep) located inside the Firemens' Training Center about eight feet away from a fenced subsurface vault. Rotameter R1, SKC pump E and a new sampling line 1 along with a designated soil gas well sampler were used. The nominal flowrate was 1.0 Lpm and the nominal sample volume was 10 liters. The initial ambient air and sampling line VOC concentrations were 0.0 ppm. The initial well VOC reading was 12.6 ppm. The well was evacuated for 30 seconds to pull a full well volume of stagnant air prior to sampling. Sampling started at 1011 EDT with an initial rotameter reading of 105 units at the bottom of the stainless steel ball. A leak check was proved before the sampling was started.

The operator noticed massive construction activities inside the Firemen's Training Center and noted it on the datasheet. Sampling stopped at 1021 EDT as scheduled. The final rotameter reading remained at 105 units. The final ambient air and well VOC readings were 1.8 and 6.7 ppm, respectively. The recorded maximum temperature inside the sampler was 51°F.

-SAMPLE 2-3M4

Sample 2-3M4 was collected from the 30" deep soil gas well (M4) located along the east side of Winding Road. R1, SKC pump E, sampling line 1 and a designated soil gas well sampler were used with a nominal flowrate of 1.0 Lpm to collect 10 liters of sample. A leak check was performed as part of the procedure. Initial VOC concentrations were measured for ambient air, and the soil gas well; all readings were 0.3 ppm and 2.6 ppm, respectively. The well was conditioned by evacuating a full well volume of stagnant air.

Sampling started at 1045 EDT and lasted for 10 minutes as scheduled. The initial and final rotameter readings were 105 and 106 units, respectively. The final ambient air and well VOC

concentrations were measured again and the results were 0.3 ppm and 2.8 ppm, respectively. The recorded maximum temperature inside the sampler was 54°F. The operator observed moisture beads inside the front trap at the end of the sampling.

- SAMPLE 2-3M5

Sample 2-3M5 was collected from well M5, a 30" deep well located west of Winding Road east of the landfill. R1, SKC pump E and sampling line 1 with a designated soil gas well sampler were used. The nominal flowrate was 1.0 Lpm. Initial ambient air and well VOC concentrations were taken and the readings were 2.6 ppm and 2.8 ppm, respectively. After the leak check, the sampler was started at 1104 EDT. The initial rotameter reading was 106 units.

The sampler was stopped at 1114 EDT. The final rotameter reading was 107 units. The final ambient air and well VOC readings were 1.4 ppm and 6.8 ppm, respectively. The recorded maximum sampler interior temperature was 54°F.

- SAMPLE 2-3M9 (10')

Sample 2-3M9 was collected from the 10 foot deep well located at cluster well M9. R1, SKC pump E, sampling line 1 and a soil gas well sampler were used. The nominal flowrate and volume were 1.0 Lpm and 10 liters, respectively. The well was evacuated for 1.5 minutes before sampling to remove one full volume of stagnant air inside the well. The evacuation was done using a spare SKC pump and sampling line at 1 Lpm flowrate. A sampling train leak check was performed. The initial ambient air and well VOC concentrations were measured at 0.0 ppm and 5.0 ppm, respectively. Sampling started at 1135 EDT with an initial rotameter reading of 105 units at the bottom of the stainless steel ball.

The sampler was stopped at 1145 EDT. Final ambient air and well VOC readings were recorded and the results were 0.0 ppm and 1.6 ppm, respectively. The recorded maximum sampler interior temperature was 58°F. The final rotameter reading was 107 units.

- SAMPLE 2-3M9 (20')

Sample 2-3M9(20) was collected from the 20 foot deep well at the cluster well M9. This well was marked with a green tape. R1, SKC pump E, a new sampling line 2 and a soil gas well sampler were used. The well was evacuated for three minutes before sampling using a spare SKC pump and sampling line. A sampling train leak check was performed. Initial ambient air and well VOC concentrations were recorded; the results were 0.0 ppm and 2.2 ppm, respectively. The sampling started at 1152 EDT and finished at 1202 EDT. The initial and final rotameter readings were 108 units and 109 units, respectively. Final ambient air and well VOC concentrations were 0.0 ppm. The recorded maximum sampler interior temperature was 58°F.

- SAMPLE 2-3M9 (30')

Sample 2-3M9(30) was collected from the 30 foot deep well located at the cluster well M9. The well was marked with a red tape. R1, SKC pump E, sampling line 1 and a soil gas well sampler were used. The well was evacuated for 4.5 minutes before sampling started and a sampling train leak check was performed. The nominal flowrate was 1.0 Lpm, and nominal sample volume was 10 liters. Initial ambient air and well VOC concentrations were 0.0 ppm and 0.3 ppm, respectively. Testing started at 1207 EDT with initial rotameter reading of 106 units.

Sampling ceased at 1217 EDT. The final rotameter reading was 108 units and final ambient air and well VOC readings were 0.0 ppm. The recorded maximum sampler interior temperature was 62°F.

- SAMPLE 2-3M9 (40')

Sample 2-3M9(40) was collected from the 40 foot well at the cluster well M9. This well was marked with yellow tape. R1, SKC pump E, sampling line 2 and a soil gas well sampler were used. The well was evacuated at 1.0 Lpm for 6 minutes prior to sampling to remove one full well volume of stagnant soil gas. The leak check was approved prior to testing. The nominal

sampling volume was 10 liters, the nominal sampling rate was 1.0 Lpm. The initial ambient air and well VOC concentrations were recorded and the readings were 0.0 ppm. Sampling started at 1219 EDT with an initial rotameter reading of 107 units.

Sampling ended at 1229 EDT. Final ambient air and well concentrations were recorded and the readings were 0.0 ppm. The final rotameter reading was 109 units. The recorded maximum sampler interior temperature was 60°F.

- SAMPLE 2-3M13

Sample 2-3M13 was collected from well M13 (30"deep). This well was located east of Winding Road. R1, SKC pump E, sampling line 3 and a soil gas well sampler were used. The initial ambient air and well VOC readings were 0.0 ppm. The nominal flowrate and volume were 1.0 Lpm and 10 liters, respectively. A leak check was conducted on all connections. Sampling started at 1316 EDT and the initial rotameter reading was 104 units.

Sampling ended at 1326 EDT. The final rotameter reading was 103 units. The final ambient air and well VOC concentrations were taken and the readings were 0.0 ppm. The recorded maximum sampler interior temperature was 64°F.

- SAMPLE 2-3M16

Sample 2-3M16 was collected between 1336 EDT and 1346 EDT from the 30" deep well M16. Located on the west side of Winding Road, east of the landfill. R1, SKC pump E, sampling line 3 and a soil gas well sampler were used with 1.0 Lpm nominal flowrate to collect 10 liters of sample. A leak check was performed. The initial ambient air VOC concentration was 0.0 ppm. The initial well VOC concentration was 0.4 ppm. The initial rotameter reading was 105 units.

Final ambient air and well VOC readings were 0.0 ppm and 1.3 ppm, respectively. The final rotameter reading was 106 units. The recorded maximum sampler interior temperature was 60°F.

- SAMPLE 2-3M2

Sample 2-3M2 was collected between 1357 EDT and 1407 EDT from the 30" deep well, M2. This well was located next to the landfill property along the west side of Winding Road. This well was reinstalled a day before the test (May 25, 1993) and was capped at 1028 EDT on the day of test (May 26, 1993). R1, SKC pump E, sampling line 3 and a designated sampler were used. The nominal flowrate was 1.0 Lpm. A leak check was performed prior to sampling on all connection lines. One full well volume of stagnant air was evacuated. Initial ambient air and sample inlet line VOC readings were taken and readings were 0.0 ppm. The initial well VOC reading was recorded above 50 ppm. This may have been due to the low voltage of the Micro-Tip. The initial rotameter reading was 105 units.

Final ambient air VOC concentration was 0.0 ppm. The recorded maximum sampler interior temperature was 60°F. The final rotameter reading was 107 units. The final well VOC reading was 46 ppm which was again caused by the below normal battery voltage. The micro-tip battery was replaced at the end of this sampling.

- SAMPLE 2-3M6

Sample 2-3M6 was taken from the 30" deep soil gas well, M6 located on the east side of Winding Road east of the landfill about 60 feet north of M4. M6 was re-installed (using an old soil gas probe located near M5) on May 25, 1993 and capped around 1030 EDT on May 26, 1993, about 4 hours prior to the sampling. R1, SKC pump E, sampling line 3 and a soil gas well sampler were used. The nominal flowrate and volume were 1.0 Lpm and 10 liters, respectively. The initial ambient air, sampling line and well VOC concentrations were 0.0 ppm. Teflon tape was used to seal the gap between the sampling line and the soil gas well probe since the probe nipple was missing. The system leak check passed and sampling started at 1421 EDT. The initial rotameter reading was 106 units.

The final ambient air, sampling line and well VOC concentrations were 0.0 ppm. The final rotameter reading was 107 units which was the same as the initial reading. The recorded maximum sampler interior temperature was 62°F.

- SAMPLE 2-3M21

Sample 2-3M21 was collected from the 30" deep well, M21, located on the west side of the landfill east of Claremont Road. R1, SKC pump E, sampling line 3 and a soil gas well sampler were used. A leak check was performed before sampling. The nominal flowrate was 1.0 Lpm and the nominal sample volume was 10 liters. The initial ambient air and sampling line VOC readings were 0.0 ppm.

Sample collection started at 1447 EDT and ended at 1457 EDT. The initial and final rotameter readings were 105 units and 107 units, respectively. Final ambient air and well VOC conditions were measured at 0.0 ppm. The maximum sampler interior temperature was 62°F.

- SAMPLE 2-3M39

Sample 2-3M39 was collected from M39, a 30" deep well located north northwest of the air stripper, next to a telephone pole. R1, SKC pump E, sampling line 3 and a designated soil gas well sampler were used. The nominal flowrate and sample volume were 1.0 Lpm and 10 liters, respectively. The well was evacuated for 30 seconds prior to the sampling and a leak check was performed. The initial ambient air and well concentrations were 0.0 ppm. The initial rotameter reading was 106 units.

Sampling started at 1511 EDT and finished at 1521 EDT. The final rotameter reading was 106 units. The final ambient air and well VOC concentrations were 0.0 ppm. The recorded maximum sampler interior temperature was 62°F.

- SAMPLE 2-3M22

Sample 2-3M22 was collected from a 30" deep well, M22, located north of the landfill. R1, SKC pump E, sampling line 3 and a designated soil gas well sampler were used. The well was evacuated for 30 seconds prior to sampling. A leak check was performed to check the line connection. Initial ambient air and well VOC concentrations were measured at 0.0 ppm.

The sampling started at 1545 EDT and lasted for ten minutes, as scheduled. During sampling the rotameter reading was 95 units. The ambient air and well VOC concentrations were recorded again at the end of sampling and readings were 0.0 ppm. The recorded maximum sampler interior temperature was 60°F.

- SAMPLE 2-3M28

Sample 2-3M28 was collected from the 30" deep well M28, located north of the recharge basin within the western landfill property line. R1, SKC pump E, sampling line 3 and a designated soil gas well sampler were used. The nominal flowrate and sample volume were 1.0 Lpm and 10 liters respectively. The initial ambient air, sampling line and well VOC concentrations were measured and the readings were 0.0 ppm. A leak check was performed prior to sampling. Sampling started at 1409 EDT with an initial rotameter reading of 105 units.

Sampling stopped at 1419 EDT. The final rotameter reading was 107 units. The final ambient air and well VOC concentrations were measured and the readings were 0.0 ppm. The recorded maximum sampler interior temperature was 62°F.

- SAMPLE 2-3M31

Sample 2-3M31 was collected from the 30" deep well M31 located southwest of the landfill. R1, SKC pump E, sampling line 3 and a soil gas well sampler were used for this sampling with a nominal flowrate and volume of 1.0 Lpm and 10 liters. The well was evacuated for 30 seconds prior to sampling. The initial ambient air, sampling line and well VOC concentrations were recorded and the readings were 0.0 ppm. A leak check was performed on all connections.

Sampling started at 1630 EDT with an initial rotameter reading of 107 units. The sampling ended at 1640 EDT, as scheduled. The final rotameter reading was 107 units. Final ambient air and soil gas well concentrations were 0.0 ppm. The recorded maximum sampler interior temperature was 62°F.

- SAMPLE 2-3M34

Sample 2-3M34 was collected from M34, a 30" deep well located southwest of the landfill on the west side of the haul road. R1, SKC pump E, sampling line 3 and a soil gas well sampler were used. The nominal flowrate was 1.0 Lpm, the nominal sample volume was 10 liters. The ambient air, sampling line and well VOC concentrations were measured before sampling and the readings were 0.0 ppm. The well was evacuated for 30 seconds prior to sampling. A leak check was performed prior to sampling. Sampling started at 1650 EDT. The initial rotameter reading was 108 units.

Sampling ended at 1700 EDT. The final rotameter reading was 109 units. The final ambient air and well VOC concentrations were 0.0 ppm. The recorded maximum sampler interior temperature was 60°F.

- SAMPLE 2-3M37

Sample 2-3M37 was collected from M37, a 30" deep well located at the southwest corner of the landfill next to a landfill leachate collection pond. R1, SKC pump E, sampling line 3 and a designated soil gas sampler were used. The nominal flowrate and sample volume were 1.0 Lpm and 10 liters, respectively. The ambient air and well VOC concentrations were measured before sampling and the readings were 0.0 ppm and 1.5 ppm, respectively. The well was evacuated for 30 seconds prior to sampling. A leak check was also performed before sampling. Sampling started at 1713 EDT. The initial rotameter reading was 106 units.

Sampling ended at 1723 EDT. The final rotameter reading was 108 units. Final ambient air and well VOC concentrations were 0.0 ppm. The recorded maximum sampler interior temperature was 60°F. The operator smelled odor from floating sludge in the pond.

-SAMPLE 2-3FB(A)

Sample 2-3FB(A) was one of two field blank samples collected. The sampling traps were removed from the shipping tubes, trap ends were opened and remained open for about 15

seconds. At the end of sample collection the trap ends were closed, placed back into the shipping tubes and labeled.

- SAMPLE 2-3FB(B)

Sample 2-3FB(B) was the second field blank sample collected as a backup field blank sample. Identical field blank sample collection procedures were applied. The traps were opened to the site atmosphere for about 15 seconds.

- SAMPLE 2-3TB(A)

Sample 2-3TB(A) was prepared on the next day of soil gas well sampling events (May 27, 1993). The sorbent traps were taken out of the shipping box with the traps remaining inside the shipping tubes. They were then labeled and put back into the shipping box.

- SAMPLE 2-3TB(B)

Sample 2-3TB(B) was prepared as the second trip blank sample. It was also prepared on May 27, 1993. The sorbent traps were taken out of the shipping box with the traps remaining inside the shipping tubes. They were then labeled and put back into the shipping box.

CHRONOLOGY - WELL PRESSURE READINGS

MAY 27, 1993

- PW1

PW1 is located northwest of the landfill along the haul road. There are two wells inside PW1. One well is marked with blue color, the other one is marked with green color. A Dwyer inclined manometer was used for well pressure measurements. The manometer was leveled, leak checked and zeroed before it was used to measure the well pressure. Pressure readings from both wells were taken two times to assure the readings were reliable. All readings were noted on the datasheet.

- PW2

PW2 is located at the southeast corner of the landfill. There are two wells inside PW2. One well is marked with blue color, the other one is marked with green color. A Dwyer inclined manometer was used for the pressure measurement. The manometer was leveled, leak checked and zeroed before it was used to measure the well pressure. Pressure readings were taken two times and all readings were recorded on the datasheet.

- PW3

PW3 is located south of the landfill inside the Firemen's Training Centers and east of soil gas well F1. Two wells are located at PW3 and they are marked with red and green colors, respectively. A Dwyer inclined manometer was used for the well pressure readings. The manometer was leveled, leak checked and zeroed as part of the quality assurance procedure. Two pressure readings were taken for both wells and all readings were recorded on the datasheet.

APPENDIX D
ANALYTICAL RESULTS

GRASEBY
NUTECH-RTL

July 7, 1993

Scott Mills
RTP Environmental Associates
400 Post Avenue
Westbury, NY 11590

RE: 93052850 (Project: LKBOBL2-3/ RSM 6/2/93) VOST Analysis

Dear Mr. Mills:

Enclosed please find the results of analysis for the samples submitted to our laboratory on 5/28/93.

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

Sincerely,

GRASEBY NUTECH-RTL



J. Wayne Jones
Chemist/ Laboratory Manager

JWJ/jwj

Enclosures

VOST GC/MS REPORT

prepared for

RTP ENVIRONMENTAL ASSOCIATES, Inc.

Project: LKBOBL2-3/ RSM (6/2/93) VOST Analysis

by

GRASEBY NUTECH-RTL


J. Wayne Jones
Chemist/ Laboratory Manager

GRTL ID # 93052850

July 6, 1993

INTRODUCTION

Scope:

To analyze (VOST) Tenax/Charcoal cartridges for the target compound list (TCL) and tentatively identify Benzaldehyde, 2-Chloroethyl vinyl ether, cis-1,2-Dichloroethane, Freon-13 and the next 5 greatest Non-TCL peaks by Desorb-Purge-Trap-Desorb Gas Chromatography/ Mass Spectrometry (DPTD GC/MS). Also the routine mass scanning range is to be altered from 35-260 amu. to 45-260 amu. as requested in prior projects. Reference the Narrative and Sample Results for more details about the tentative identification of the TCL-Ketones due to the increase in the minimum scan range setting.

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. The compounds are desorbed from the analytical trap into the GC/MS system.

Calculations:

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

ANALYTICAL CONDITIONS

Equipment:

HP 5970 GC/ MSD with HP DOS Chemstation tuned to BFB criteria

GC Conditions:

Temp 1 : 0 °C
Time 1 : 4.0 minutes
Ramp Rate 1 : 6.0 °C/minute
Temp 2 : 120 °C
Time 2 : 0 minutes
Ramp Rate 2 : 20.0 °C/minute
Temp 3 : 160 °C
Time 3 : 0.5 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

Mass Spectrometer Conditions:

Run Time : 26 minutes
Scan Range : 45 - 260 AMU
Scan Delay : 1.25 minutes
Ion Source Temp : 200 °C
Electron Multiplier : 2400 ± 200 EV
Separator Temp : 225 °C

Sample Chronicle:

Client	RTP Environmental Associates Inc.
RTL Project ID	93052850
Analysis Type	VOST Tenax/ charcoal pairs
Date of Collection	5/26/93
Date Received	5/28/93
Date Authorized	5/28/93
Date Analyzed	6/24 & 6/28-29/93
Date Reported	07/06/93

NARRATIVE

The letter dated June 2, 1993 stated the project scope and any special considerations required by RTP Environmental Associates. The routine custom scope was implemented as to the mass range modification from 35- 260 amu. to 45-260 amu. to primarily prevent the potential of mass 44 saturation during analysis. Sample splits were also implemented where requested. All internal standards recovered within expected QC limits. However, several notable occurrences were observed and are listed on each respective report and further explained in the Endnotes.

- The scope implemented was to analyze the samples in the requested sequence by RTP Environmental, and call after each step to confirm overall values and any complications, if observed.
- As stated with prior projects, the Ketones will be identified using secondary ion information only in most cases due to the lack of data for mass 43. Calibration information will reflect the new quantitation ion response where necessary. The identification of these target compounds is solely based upon the presence of minimal information and retention time similarity only. The laboratory does recognize positive identification cannot be confirmed, and therefore, the hits will be labeled as "Tentatively Identified Target Compounds". See Sample Results page 2 of each respective sample report. RTP has prior information explaining the above identification short comings.
- Several samples were received and noted as not for analysis by RTP. Due to an inadvertent GC problem the sample "2-3TB(A)-F/B" was not analyzed correctly and the backup sample, "2-3TB(B)-F/B", listed by RTP was therefore analyzed and reported.
- Sample "2-3M5-B" back half was observed to have 6,900 ng of 2-Butanone. The amount is considered to be extremely high due to the fact the sample cartridge was represented as the last in a series of a tenax/ charcoal (T/C) pair. Contamination of the desorption system appears to be the most likely explanation from the prior sample "2-3M2-F/B". "2-3M2-F/B" T/C pair showed 58,000 ng after the split calculation. The actual amount injected on the GC column was one fifth due to the 1:5 split ratio. The approximate 11,600 ng amount could have left residue in the system and thus resulted in carryover to sample "2-3M5-B". Routinely system blanks are run after the detection of extreme levels of sample eluents. Also system blanks are run by the chemist's discretion and experience as to routine contaminants. A system evaluation should have been undertaken and was overlooked after sample "2-3M2-F/B" T/C pair. The laboratory regrets the error. Also reference the bullet (•) 2 above about tentative identification.
- Sample "2-3M4-F/B" front half end broke after being attached and spiked with internal standards and surrogates on the desorption apparatus. The cartridge was removed and the contents transferred to a new clean cartridge and subsequently analyzed. The standard's recoveries were well within QC limits. No other difficulties were observed during the analysis.
- Vinyl acetate has been added to GRASEBY RTL's VOST TCL and can be quantitated in future projects utilizing full scan settings of the mass spectrometer. However upon more thorough evaluation of the compound as an available standard, the primary identifying masses are not represented in the modified scan ranged method. The two significant ions for identification are less than mass 45. Therefore, no tentative identification can be made regarding a library search confirmation due to the lack of data. Also the compound represents itself as a low responding polar compound in the desorption system. The low response would usually be hidden in the total ion chromatogram by a larger coeluting compound unless a extremely large amount was present in the sample.

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

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, DC. 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

ENDNOTES

- a: The amount detected is beyond the established calibration range. Linearity should not be assumed for results which greatly exceed the highest limit. When sample splitting is used, the ratio of the split, calculated using the internal standards, is the factor for the new extended calibration range ,i.e., 20 - 1000 ng range and a split of 1:10 becomes 200 - 10,000 ng. See each sample report for the applicable calibration range.
- b: Vinyl acetate can not be detected (ND) due to the lack of scan data to observe the primary masses for identification. See Narrative for more information concerning the project scope and RTL's new available standards for quantitation.
- c: Surrogate recovery was observed outside the expected limits of 50 to 150 % recovery. The overall sample contained generally high levels of petroleum hydrocarbons, a high level of Toluene which mostly coelutes and the sample was also split due to the potentially high levels expected. All internal standards (IS) recovered well within expected QC limits. A consistent split was obtained upon evaluation of each IS alone. Careful review of the available data did not confirm a specific interferent leading to the increased recovery.

SAMPLE RESULTS

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 6/29/93

Sample ID: 93052850-1 / 2-3A1-F/B

GC/MS Method: VOS_RTP2.M

Lab File: D:\062993\SO62914.D

Sample Matrix: T/C : T/C pair/ Split

Quant. Range: 100 to 5000 ng

Split Factor: 5

Percent Surrogate Recovery

1,2-Dichloroethane-d4	108
Toluene-d8	153 c
4-Bromofluorobenzene	128

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	800	
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	1,100	
75-35-4	1,1-Dichloroethene	BQL	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	650	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	720	
56-23-5	Carbon tetrachloride	230	
71-43-2	Benzene	690	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	120	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	6,900	a
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	2,000	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	1,000	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng - BQL)	3,800	
95-47-6	o-Xylene	1,400	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	320	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Sample ID: 93052850-1 / 2-3A1-F/B

Lab File: D:\062993\S062914.D

Date Analyzed: 6/29/93

GC/MS Method: VOS_RTP2.M

Sample Matrix: T/C : T/C pair/ Spli

Split Factor: 5

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.83	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	ND	
13.77	108-10-1	4-Methyl-2-pentanone	150	
15.63	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
Sample ID: **93052850-1 / 2-3A1-F/B**
Lab File: **D:\062993\S062914.D**

Date Analyzed: **6/29/93**
GC/MS Method: **VOS RTP2.M**
Sample Matrix: **T/C : T/C pair/ Split**
Split Factor: **5**

No.	RT.		Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds		
1	1.77	Unknown	4,600	
2	4.05	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	1,700	
3	20.86	Ethylmethylbenzene isomer	3,300	
4	21.82	Trimethylbenzene isomer	2,400	
5	23.37	Unknown alkane	1,400	

RT: Retention time N/D: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-2A / 2-3A2-F
 Lab File: D:\062993\S062912.D
 Quant. Range: 100 to 5000 ng

Date Analyzed: 6/29/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C only
 Split Factor: 5

Percent Surrogate Recovery

1,2-Dichloroethane-d4	109
Toluene-d8	153 c
4-Bromofluorobenzene	144

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	160	
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	800	
75-35-4	1,1-Dichloroethene	BQL	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	280	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	550	
56-23-5	Carbon tetrachloride	190	
71-43-2	Benzene	520	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	110	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	6,000	a
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	1,100	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	820	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng = BQL)	2,900	
95-47-6	o-Xylene	1,200	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	270	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-2A / 2-3A2-F
 Lab File: D:\062993\SO62912.D

Date Analyzed: 6/29/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C only
 Split Factor: 5

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.83	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	ND	
13.77	108-10-1	4-Methyl-2-pentanone	ND	
15.63	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
Sample ID: **93052850-2A / 2-3A2-F**
Lab File: **D:\062993\S062912.D**

Date Analyzed: **6/29/93**
GC/MS Method: **VOS_RTP2.M**
Sample Matrix: **T/C only**
Split Factor: **5**

RT.		Tentatively Identified Compounds	Amount (ng)	Flags
No.	(minutes)			
1	1.82	Unknown	3,600	
2	20.55	Unknown alkane	2,000	
3	20.84	Ethylmethylbenzene isomer	3,700	
4	21.80	Trimethylbenzene isomer	1,900	
5	23.35	Unknown alkane	3,200	

RT: Retention time N/D: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 6/29/93

Sample ID: 93052850-2B / 2-3A2-B

GC/MS Method: VOS_RTP2.M

Lab File: D:\062993\SO62910.D

Sample Matrix: T/C only

Quant. Range: 20 to 1000 ng

Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	106
Toluene-d8	119
4-Bromofluorobenzene	118

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	2,600	a
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	350	
75-35-4	1,1-Dichloroethene	BQL	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	150	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	22	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng - BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-2B / 2-3A2-B
 Lab File: D:\062993\062910.D

Date Analyzed: 6/29/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C only
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.83	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	ND	
13.77	108-10-1	4-Methyl-2-pentanone	ND	
15.63	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**

Sample ID: **93052850-2B / 2-3A2-B**

Lab File: **D:\062993\SO62910.D**

Date Analyzed: **6/29/93**

GC/MS Method: **VOS_RTP2.M**

Sample Matrix: **T/C only**

Split Factor: **1**

No.	RT.		Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds		
1	4.32	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	120	
2	24.81	Unknown alkane	78	
3	25.65	Unknown alkane	160	

RT: Retention time

N/D: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-3 / 2-3A3-F/B
 Lab File: D:\062493\S062410.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 6/24/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	117
Toluene-d8	98
4-Bromofluorobenzene	117

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	800	
74-87-3	Chloromethane	200	
75-01-4	Vinyl chloride	BQL	
74-83-9	Bromomethane	BQL	
75-00-3	Chloroethane	BQL	
75-69-4	Trichlorofluoromethane	240	
75-35-4	1,1-Dichloroethene	BQL	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	84	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	180	
56-23-5	Carbon tetrachloride	58	
71-43-2	Benzene	260	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	36	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	490	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	150	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	110	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng = BQL)	400	
95-47-6	o-Xylene	150	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	39	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Sample ID: 93052850-3 / 2-3A3-F/B

Lab File: D:\062493\SO62410.D

Date Analyzed: 6/24/93

GC/MS Method: VOS_RTP2.M

Sample Matrix: T/C:T/C pair

Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.73	67-64-1	Acetone	ND	
7.73	108-05-4	Vinyl acetate	ND	b
8.68	78-93-3	2-Butanone	21	
13.78	108-10-1	4-Methyl-2-pentanone	ND	
15.59	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**

Sample ID: **93052850-3 / 2-3A3-F/B**

Lab File: **D:\062493\S062410.D**

Date Analyzed: **6/24/93**

GC/MS Method: **VOS_RTP2.M**

Sample Matrix: **T/C:T/C pair**

Split Factor: **1**

No.	RT.		Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds		
1	2.10	Xenon	430	
2	20.61	Unknown alkane	160	
3	20.90	Ethylmethylbenzene isomer	280	
4	23.45	Undecane	230	
5	24.41	Hexachloroethane	180	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 6/29/93

Sample ID: 93052850-5 / 2-3F1-F/B

GC/MS Method: VOS_RTP2.M

Lab File: D:\062993\062911.D

Sample Matrix: T/C : T/C pair

Quant. Range: 20 to 1000 ng

Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	106
Toluene-d8	112
4-Bromofluorobenzene	118

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	24	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	38	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng - BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
 Sample ID: **93052850-5 / 2-3F1-F/B**
 Lab File: **D:\062993\SO62911.D**

Date Analyzed: **6/29/93**
 GC/MS Method: **VOS_RTP2.M**
 Sample Matrix: **T/C : T/C pair**
 Split Factor: **1**

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.83	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	ND	
13.77	108-10-1	4-Methyl-2-pentanone	ND	
15.63	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
Sample ID: **93052850-5 / 2-3F1-F/B**
Lab File: **D:\062993\S062911.D**

Date Analyzed: **6/29/93**
GC/MS Method: **VOS_RTP2.M**
Sample Matrix: **T/C : T/C pair**
Split Factor: **1**

No.	RT.		Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds		
1	1.95	Unknown & Xenon coelution	960	
2	24.28	Hexachloroethane	93	

RT: Retention time N/D: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 6/24/93

Sample ID: 93052850-6 / 2-3M2-F/B

GC/MS Method: VOS RTP2.M

Lab File: D:\062493\S062411.D

Sample Matrix: T/C:T/C pair/ split

Quant. Range: 100 to 5000 ng

Split Factor: 5

Percent Surrogate Recovery

1,2-Dichloroethane-d4	112
Toluene-d8	124
4-Bromofluorobenzene	108

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	BQL	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	220	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng -BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-6 / 2-3M2-F/B
 Lab File: D:\062493\S062411.D

Date Analyzed: 6/24/93
 GC/MS Method: VOS RTP2.M
 Sample Matrix: T/C:T/C pair/ split
 Split Factor: 5

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.73	67-64-1	Acetone	ND	
7.73	108-05-4	Vinyl acetate	ND	b
8.68	78-93-3	2-Butanone	58,000	a
13.78	108-10-1	4-Methyl-2-pentanone	ND	
15.59	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**

Date Analyzed: 6/24/93

Sample ID: **93052850-6 / 2-3M2-F/B**

GC/MS Method: VOS_RTP2.M

Lab File: D:\062493\S062411.D

Sample Matrix: T/C:T/C pair/ split

Split Factor: 5

RT.				
No.	(minutes)	Tentatively Identified Compounds	Amount (ng)	Flags
1	1.86	Unknown & Xenon coelution	3,000	
2	9.54	Unknown hydrocarbon	1,700	

RT: Retention time N/D: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-7 / 2-3M4-F/B
 Lab File: D:\062893\SO62804.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 6/28/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C: T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	106
Toluene-d8	113
4-Bromofluorobenzene	80

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	BQL	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng - BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-7 / 2-3M4-F/B
 Lab File: D:\062893\S062804.D

Date Analyzed: 6/28/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C: T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.80	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	ND	
13.76	108-10-1	4-Methyl-2-pentanone	ND	
15.55	591-78-6	2-Hexanone	33	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Sample ID: 93052850-7 / 2-3M4-F/B

Lab File: D:\062893\S062804.D

Date Analyzed: 6/28/93

GC/MS Method: VOS_RTP2.M

Sample Matrix: T/C: T/C pair

Split Factor: 1

RT.				
No.	(minutes)	Tentatively Identified Compounds	Amount (ng)	Flags
1	3.92	Unknown & Xenon coelution	1,300	
2	21.53	Unknown alkane	56	
3	22.13	Unknown alkane	71	
4	24.40	Hexachloroethane	41	

RT: Retention time

N/D: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 6/28/93

Sample ID: 93052850-8A / 2-3M5-F

GC/MS Method: VOS_RTP2.M

Lab File: D:\062893\SO62805.D

Sample Matrix: T/C only

Quant. Range: 20 to 1000 ng

Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	127
Toluene-d8	113
4-Bromofluorobenzene	142

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	BQL	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	99	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng -BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-8A / 2-3M5-F
 Lab File: D:\062893\S062805.D

Date Analyzed: 6/28/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C only
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.80	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	ND	
13.76	108-10-1	4-Methyl-2-pentanone	ND	
15.55	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
Sample ID: **93052850-8A / 2-3M5-F**
Lab File: **D:\062893\S062805.D**

Date Analyzed: **6/28/93**
GC/MS Method: **VOS_RTP2.M**
Sample Matrix: **T/C only**
Split Factor: **1**

No.	RT.		Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds		
1	2.10	Xenon	410	
2	24.37	Hexachloroethane	110	

RT: Retention time N/D: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 6/24/93

Sample ID: 93052850-8B / 2-3M5-B

GC/MS Method: VOS_RTP2.M

Lab File: D:\062493\SO62412.D

Sample Matrix: T/C only

Quant. Range: 20 to 1000 ng

Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	114
Toluene-d8	97
4-Bromofluorobenzene	112

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	BQL	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng - BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
 Sample ID: **93052850-88 / 2-3M5-B**
 Lab File: **D:\062493\S062412.D**

Date Analyzed: **6/24/93**
 GC/MS Method: **VOS_RTP2.M**
 Sample Matrix: **T/C only**
 Split Factor: **1**

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.73	67-64-1	Acetone	ND	
7.73	108-05-4	Vinyl acetate	ND	b
8.68	78-93-3	2-Butanone	6,900	a
13.78	108-10-1	4-Methyl-2-pentanone	ND	
15.59	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**

Date Analyzed: 6/24/93

Sample ID: **93052850-8B / 2-3M5-B**

GC/MS Method: VQS RTP2.M

Lab File: D:\062493\SO62412.D

Sample Matrix: T/C only

Split Factor: 1

No.	RT.		Tentatively Identified Compounds	Amount (ng)	Flags
	(minutes)				
1	2.07		Xenon	620	
2	9.54		Unknown hydrocarbon	270	
3	19.97		Cyclohexanone	250	

RT: Retention time N/D: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-9 / 2-3M6-F/B
 Lab File: D:\062893\SO62806.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 6/28/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C : T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	118
Toluene-d8	116
4-Bromofluorobenzene	147

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	BQL	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng - BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Sample ID: 93052850-9 / 2-3M6-F/B

Lab File: D:\062893\S062806.D

Date Analyzed: 6/28/93

GC/MS Method: VOS_RTP2.M

Sample Matrix: T/C : T/C pair

Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.80	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	300	
13.76	108-10-1	4-Methyl-2-pentanone	ND	
15.55	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 6/28/93

Sample ID: 93052850-9 / 2-3M6-F/B

GC/MS Method: VOS_RTP2.M

Lab File: D:\062893\SO62806.D

Sample Matrix: T/C : T/C pair

Split Factor: 1

No.	RT.		Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds		
1	1.95	Unknown & Xenon coelution	810	
2	18.32	Unknown methylcyclohexene	370	
3	19.80	2,2-Dimethylbicyclo[2.2.1]heptane	1,100	
4	25.87	Unknown methylcyclopentanecarboxylic acid	1,200	

RT: Retention time

N/D: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-10 / 2-3M9(10)-F/B
 Lab File: D:\062893\062807.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 6/28/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C : T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	120
Toluene-d8	107
4-Bromofluorobenzene	133

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	30	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	140	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	58	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng - BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-10 / 2-3M9(10)-F/B
 Lab File: D:\062893\062807.D

Date Analyzed: 6/28/93
 GC/MS Method: VQS_RTP2.M
 Sample Matrix: T/C : T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.80	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	ND	
13.76	108-10-1	4-Methyl-2-pentanone	ND	
15.55	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
Sample ID: **93052850-10 / 2-3M9(10)-F/B**
Lab File: **D:\062893\S062807.D**

Date Analyzed: **6/28/93**
GC/MS Method: **VOS_RTP2.M**
Sample Matrix: **T/C : T/C pair**
Split Factor: **1**

RT.		Tentatively Identified Compounds	Amount (ng)	Flags
No.	(minutes)			
1	1.97	Unknown & Xenon coelution	920	

RT: Retention time N/D: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 6/28/93

Sample ID: 93052850-11 / 2-3M9(20)-F/B

GC/MS Method: VOS RTP2.M

Lab File: D:\062893\SO62808.D

Sample Matrix: T/C : T/C pair

Quant. Range: 20 to 1000 ng

Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	127
Toluene-d8	99
4-Bromofluorobenzene	132

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	75	
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	36	
75-35-4	1,1-Dichloroethene	BQL	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	160	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	46	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng -BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-11 / 2-3M9(20)-F/B
 Lab File: D:\062893\S062808.D

Date Analyzed: 6/28/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C : T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.80	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	ND	
13.76	108-10-1	4-Methyl-2-pentanone	ND	
15.55	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**

Sample ID: **93052850-11 / 2-3M9(20)-F/B**

Lab File: **D:\062893\S062808.D**

Date Analyzed: **6/28/93**

GC/MS Method: **VDS_RTP2.M**

Sample Matrix: **T/C : T/C pair**

Split Factor: **1**

No.	RT.		Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds		
1	1.86	Unknown & Xenon coelution	510	
2	24.85	Unknown cyclic heptane	41	
3	25.55	Caryophyllene	75	
4	25.98	Unknown methylbenzene & naphthalene	58	

RT: Retention time

N/D: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-12 / 2-3M9(30)-F/B
 Lab File: D:\062893\062809.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 6/28/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C : T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	131
Toluene-d8	103
4-Bromofluorobenzene	137

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	110	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	56	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	43	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng - BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-12 / 2-3M9(30)-F/B
 Lab File: D:\062893\SO62809.D

Date Analyzed: 6/28/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C : T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.80	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	ND	
13.76	108-10-1	4-Methyl-2-pentanone	ND	
15.55	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
Sample ID: **93052850-12 / 2-3M9(30)-F/B**
Lab File: **D:\062893\062809.D**

Date Analyzed: **6/28/93**
GC/MS Method: **VOS_RTP2.M**
Sample Matrix: **T/C : T/C pair**
Split Factor: **1**

RT.		Tentatively Identified Compounds	Amount (ng)	Flags
No.	(minutes)			
1	1.94	Unknown & Xenon coelution	900	
2	23.84	Unknown hydrocarbon	52	
3	25.22	Unknown alkene	160	

RT: Retention time N/D: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 6/28/93

Sample ID: 93052850-13 / 2-3M9(40)-F/B

GC/MS Method: VOS RTP2.M

Lab File: D:\062893\SO62810.D

Sample Matrix: T/C : T/C pair

Quant. Range: 20 to 1000 ng

Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	117
Toluene-d8	110
4-Bromofluorobenzene	133

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	2,100	a
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	60	
75-35-4	1,1-Dichloroethene	BQL	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	30	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	180	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	20	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	53	
127-18-4	Tetrachloroethene	3,100	a
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng - BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-13 / 2-3M9(40)-F/B
 Lab File: D:\062893\SO62810.D

Date Analyzed: 6/28/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C : T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.80	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	ND	
13.76	108-10-1	4-Methyl-2-pentanone	ND	
15.55	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
Sample ID: **93052850-13 / 2-3M9(40)-F/B**
Lab File: **D:\062893\S062810.D**

Date Analyzed: **6/28/93**
GC/MS Method: **VOS_RTP2.M**
Sample Matrix: **T/C : T/C pair**
Split Factor: **1**

No.	RT.		Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds		
1	4.24	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	380	

RT: Retention time N/D: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 6/28/93

Sample ID: 93052850-14 / 2-3M13-F/B

GC/MS Method: VOS_RTP2.M

Lab File: D:\062893\SO62811.D

Sample Matrix: T/C : T/C pair

Quant. Range: 20 to 1000 ng

Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	129
Toluene-d8	127
4-Bromofluorobenzene	137

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	BQL	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	110	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng - BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
 Sample ID: **93052850-14 / 2-3M13-F/B**
 Lab File: **D:\062893\S062811.D**

Date Analyzed: **6/28/93**
 GC/MS Method: **VOS_RTP2.M**
 Sample Matrix: **T/C : T/C pair**
 Split Factor: **1**

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.80	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	ND	
13.76	108-10-1	4-Methyl-2-pentanone	ND	
15.55	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
Sample ID: **93052850-14 / 2-3M13-F/B**
Lab File: **D:\062893\S062811.D**

Date Analyzed: **6/28/93**
GC/MS Method: **VOS_RTP2.M**
Sample Matrix: **T/C : T/C pair**
Split Factor: **1**

No.	RT.		Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds		
1	1.96	Unknown & Xenon coelution	720	
2	24.36	Hexachloroethane	26	

RT: Retention time N/D: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 6/28/93

Sample ID: 93052850-15 / 2-3M16-F/B

GC/MS Method: VOS_RTP2.M

Lab File: D:\062893\062812.D

Sample Matrix: T/C : T/C pair

Quant. Range: 20 to 1000 ng

Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	118
Toluene-d8	95
4-Bromofluorobenzene	135

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	BQL	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	150	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng ~ BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
 Sample ID: **93052850-15 / 2-3M16-F/B**
 Lab File: **D:\062893\S062812.D**

Date Analyzed: **6/28/93**
 GC/MS Method: **VOS_RTP2.M**
 Sample Matrix: **T/C : T/C pair**
 Split Factor: **1**

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.80	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	ND	
13.76	108-10-1	4-Methyl-2-pentanone	ND	
15.55	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
Sample ID: **93052850-15 / 2-3M16-F/B**
Lab File: **D:\062893\S062812.D**

Date Analyzed: **6/28/93**
GC/MS Method: **VOS_RTP2.M**
Sample Matrix: **T/C : T/C pair**
Split Factor: **1**

RT.				
No.	(minutes)	Tentatively Identified Compounds	Amount (ng)	Flags
1	1.94	Unknown & Xenon coelution	710	
2	24.35	Hexachloroethane	150	

RT: Retention time N/D: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 6/28/93

Sample ID: 93052850-16 / 2-3M21-F/B

GC/MS Method: VOS_RTP2.M

Lab File: D:\062893\SO62813.D

Sample Matrix: T/C : T/C pair

Quant. Range: 20 to 1000 ng

Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	126
Toluene-d8	120
4-Bromofluorobenzene	134

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	BQL	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	65	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng - BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**

Sample ID: **93052850-16 / 2-3M21-F/B**

Lab File: **D:\062893\S062813.D**

Date Analyzed: **6/28/93**

GC/MS Method: **VOS RTP2.M**

Sample Matrix: **T/C : T/C pair**

Split Factor: **1**

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.80	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	84	
13.76	108-10-1	4-Methyl-2-pentanone	ND	
15.55	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
Sample ID: **93052850-16 / 2-3M21-F/B**
Lab File: **D:\062893\S062813.D**

Date Analyzed: **6/28/93**
GC/MS Method: **VOS_RTP2.M**
Sample Matrix: **T/C : T/C pair**
Split Factor: **1**

No.	RT.		Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds		
1	1.94	Unknown & Xenon coelution	710	
2	24.35	Hexachloroethane	150	

RT: Retention time N/D: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 6/28/93

Sample ID: 93052850-17 / 2-3M22-F/B

GC/MS Method: VOS_RTP2.M

Lab File: D:\062893\SO62814.D

Sample Matrix: T/C : T/C pair

Quant. Range: 20 to 1000 ng

Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	123
Toluene-d8	111
4-Bromofluorobenzene	134

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	BQL	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng -BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
 Sample ID: **93052850-17 / 2-3M22-F/B**
 Lab File: **D:\062893\SO62814.D**

Date Analyzed: **6/28/93**
 GC/MS Method: **VQS_RTP2.M**
 Sample Matrix: **T/C : T/C pair**
 Split Factor: **1**

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.80	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	47	
13.76	108-10-1	4-Methyl-2-pentanone	ND	
15.55	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
Sample ID: **93052850-17 / 2-3M22-F/B**
Lab File: **D:\062893\SO62814.D**

Date Analyzed: **6/28/93**
GC/MS Method: **VOS_RTP2.M**
Sample Matrix: **T/C : T/C pair**
Split Factor: **1**

RT.				
No.	(minutes)	Tentatively Identified Compounds	Amount (ng)	Flags
1	1.87	Xenon	490	
2	19.21	.alpha.-Pinene	370	
3	20.86	4-Methylene-1-(1-methylethyl)cyclohexene	60	
4	21.13	.beta.-Myrcene	44	
5	22.64	Methylmethylethylbenzene isomer	30	

RT: Retention time N/D: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 6/28/93

Sample ID: 93052850-18 / 2-3M28-F/B

GC/MS Method: VOS_RTP2.M

Lab File: D:\062893\SO62815.D

Sample Matrix: T/C : T/C pair

Quant. Range: 20 to 1000 ng

Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	128
Toluene-d8	117
4-Bromofluorobenzene	132

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	37	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	21	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	110	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng = BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
 Sample ID: **93052850-18 / 2-3M28-F/B**
 Lab File: **D:\062893\SO62815.D**

Date Analyzed: **6/28/93**
 GC/MS Method: **VOS_RTP2.M**
 Sample Matrix: **T/C : T/C pair**
 Split Factor: **1**

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.80	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	ND	
13.76	108-10-1	4-Methyl-2-pentanone	ND	
15.55	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
Sample ID: **93052850-18 / 2-3M28-F/B**
Lab File: **D:\062893\S062815.D**

Date Analyzed: **6/28/93**
GC/MS Method: **VOS_RTP2.M**
Sample Matrix: **T/C : T/C pair**
Split Factor: **1**

No.	RT.		Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds		
1	1.93	Unknown & Xenon coelution	690	
2	24.37	Hexachloroethane	41	

RT: Retention time N/D: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
 Sample ID: **93052850-19 / 2-3m31-F/B**
 Lab File: **D:\062993\S062906.D**
 Quant. Range: **20 to 1000 ng**

Date Analyzed: **6/29/93**
 GC/MS Method: **VOS_RTP2.M**
 Sample Matrix: **T/C : T/C pair**
 Split Factor: **1**

Percent Surrogate Recovery

1,2-Dichloroethane-d4	103
Toluene-d8	122
4-Bromofluorobenzene	115

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	BQL	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	29	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng - BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-19 / 2-3m31-F/B
 Lab File: D:\062993\S062906.D

Date Analyzed: 6/29/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C : T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.83	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	ND	
13.77	108-10-1	4-Methyl-2-pentanone	ND	
15.63	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
Sample ID: **93052850-19 / 2-3m31-F/B**
Lab File: **D:\062993\062906.D**

Date Analyzed: **6/29/93**
GC/MS Method: **VOS_RTP2.M**
Sample Matrix: **T/C : T/C pair**
Split Factor: **1**

RT.			
No.	(minutes)	Tentatively Identified Compounds	Amount (ng) Flags
1	ND	None detected	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
 Sample ID: **93052850-22 / 2-3M34-F/B**
 Lab File: **D:\062993\S062909.D**
 Quant. Range: **20 to 1000 ng**

Date Analyzed: **6/29/93**
 GC/MS Method: **VOS RTP2.M**
 Sample Matrix: **T/C : T/C pair**
 Split Factor: **1**

Percent Surrogate Recovery

1,2-Dichloroethane-d4	102
Toluene-d8	117
4-Bromofluorobenzene	114

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	BQL	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng - BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-22 / 2-3M34-F/B
 Lab File: D:\062993\SO62909.D

Date Analyzed: 6/29/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C : T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.83	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	ND	
13.77	108-10-1	4-Methyl-2-pentanone	ND	
15.63	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
 Sample ID: **93052850-22 / 2-3M34-F/B**
 Lab File: **D:\062993\SO62909.D**

Date Analyzed: **6/29/93**
 GC/MS Method: **VDS_RTP2.M**
 Sample Matrix: **T/C : T/C pair**
 Split Factor: **1**

No.	RT.		Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds		
1	1.92	Unknown & Xenon coelution	790	

RT: Retention time N/D: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-20 / 2-3M37-F/B
 Lab File: D:\062993\062907.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 6/29/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C : T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	102
Toluene-d8	105
4-Bromofluorobenzene	120

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	160	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	46	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng - BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Sample ID: 93052850-20 / 2-3M37-F/B

Lab File: D:\062993\S062907.D

Date Analyzed: 6/29/93

GC/MS Method: VOS_RTP2.M

Sample Matrix: T/C : T/C pair

Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.83	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	ND	
13.77	108-10-1	4-Methyl-2-pentanone	ND	
15.63	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**

Sample ID: **93052850-20 / 2-3M37-F/B**

Lab File: **D:\062993\S062907.D**

Date Analyzed: **6/29/93**

GC/MS Method: **VOS_RTP2.M**

Sample Matrix: **T/C : T/C pair**

Split Factor: **1**

No.	RT.		Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds		
1	1.93	Unknown & Xenon coelution	890	
2	19.21	2,2,6-Trimethyldecane	330	
3	20.62	2,2,3-Trimethylbicyclo[2.2.1]heptane isomer	290	
4	21.45	Methylpropylnonane isomer	610	
5	22.05	Unknown alkane	430	

RT: Retention time

N/D: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-21 / 2-3M39-F/B
 Lab File: D:\062993\062908.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 6/29/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C : T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	111
Toluene-d8	118
4-Bromofluorobenzene	117

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	BQL	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	150	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng - BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
 Sample ID: **93052850-21 / 2-3M39-F/B**
 Lab File: **D:\062993\S062908.D**

Date Analyzed: **6/29/93**
 GC/MS Method: **VOS_RTP2.M**
 Sample Matrix: **T/C : T/C pair**
 Split Factor: **1**

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.83	67-64-1	Acetone	ND	
7.71	108-05-4	Vinyl acetate	ND	b
8.71	78-93-3	2-Butanone	240	
13.77	108-10-1	4-Methyl-2-pentanone	ND	
15.63	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
Sample ID: **93052850-21 / 2-3M39-F/B**
Lab File: **D:\062993\S062908.D**

Date Analyzed: **6/29/93**
GC/MS Method: **VOS_RTP2.M**
Sample Matrix: **T/C : T/C pair**
Split Factor: **1**

No.	RT.		Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds		
1	1.95	Unknown & Xenon coelution	840	
2	23.33	Undecane	270	
3	24.28	Hexachloroethane	99	

RT: Retention time N/D: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 6/24/93

Sample ID: 93052850-24 / 2-3TB(B)-F/B

GC/MS Method: VOS RTP2.M

Lab File: D:\062493\062408.D

Sample Matrix: T/C:T/C pair

Quant. Range: 20 to 1000 ng

Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	113
Toluene-d8	111
4-Bromofluorobenzene	108

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	BQL	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng - BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 93052850-24 / 2-3TB(B)-F/B
 Lab File: D:\062493\062408.D

Date Analyzed: 6/24/93
 GC/MS Method: VOS_RTP2.M
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.73	67-64-1	Acetone	ND	
7.73	108-05-4	Vinyl acetate	ND	b
8.68	78-93-3	2-Butanone	ND	
13.78	108-10-1	4-Methyl-2-pentanone	ND	
15.59	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
Sample ID: **93052850-24 / 2-3TB(B)-F/B**
Lab File: **D:\062493\062408.D**

Date Analyzed: **6/24/93**
GC/MS Method: **VOS_RTP2.M**
Sample Matrix: **T/C:T/C pair**
Split Factor: **1**

RT.			
No.	(minutes)	Tentatively Identified Compounds	Amount (ng) Flags
1		None detected	
2			
3			
4			
5			

RT: Retention time N/D: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client:	RTP Environmental Associates Inc.	Date Analyzed:	6/24/93
Sample ID:	93052850-25 / 2-3FB(A)-F/B	GC/MS Method:	VOS_RTP2.M
Lab File:	D:\062493\SO62409.D	Sample Matrix:	T/C:T/C pair
Quant. Range:	20 to 1000 ng	Split Factor:	1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	111
Toluene-d8	93
4-Bromofluorobenzene	107

CAS No.	Target Compounds	Amount (ng)	Flags
75-71-8	Dichlorodifluoromethane	BQL	
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	
74-88-4	Iodomethane	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	BQL	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
74-95-3	Dibromomethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	m- & p-Xylene (coeluting isomers < 40ng - BQL)	BQL	
95-47-6	o-Xylene	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: **RTP Environmental Associates Inc.**
 Sample ID: **93052850-25 / 2-3FB(A)-F/B**
 Lab File: **D:\062493\S062409.D**

Date Analyzed: **6/24/93**
 GC/MS Method: **VOS RTP2.M**
 Sample Matrix: **T/C:T/C pair**
 Split Factor: **1**

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.73	67-64-1	Acetone	ND	
7.73	108-05-4	Vinyl acetate	ND	b
8.68	78-93-3	2-Butanone	ND	
13.78	108-10-1	4-Methyl-2-pentanone	ND	
15.59	591-78-6	2-Hexanone	ND	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client:
RTP Environmental Associates Inc.

Date Analyzed:
6/24/93

Sample ID:
93052850-25 / 2-3FB(A)-F/B

GC/MS Method:
VOS_RTP2.M

Lab File:
D:\062493\S062409.D

Sample Matrix:
T/C:T/C pair

Split Factor:
1

RT.			
No.	(minutes)	Tentatively Identified Compounds	Amount (ng) Flags
1	1.84	Unknown	53
2			
3			
4			
5			

RT: Retension time
N/D: Not detected or available
Flags: See Endnotes if applicable.

CHAIN OF CUSTODY RECORD

Project ID: LKBOBL2-3		Project Name: Ambient air & Soil gas well survey					
Samplers: (Signature)				Number of Containers			
Test ID	Sample ID	Date	Time	Sampling Location	A	B	C
2-3	2-3 A1-F	5/24/93		OBLE			
	2-3 A1-B						
	2-3 A2-F						
	2-3 A2-B						
	2-3 A3-F						
	2-3 A3-B						
	2-3 A4-F						
	2-3 A4-B						
	2-3 F1-F	5/24/93					
	2-3 F1-B						
	2-3 M2-F						
	2-3 M2-B						
	2-3 M4-F						
Relinquished By: (Signature) <i>Scott Neely</i>				Received By: (Signature)		Date/Time:	
Relinquished By: (Signature)				Received By: (Signature)		Date/Time:	
Relinquished By: (Signature)				Received By: (Signature) <i>P. Wayne Jones</i>		Date/Time: 5/28/93 10:00	
Remarks: Hold for lab instructions!							

RTP ENVIRONMENTAL ASSOCIATES, INC.
400 Post Avenue, Suite 105, Westbury, NY 11590
(516) 333-4526

CHAIN OF CUSTODY RECORD

Project ID: LKBOBL2-3		Project Name: Ambient air & Soil gas well survey			
Samplers: (Signature)				Number of Containers	
Test ID	Sample ID	Date	Time	Sampling Location	Remarks
2-3	2-3 M4-B	5/24/93		03LF	
	2-3 M5-F				
	2-3 M5-B				
	2-3 M6-F				
	2-3 M6-B				
	2-3 M9 (10)-F				
	2-3 M9 (10)-B				
	2-3 M9 (20)-F				
	2-3 M9 (20)-B				
	2-3 M9 (30)-F				
	2-3 M9 (30)-B				
	2-3 M9 (40)-F				
	2-3 M9 (40)-B				
Relinquished By: (Signature)		Date/Time:		Received By: (Signature)	Date/Time:
<i>Scott Mills</i>		5/27/93 1700			
Relinquished By: (Signature)		Date/Time:		Received By: (Signature)	Date/Time:
Relinquished By: (Signature)		Date/Time:		Received By: (Signature)	Date/Time:
				<i>J. Delaney Jones</i>	5/28/93 10:02
Remarks: Hold for lab instructions!					

RTP ENVIRONMENTAL ASSOCIATES, INC.
400 Post Avenue, Suite 105, Westbury, NY 11590
(516) 333-4526

CHAIN OF CUSTODY RECORD

Project ID: LKBOBL2-3		Project Name: Ambient air & Soil gas well survey			
Samplers: (Signature)					
Test ID	Sample ID	Date	Time	Sampling Location	Number of Containers
2-3	2-3 M34-B	5/27/93		OBLC	1
	2-3 M37-F				1
	2-3 M37-B				1
	2-3 M39-F				1
	2-3 M39-B				1
	2-3 TB(A)-F				1
	2-3 TB(A)-B				1
	2-3 TB(B)-F				1
	2-3 TB(B)-B				1
	2-3 FB(A)-F				1
	2-3 FB(A)-B				1
	2-3 FB(B)-F				1
	2-3 FB(B)-B				1
Relinquished By: (Signature)		Date/Time: 5/27/93 1200		Received By: (Signature)	
Relinquished By: (Signature)		Date/Time:		Received By: (Signature)	
Relinquished By: (Signature)		Date/Time:		Received By: (Signature)	

Remarks: Hold for lab instructions!

RTP ENVIRONMENTAL ASSOCIATES, INC.
400 Post Avenue, Suite 105, Westbury, NY 11590
(516) 333-4526

APPENDIX E
FIELD DATA FORMS

AMBIENT AIR SAMPLING DATA SHEET

Project: LKBOBL2-3

Date: May 26, 1993 → May 27, 93

Project Site: Oyster Bay Landfill

Operators: MB

General Weather Conditions: *partly sunny ~65°F N-NW wind 3-10 mph (at start)*

Sample ID: 2-3A1-FEB

Sample Location: *Battle Run Campgrounds 50' W 30' S of Int. 56 gate*

Pump ID: C/R3

Nominal Flow Rate: 0.70 gpm (RR=195)

Sampler ID: *SS Highflow*

Nominal Sample Volume: 5000 L: tars

909B
909B

↳ bottom of SS Bar

Initial Ambient VOC Conc. (ppm): 0.0

Leak Check: OK

Sample Start Time: 0847 ET

Initial Rotameter Reading, (Bottom of the Ball): 87 SS Ball

Rotameter Reading	Total Elapse Time	Local Time
87 SS	8	0855
86 SS	120	1047
87 SS	140	1107
90 SS	270	1318
89 SS	359	1447
88 SS	502	1708
87 SS	620	1913

Rotameter Reading	Total Elapse Time	Local Time
86 SS	839	2046
84 SS	987	2114
84 SS	1205	0453
88 SS	1412	0818
SS		
SS		
SS		

Sample Stop Time: ~~1440~~ 0847 ET

Final Rotameter Reading: 88

Total Elapse Time: 1440 Min

Final Ambient VOC Conc. (ppm): 0.2

44°F MIN / 66°F MAX

Comments: CHECKED COOLER INTERIOR + SET MAX-MIN THERMOMETERS 1110E. SKY OVERCAST / B20 SUN SHINING / 1545E - BARRAGE AS + DUMPED IN DUMPSTER 90 YDS UPWIND (ABOUT 30° OFF WIND DIRECTION, LITRE OR NO EFFECT NOTED IN SAMPLER AREA / CFF 0847E

AMBIENT AIR SAMPLING DATA SHEET

Project: LKBOBL2-3

Date: May 26, 1993

Project Site: OysterBay Landfill

Operators: ~~MB~~ SM TW

General Weather Conditions: Sunny 10/1/13

2-3A2-B F909B

Sample ID: 2-3 A2-F B 909B

Pump ID: A / ~~R1~~ R3

Sampler ID: High floor / downwind

Sample Location: SE of landfill

Nominal Flow Rate: 0.7 Lpm

Nominal Sample Volume: 1000 L

Initial Ambient VOC Conc. (ppm): 2.0

Leak Check: OK

Sample Start Time: 924 ~~ET~~ EDT

Initial Rotameter Reading, (Bottom of the Ball): 87 SS Ball

Rotameter Reading	Total Elapse Time	Local Time
ND 93 ss	36	1001
✓ 87 ss	38	1003
82 ss	65	1030
81 ss	122	1138
83 ss	280	1405
84 ss	334	1459
82 ss	447	1646

Rotameter Reading		Total Elapse Time	Local Time
81	SS	591	1916
82	SS	611	2256
80	SS	957	0122
80	SS	1176	0500
83	SS	1353	0758
83	SS	1431	0917
	SS	1440	0926

Sample Stop Time: 0926 ET

Final Rotameter Reading: ~~1440~~ 926

Total Elapse Time: 1440 Min

Final Ambient VOC Conc. (ppm): 0.0

38°F MIN 62°F MAX

~~38/62 ⁶⁶55-110-36# MAX - 6000~~

Comments: 1000 ROTAMETER VARYING UP + DOWN 10-2 DIVISIONS IN
WIND GUSTS / 1130 E CHECKED INTERIOR RESET MAX/WIND
THERMOMETER / ADDED ICE 1650 E / 2300 CALM / 0500 LIGHTS IN
WIND

AMBIENT AIR SAMPLING DATA SHEET

Project: LKBOBL2-3 Date: May 26, 1993
 Project Site: Oyster Bay Landfill Operators: MB JW SM
 General Weather Conditions: Sunny wsw

Sample ID: 2-3A2^F_B 909B^F_B
 Pump ID: B/R2
 Sampler ID: low flow / down wind

Sample Location: same as 2-3A2, 1' away from A
 Nominal Flow Rate: 0.07 Lpm
 Nominal Sample Volume: 100 Liters

Initial Ambient VOC Conc. (ppm): 0.0
 Leak Check: OK
 Sample Start Time: 924 EDT EDT
 Initial Rotameter Reading, (Bottom of the Ball): 53 58 Ball

Bottom of the Ball

Rotameter Reading	Total Elapse Time	Local Time
59 ss	33	0957
56 ss	66	1030
55 ss	123	1138
57 ss	282	1407
58 ss	336	1501
58 ss	443	1647
56 ss	592	1917

B. Ball

Rotameter Reading	Total Elapse Time	Local Time
56 ss	0813	2258
56 ss	0959	0125
57 ss	1177	0502
56 ss	1354	0759
54 ss	1433	0918
ss	1440	0925
ss		

Sample Stop Time: 0925 ET 5/27/93
 Final Rotameter Reading: 1440
 Total Elapse Time: Min
 Final Ambient VOC Conc. (ppm): 0.0

52°F 66°F

Comments: CHECKED INTERIOR SET MAX-MIN 1130E
 ADDED ICE 1653E / 2300-CALM / 0500 LIGHT SW WIND

AMBIENT AIR SAMPLING DATA SHEET

Project: LKBOBL2-3
 Project Site: Oyster Bay Landfill
 General Weather Conditions:

Date: May , 1993
 Operators: MB

Sample ID: 2-3A4 (90E)(90E) F+B
 Pump ID: DRTT R3
 Sampler ID: 4

Sample Location: DUE SOUTH OF RIGHTMOST OLDSTACK
 NER PARKIN FIELD RAIL
 Nominal Flow Rate: 7 LPM
 Nominal Sample Volume:

Initial Ambient VOC Conc. (ppm): 0.0
 Leak Check: ☒
 Sample Start Time: 0938 ET
 Initial Rotameter Reading, (Bottom of the Ball): 88 SS Ball

Rotameter Reading	Total Elapse Time	Local Time
82 SS	1041	1041
83 SS	123	1141
83 SS	281	1420
85 SS	0331	1509
85 SS	0441	1700
82 SS	585	1924
SS		

Rotameter Reading	Total Elapse Time	Local Time
83 SS	809	2307
85 SS	953	0132
84 SS	1173	0511
88 SS	1350	0808
SS		
SS		
SS		

Sample Stop Time: 0943 ET
 Final Rotameter Reading: 1445
 Total Elapse Time: Min
 Final Ambient VOC Conc. (ppm): 0.2

54°F MIN 62°F MAX

Comments: CHECKED INTERIOR SST MAX MIN 1144E / CHECKED KE 1425E-CK / 1510 ICE CK / 1555 ADDED ICE / 2300 CACM / 0510 CACM

Found disconnector when taking off line — not analyzed.

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKBOBL2-3 LOCATION OysterBay Landfill DATE May 26, 1993INVESTIGATORS MB, RSM, JWGENERAL WEATHER CONDITIONS Sunny wswSAMPLE ID 2-3F1 915D-F
915D-BSAMPLER ID soil gas wellPUMP ID E / R1SAMPLE LOCATION Fireman's Training CenterWELL ID F1WELL DEPTH 30"NOMINAL FLOW RATE ~ 1 LpmNOMINAL SAMPLE VOLUME 10 LitersINITIAL AMBIENT
VOC READING 0.0 ppmINITIAL WELL
VOC READING 12.6
~~12.0~~ ppmINITIAL INLET LINE
VOC READING 0.0 ppmSAMPLE START TIME 10:11 EDTINITIAL ROTAMETER READING 105 S.S Ball (READ FROM T C (B))FINAL AMBIENT
VOC READING 1.8 ppmFINAL WELL
VOC READING 6.7 ppmSAMPLE STOP TIME 1021DURATION 10 minFINAL ROTAMETER READING 105 S.S Ball (READ FROM T C (B))

COMMENTS: construction activities inside fireman's training center
condition the well w/ micro tip pump for 30" prior to start
leak check prior to test OK
Max. sample temp = 51° F

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB0BL2-3 LOCATION Oyster Bay Landfill DATE May 26, 1993INVESTIGATORS MB, RSM, JWGENERAL WEATHER CONDITIONS Sunny → cloudySAMPLE ID 2-3 M4 915D < F
BSAMPLER ID Soil Gas WellPUMP ID E/R1SAMPLE LOCATION E side of the windy road
1st road near landfill
50 yds from ambient (AZ208)
near fenceWELL ID M4WELL DEPTH 30"NOMINAL FLOW RATE 1.0 LpmNOMINAL SAMPLE VOLUME 10 LitersINITIAL AMBIENT
VOC READING 0.3 ppmINITIAL WELL
VOC READING 2.6 ppmINITIAL INLET LINE
VOC READING 0.0 ppmSAMPLE START TIME 10:45 EDTINITIAL ROTAMETER READING 105 S.S Ball (READ FROM T C (B))FINAL AMBIENT
VOC READING 0.3 ppmFINAL WELL
VOC READING 2.8 ppmSAMPLE STOP TIME 10:55DURATION 10 minFINAL ROTAMETER READING 106 S.S Ball (READ FROM T C (B))COMMENTS: Max. temp = 54°FLeak check = OKmoisture beads inside the front trap

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB0BL2-3 LOCATION Oyster Bay Landfill DATE May 26, 1993INVESTIGATORS MB, RSM, JWGENERAL WEATHER CONDITIONS Summer CloudySAMPLE ID 2-3 MS F > 9150SAMPLER ID soil gas wellPUMP ID E/R1SAMPLE LOCATION W side of the windy roadWELL ID MSWELL DEPTH 30"NOMINAL FLOW RATE 1 LpmNOMINAL SAMPLE VOLUME 10 LitersINITIAL AMBIENT
VOC READING 2.6 ppmINITIAL WELL
VOC READING 2.8 ppmINITIAL INLET LINE
VOC READING 0.0 ppmSAMPLE START TIME 1104 EDTINITIAL ROTAMETER READING 106 S.S Ball (READ FROM T C B)FINAL AMBIENT
VOC READING 1.4 ppmFINAL WELL
VOC READING 6.8 ppmSAMPLE STOP TIME 1114DURATION 10 minFINAL ROTAMETER READING 107 S.S Ball (READ FROM T C B)COMMENTS: Max. Temp. = 54°Fleak check = OK

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB0BL2-3 LOCATION Oyster Bay Landfill DATE May 26, 1993INVESTIGATORS MB, RSM, JWGENERAL WEATHER CONDITIONS ~~Sunny~~ cloudySAMPLE ID 2-3 M9 (10) F > 915E blueSAMPLER ID soil gasPUMP ID E/R1SAMPLE LOCATION E side of windy roadWELL ID M9 (10)WELL DEPTH 10'NOMINAL FLOW RATE 1. LpmNOMINAL SAMPLE VOLUME 10 LitersINITIAL AMBIENT
VOC READING 0.0 ppmINITIAL WELL
VOC READING 5.0 ppmINITIAL INLET LINE
VOC READING 0.0 ppmSAMPLE START TIME 1135 EDTINITIAL ROTAMETER READING 105 S.S Ball (READ FROM T C B)FINAL AMBIENT
VOC READING 0.0 ppmFINAL WELL
VOC READING 1.6 ppmSAMPLE STOP TIME 1145DURATION 10 minFINAL ROTAMETER READING 107 S.S Ball (READ FROM T C B)COMMENTS: Max temp = 58°Fleak check = OKused the same line and rod to sample, name it Line 1.line 1 was used for M4, F1 M5

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB0BL2-3 LOCATION OysterBay Landfill DATE May 26, 1993INVESTIGATORS MB, RSM, JWGENERAL WEATHER CONDITIONS cloudySAMPLE ID 2-3 M9 (20) 915A-T
915B-B Green SAMPLER ID soil gas wellPUMP ID E/R1SAMPLE LOCATION M9, E side of Windy rd.WELL ID M9 (20')WELL DEPTH 20'NOMINAL FLOW RATE 1. LpmNOMINAL SAMPLE VOLUME 10 LitersINITIAL AMBIENT
VOC READING 0.0 ppmINITIAL WELL
VOC READING 2.2 ppmINITIAL INLET LINE
VOC READING 0.0 ppmSAMPLE START TIME 1152 EDTINITIAL ROTAMETER READING 108 S.S Ball (READ FROM T C (B))FINAL AMBIENT
VOC READING 0.0 ppmFINAL WELL
VOC READING 0.0 ppmSAMPLE STOP TIME 1202 EDTDURATION 10 minFINAL ROTAMETER READING 109 S.S Ball (READ FROM T C (B))COMMENTS: max temp. = 58 °Fleak check = OKused a new line to purge and sampling (line 2)line 2 was used

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB0BL2-3 LOCATION OysterBay Landfill DATE May 26, 1993INVESTIGATORS MB, RSM, JWGENERAL WEATHER CONDITIONS Cloudy → partly sunnySAMPLE ID 2-3M9(30), red 915A F
915B-BSAMPLER ID soil gas wellPUMP ID E/R1SAMPLE LOCATION M9, east of w. rd.WELL ID M9(30')WELL DEPTH 30'NOMINAL FLOW RATE 1 LpmNOMINAL SAMPLE VOLUME 10 LitersINITIAL AMBIENT
VOC READING 0.0 ppmINITIAL WELL
VOC READING 0.3 ppmINITIAL INLET LINE
VOC READING 0.0 ppmSAMPLE START TIME 1207 EDTINITIAL ROTAMETER READING 106 S.S Ball (READ FROM T C (B))FINAL AMBIENT
VOC READING 0.0 ppmFINAL WELL
VOC READING 0.0 ppmSAMPLE STOP TIME 1217 EDTDURATION FINAL ROTAMETER READING 108 S.S Ball (READ FROM T C (B))COMMENTS: Leak Check = OKMax. temp = 62 °Fline 1 was used

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB0BL2-3 LOCATION OysterBay Landfill DATE May 26, 1993INVESTIGATORS MB, RSM, JWGENERAL WEATHER CONDITIONS ~~clearing~~ → partly sunnySAMPLE ID 2-3 M9 (40') F-415A
B-915ASAMPLER ID soil gas wellPUMP ID E/R1SAMPLE LOCATION M9. east of w. roadWELL ID M9 (40') yellowWELL DEPTH 40'NOMINAL FLOW RATE 1 LpmNOMINAL SAMPLE VOLUME 10 LitersINITIAL AMBIENT
VOC READING 0.0 ppmINITIAL WELL
VOC READING 0.0 ppmINITIAL INLET LINE
VOC READING 0.0 ppmSAMPLE START TIME 1219 EDTINITIAL ROTAMETER READING 107 S.S Ball (READ FROM T C (B))FINAL AMBIENT
VOC READING 0.0 ppmFINAL WELL
VOC READING 0.0 ppmSAMPLE STOP TIME 1229 EDTDURATION 10 minFINAL ROTAMETER READING 109 S.S Ball (READ FROM T C (B))COMMENTS: line 2 was usedLeak check = OKMax. temp = 60°F

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKBOBL2-3 LOCATION Oyster Bay Landfill DATE May 26, 1993INVESTIGATORS MB, RSM, JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-3 M13 F-915A
B-909CSAMPLER ID soil gas wellPUMP ID E/R1SAMPLE LOCATION E. of Windy Rd.WELL ID M13WELL DEPTH 30" west of W.R. & laneNOMINAL FLOW RATE 1. LpmNOMINAL SAMPLE VOLUME 10 LitersINITIAL AMBIENT
VOC READING 0.0 ppmINITIAL WELL
VOC READING 0.0 ppmINITIAL INLET LINE
VOC READING 0.0 ppmSAMPLE START TIME 1316 EDTINITIAL ROTAMETER READING 104 S.S Ball (READ FROM T C B)FINAL AMBIENT
VOC READING 0.0 ppmFINAL WELL
VOC READING 0.0 ppmSAMPLE STOP TIME 1326 EDTDURATION 10 minFINAL ROTAMETER READING 103 S.S Ball (READ FROM T C B)COMMENTS: Leak check = OKMax Time = 64°Fline 3 (new for this well) was used

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB0BL2-3 LOCATION Oyster Bay Landfill DATE May 26, 1993INVESTIGATORS MB, RSM, JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-3 M16 90°C < F
BSAMPLER ID soil gas wellPUMP ID E/R1SAMPLE LOCATION W. of the windmill road
cross the street if
incooreys road instersee.WELL ID M16WELL DEPTH 30"NOMINAL FLOW RATE 1 LpmNOMINAL SAMPLE VOLUME 10 LitersINITIAL AMBIENT
VOC READING 0.0 ppmINITIAL WELL
VOC READING 0.4 ppmINITIAL INLET LINE
VOC READING 0.0 ppmSAMPLE START TIME 1336 EDTINITIAL ROTAMETER READING 105 S.S Ball (READ FROM T C B)FINAL AMBIENT
VOC READING 0.0 ppmFINAL WELL
VOC READING 1.3 ppmSAMPLE STOP TIME 1346 EDTDURATION 10 minFINAL ROTAMETER READING 106 S.S Ball (READ FROM T C B)COMMENTS: Leak check = OKMax. Temp = 60°Fline 3 was used

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB0BL2-3 LOCATION Oyster Bay Landfill DATE May 26, 1993INVESTIGATORS MB, RSM, JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-3M2 915E F B (2)SAMPLER ID soil gas wellPUMP ID E/R1SAMPLE LOCATION near A2 & A3. W side of winding road.WELL ID M2WELL DEPTH 30"NOMINAL FLOW RATE 1 LpmNOMINAL SAMPLE VOLUME 10 LitersINITIAL AMBIENT VOC READING 0.0 ppmINITIAL WELL VOC READING >50 ppm maybe battery low
change batteryINITIAL INLET LINE VOC READING 0.0 ppmSAMPLE START TIME 1357 EDTINITIAL ROTAMETER READING 105 S.S Ball (READ FROM T C B)FINAL AMBIENT VOC READING 0.0 107 ppmFINAL WELL VOC READING 46 ppmSAMPLE STOP TIME 1407 EDTDURATION 10 minFINAL ROTAMETER READING 107 S.S Ball (READ FROM T C B)COMMENTS: Leak Check = OKTemp (max.) = 60°Flines usedM2 was re-installed on 5/25/93 and was capped on 5/26/93 around 10:28 AM

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKBOBL2-3 LOCATION Oyster Bay Landfill DATE May 26, 1993INVESTIGATORS MB, RSM, JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-3 M6915E ← F
BSAMPLER ID soil gas wellPUMP ID E/R1SAMPLE LOCATION E. of windy rd. near a small treeWELL ID M6WELL DEPTH 30"NOMINAL FLOW RATE 1 LpmNOMINAL SAMPLE VOLUME 10 LitersINITIAL AMBIENT
VOC READING0.0 ppmINITIAL WELL
VOC READING0.0 ppmINITIAL INLET LINE
VOC READING0.0 ppmSAMPLE START TIME 1421 EDTINITIAL ROTAMETER READING 106 S.S Ball (READ FROM T C B)FINAL AMBIENT
VOC READING0.0 ppmFINAL WELL
VOC READING0.0 ppmSAMPLE STOP TIME 1431DURATION 10 minFINAL ROTAMETER READING 107 S.S Ball (READ FROM T C B)

COMMENTS:

Leak Check = OKMax. Temp. = 62°FLine 3 was usedM6 was found destroyed on well survey day, and
was re-installed on 5/25/93. It was capped on 5/26/93around 10:30 AM with a little glue since the probe
was broken. seal the well w/ teflon tape while sampling
since the probe nipple was missing

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB0BL2-3 LOCATION Oyster Bay Landfill DATE May 26, 1993INVESTIGATORS MB, RSM, JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-3M21 915 C F
BSAMPLER ID soil gas wellPUMP ID E/R1SAMPLE LOCATION East side of cement roadWELL ID M21WELL DEPTH 30"NOMINAL FLOW RATE 1 LpmNOMINAL SAMPLE VOLUME 10 LitersINITIAL AMBIENT
VOC READING 0.0 ppmINITIAL WELL
VOC READING ppmINITIAL INLET LINE
VOC READING 0.0 ppmSAMPLE START TIME 1447 EDTINITIAL ROTAMETER READING 105 S.S Ball (READ FROM T C (B))FINAL AMBIENT
VOC READING 0.0 ppmFINAL WELL
VOC READING 0.0 ppmSAMPLE STOP TIME 1457 EDTDURATION 10 minFINAL ROTAMETER READING 107 S.S Ball (READ FROM T C (B))COMMENTS: Leak Check = OKMax. Temp = 62°Fline 3 was used

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB0BL2-3 LOCATION Oyster Bay Landfill DATE May 26, 1993INVESTIGATORS MB, RSM, JWGENERAL WEATHER CONDITIONS partly sunnySAMPLE ID 2-3 M39 915C < FSAMPLER ID soil gas wellPUMP ID E/R1SAMPLE LOCATION near Air stripper
near a telephone poleWELL ID M39WELL DEPTH 30"NOMINAL FLOW RATE 1 lpmNOMINAL SAMPLE VOLUME 10 LitersINITIAL AMBIENT
VOC READING 0.0 ppmINITIAL WELL
VOC READING 0.0 ppmINITIAL INLET LINE
VOC READING 0.0 ppmSAMPLE START TIME 1511 EDTINITIAL ROTAMETER READING 106 S.S Ball (READ FROM T C (B))FINAL AMBIENT
VOC READING 0.0 ppmFINAL WELL
VOC READING 0.0 ppmSAMPLE STOP TIME 1521 EDTDURATION 10 minFINAL ROTAMETER READING 106 S.S Ball (READ FROM T C (B))COMMENTS: Leak Check = OKMax Temp. = 62° Fline 3 was used

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB0BL2-3 LOCATION Oyster Bay Landfill DATE May 26, 1993

INVESTIGATORS MB, RSM, JW

GENERAL WEATHER CONDITIONS Sunny

SAMPLE ID 2-3 M22 915C F
B

SAMPLER ID Soil Gas well

PUMP ID E/R1

SAMPLE LOCATION Cross the street of trailers
E. of the landfill Access road

WELL ID M22

WELL DEPTH 30"

NOMINAL FLOW RATE 1 Lpm

NOMINAL SAMPLE VOLUME 10 Liters

INITIAL AMBIENT
VOC READING 0.0 ppm

INITIAL WELL
VOC READING 0.0 ppm

INITIAL INLET LINE
VOC READING 0.0 ppm

SAMPLE START TIME 1545 EDT

INITIAL ROTAMETER READING 95 S.S Ball (READ FROM T C B)

FINAL AMBIENT
VOC READING 0.0 ppm

FINAL WELL
VOC READING 0.0 ppm

SAMPLE STOP TIME 1555 EDT

DURATION 10 min

FINAL ROTAMETER READING 95 S.S Ball (READ FROM T C B)

COMMENTS: Leak check = OK
Max Temp = 60°F
Line 3 was used

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKBOBL2-3 LOCATION Oyster Bay Landfill DATE May 26, 1993INVESTIGATORS MB, RSM, JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-3 M28SAMPLER ID Soil Gas wellPUMP ID E/R1SAMPLE LOCATION W of discharge basinWELL ID M28WELL DEPTH 30"NOMINAL FLOW RATE 1 LpmNOMINAL SAMPLE VOLUME 10 LitersINITIAL AMBIENT
VOC READING 0.0 ppmINITIAL WELL
VOC READING 0.0 ppmINITIAL INLET LINE
VOC READING 0.0 ppmSAMPLE START TIME 1409 EDTINITIAL ROTAMETER READING 105 S.S Ball (READ FROM T C B)FINAL AMBIENT
VOC READING 0.0 ppmFINAL WELL
VOC READING 0.0 ppmSAMPLE STOP TIME 1419 EDTDURATION 10 minFINAL ROTAMETER READING 107 S.S Ball (READ FROM T C B)

COMMENTS:

Leak check = OKMax. Temp. = 62°FLine 3 was used

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB0BL2-3 LOCATION Oyster Bay Landfill DATE May 26, 1993INVESTIGATORS MB, RSM, JWGENERAL WEATHER CONDITIONS Partly Sunny90°C $\leftarrow$ F
BSAMPLE ID 2-3M31 SAMPLER ID soil gas wellPUMP ID E/R1 SAMPLE LOCATION SW of landfillWELL ID M31 WELL DEPTH 30" near to W. access roadNOMINAL FLOW RATE 1 Lpm NOMINAL SAMPLE VOLUME 10 LitersINITIAL AMBIENT VOC READING 0.0 ppm INITIAL WELL VOC READING 0.0 ppmINITIAL INLET LINE VOC READING 0.0 ppm SAMPLE START TIME 1630 EDTINITIAL ROTAMETER READING 107 S.S Ball (READ FROM T C B)FINAL AMBIENT VOC READING 0.0 ppm FINAL WELL VOC READING 0.0 ppmSAMPLE STOP TIME 1640 EDT DURATION 10 minsFINAL ROTAMETER READING 107 S.S Ball (READ FROM T C B)COMMENTS: Leak Check = OKMax. Temp = 62°Fline 3 was used

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB08L2-3 LOCATION Oyster Bay Landfill DATE May, 1993INVESTIGATORS MB, RSM, JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-3M34 F > 90°C
BSAMPLER ID soil gas wellPUMP ID E/R1SAMPLE LOCATION E. of the w access roadWELL ID M31WELL DEPTH 30"NOMINAL FLOW RATE 1 LpmNOMINAL SAMPLE VOLUME 10 LitersINITIAL AMBIENT
VOC READING 0.0 ppmINITIAL WELL
VOC READING 0.0 ppmINITIAL INLET LINE
VOC READING 0.0 ppmSAMPLE START TIME 1650 EDTINITIAL ROTAMETER READING 108 S.S Ball (READ FROM T C B)FINAL AMBIENT
VOC READING 0.0 ppmFINAL WELL
VOC READING 0.0 ppmSAMPLE STOP TIME 1700 EDTDURATION 10 minFINAL ROTAMETER READING 109 S.S Ball (READ FROM T C B)COMMENTS: Leak Check = OKMax Temp = 60°FLine 3 was used

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKBOBL2-3 LOCATION Oyster Bay Landfill DATE May 26, 1993INVESTIGATORS MB, RSM, JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-3 M37 F>915CSAMPLER ID soil gas wellPUMP ID E/R1SAMPLE LOCATION next to the pondWELL ID M37WELL DEPTH 30"NOMINAL FLOW RATE 1 LpmNOMINAL SAMPLE VOLUME 10 LitersINITIAL AMBIENT
VOC READING 0.0 ppmINITIAL WELL
VOC READING 1.5 ppmINITIAL INLET LINE
VOC READING 0.0 ppmSAMPLE START TIME 1713 EDTINITIAL ROTAMETER READING 106 S.S Ball (READ FROM T C B)FINAL AMBIENT
VOC READING 0.0 ppmFINAL WELL
VOC READING 0.0 ppmSAMPLE STOP TIME 1723 EDTDURATION 10 minFINAL ROTAMETER READING 108 S.S Ball (READ FROM T C B)COMMENTS: Leak check = OKMax Temp = 60 °FLine 3 was usedsmall odor from float, sludge in pond

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKBOBL2-3 LOCATION Oyster Bay Landfill DATE May 27, 1993

INVESTIGATORS MB, RSM, JW

GENERAL WEATHER CONDITIONS Sunny

SAMPLE ID 2-3 = B1A) 915B-F B

SAMPLER ID

PUMP ID

SAMPLE LOCATION

WELL ID

WELL DEPTH

NOMINAL FLOW RATE

NOMINAL SAMPLE VOLUME 10 Liters

INITIAL AMBIENT
VOC READING

ppm

INITIAL WELL
VOC READING

ppm

INITIAL INLET LINE
VOC READING

ppm

SAMPLE START TIME

ET

INITIAL ROTAMETER READING

S.S Ball

(READ FROM T C B)

FINAL AMBIENT
VOC READING

ppm

FINAL WELL
VOC READING

ppm

SAMPLE STOP TIME

DURATION

FINAL ROTAMETER READING

S.S Ball

(READ FROM T C B)

COMMENTS:

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB0BL2-3 LOCATION OysterBay Landfill DATE May 27, 1993

INVESTIGATORS MB, RSM, JW

GENERAL WEATHER CONDITIONS Bunny

SAMPLE ID 2-3 FEB 13 4:56 B SAMPLER ID

PUMP ID SAMPLE LOCATION

WELL ID WELL DEPTH

NOMINAL FLOW RATE NOMINAL SAMPLE VOLUME 10 Liters

INITIAL AMBIENT VOC READING ppm INITIAL WELL VOC READING ppm

INITIAL INLET LINE VOC READING ppm SAMPLE START TIME ET

INITIAL ROTAMETER READING S.S Ball (READ FROM T C B)

FINAL AMBIENT VOC READING ppm FINAL WELL VOC READING ppm

SAMPLE STOP TIME DURATION

FINAL ROTAMETER READING S.S Ball (READ FROM T C B)

COMMENTS:

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB0BL2-3 LOCATION OysterBay Landfill DATE May 27, 1993

INVESTIGATORS MB, RSM, JW

GENERAL WEATHER CONDITIONS Sunny

SAMPLE ID 2-3T61A B7D 315B

SAMPLER ID _____

PUMP ID

SAMPLE LOCATION _____

WELL ID _____

WELL DEPTH _____

NOMINAL FLOW RATE _____

NOMINAL SAMPLE VOLUME 10 Liters

INITIAL AMBIENT
VOC READING _____ ppm

INITIAL WELL
VOC READING _____ ppm

INITIAL INLET LINE
VOC READING _____ ppm

SAMPLE START TIME	ET
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0001	0001
0002	0002
0003	0003
0004	0004
0005	0005
0006	0006
0007	0007
0008	0008
0009	0009
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0099	0099

INITIAL ROTAMETER READING _____ S.S Ball (READ FROM T C B)

FINAL AMBIENT
VOC READING _____ ppm

FINAL WELL
VOC READING _____ ppm

SAMPLE STOP TIME _____

DURATION _____

FINAL ROTAMETER READING _____ S.S. Ball _____ (READ FROM T C B)

COMMENTS:

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB0BL2-3 LOCATION OysterBay Landfill DATE May 27, 1993

INVESTIGATORS MB, RSM, JW

GENERAL WEATHER CONDITIONS *Sunny*

SAMPLE ID 2-3TB(B) $\sqrt{B \cdot A \cdot 5B}$

SAMPLER ID

PUMP ID

SAMPLE LOCATION

WELL ID

WELL DEPTH

NOMINAL FLOW RATE

NOMINAL SAMPLE VOLUME 10 Liters

INITIAL AMBIENT
VOC READING

INITIAL WELL
VOC READING

INITIAL INLET LINE
VOC READING ppm

SAMPLE START TIME	ET
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0001	0001
0002	0002
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0098	0098
0099	0099

INITIAL ROTAMETER READING S.S Ball (READ FROM T C B)

FINAL AMBIENT
VOC READING

FINAL WELL
VOC READING ppm

SAMPLE STOP TIME

DURATION

FINAL ROTAMETER READING S.S Ball (READ FROM T C B)

COMMENTS:

PRESSURE WELL READING DATA SHEET

Project ID: LK B03L2-3
 Project Site: Oyster Bay Landfill
 Date: May 27, 1993
 General Weather Condition: Sunny, westerly wind
 Equipment ID: 10" WC manometer
 Operators: RSM JW

Well ID	Pressure Well Location	Color Code	Reading	Time
PW1	NW of landfill	Blue	-0.10	1040
		Green	-0.07	1044
		B	-0.09	1050
		G	-0.07	1055
Well ID	Pressure Well Location	Color Code	Reading	
PW2	SE of the landfill	Blue	0.00	1030
		Green	-0.14	1033
		B	0.00	1105
		G	-0.14	1110
Well ID	Pressure Well Location	Color Code	Reading	
PW3	ETC	Red	-0.37	1140
		No ID	-0.44	1145
		R	-0.35	1155
		No ID	-0.44	1200

Comments: Sunny but windy

APPENDIX F
EQUIPMENT CALIBRATIONS

PUMP CALIBRATION SHEET

Project: LKBBBL2-3
 Date: 5/14/93 (pre)
 Time: 1200 Am
 Pump ID: Rotameter ID: R1

Barometric Pressure, (Pb): 29.8 (in-Hg)
 Temperature, (T): 72.5 70 (F)
 Operator: JLW

Pre-calibration

Rotameter Reading (Bottom of the Ball)				
90	100	110	120	
Sampling Medium				
2 T/C only	2 T/C only	2 T/C	2 T/C	
Actual Liters Per Minutes, ALPM				
0.790	0.836	0.955	1.04	
0.796	0.837	0.954	1.04	
0.804	0.891	0.948	1.03	
0.754	0.843	0.950	1.04	
0.707	0.842	0.949	1.04	
0.750	0.845	0.956	1.05	
0.757	0.862	0.957	1.03	
0.730	0.848	0.961	1.05	
0.759	0.853	0.950	1.05	
0.758	0.850	0.954	1.03	
0.754	0.849	0.960	1.03	
0.767	0.844	0.956	1.03	
0.766	0.848	0.955	1.03	
0.766	0.851	0.943	1.03	
0.761	0.850	0.942	1.03	
0.775	0.856	0.944	1.05	
0.691	0.855	0.949	1.03	
Avg(ALPM)				
0.756	0.850	0.952	1.04	
Average Standard Liters Per Minute, Avg(SLPM)				
$SLPM = ALPM \times \left(\frac{(Pb - Pv) \times 29.92}{273 + T} \right)$ $C = (5/9) \times (F - 32)$				

Vapor Pressure (Pv) Table	
(C)	(In-Hg)
15	0.50
16	0.54
17	0.57
18	0.61
19	0.65
20	0.69
21	0.73
22	0.78
23	0.83
24	0.88
25	0.94
26	0.99
27	1.06
28	1.12
29	1.18
30	1.25
31	1.33
32	1.40

Remarks:

- Remarks: ① Flow fault occurred several times when calibrating reading 90 ~~for~~.
- ② Changed pump from D to B, still have flow fault for reading 100 w/ 2 T/C in series. ^{try 10} Calibrate w/ one T/C trap, still get flow fault. Change to pump E, E, Airc, still have flow faults.
- ③ Finally, did calibrate w/ 2 T/C traps using pump C, flow faults happened several times

PUMP CALIBRATION SHEET

Project: LRGDB-2-3
 Date: March 30, 1998
 Time: 11 AM
 Pump ID: APR 2 R2

Barometric Pressure, (Pb): 29.86 (in-Hg)
 Temperature, (T): 70 (F)
 Operator: me

precalibration

Rotameter Reading (Bottom of the Ball)					
45	50	55			
Sampling Medium					
2 nd Manganese					
Actual Liters Per Minutes, ALPM					
0.0564	0.0674	0.0784			
0.0569	0.0680	0.0783			
0.0570	0.0682	0.0787			
0.0570	0.0678	0.0784			
0.0566	0.0677	0.0788			
0.0570	0.0683	0.0790			
0.0571	0.0683	0.0786			
0.0569	0.0678	0.0783			
0.0571	0.0678	0.0786			
0.0568	0.0680	0.0785			
0.0570	0.0680	0.0782			
0.0572	0.0680	0.0785			
0.0572	0.0678	0.0788			
0.0572	0.0681	0.0782			
0.0571	0.0677	0.0784			
0.0574	0.0680	0.0783			
0.0572	0.0678	0.0783			
Avg(ALPM)					
0.0570	0.0679	0.0785			
Average Standard Liters Per Minute, Avg(SLPM)					
$SLPM = ALPM \times \left[\left(\frac{Pb - Pv}{29.92} \right) \times \left(\frac{293}{273 + T} \right) \right]$ $C = (5/9) \times (F - 32)$					

Vapor Pressure (Pv) Table	
(C)	(in-Hg)
15	0.50
16	0.54
17	0.57
18	0.61
19	0.65
20	0.69
21	0.73
22	0.78
23	0.83
24	0.88
25	0.94
26	0.99
27	1.06
28	1.12
29	1.18
30	1.25
31	1.33
32	1.40

Remarks:

Remarks: *Read at bottom of the black ball.*

PUMP CALIBRATION SHEET

Project: LK60BL 2-3
 Date: 5/19/93
 Time: 10:30 AM
 Pump ID: PRID R3

Barometric Pressure, (Pb): 29.8 (in-Hg)
 Temperature, (T): 70 (F)
 Operator: nm

Pre-calibration

Rotameter Reading (Bottom of the Ball)					
70	80	90	100	110	120
Sampling Medium					
< 2 T/C traps & 5.96L >			< 1 T/C traps w/o 5.96L >		
Actual Liters Per Minutes, ALPM					
	0.681	0.772	0.872	0.972	1.06
	0.678	0.750	0.869	0.952	1.07
	0.682	0.764	0.867	0.962	1.03
	0.678	0.767	0.867	0.971	1.06
	0.673	0.773	0.861	0.969	1.05
	0.682	0.771	0.868	0.954	1.06
	0.678	0.764	0.865	0.962	1.05
	0.681	0.745	0.868	0.960	1.04
	0.682	0.764	0.865	0.964	1.06
	0.675	0.773	0.869	0.964	1.05
	0.683	0.772	0.867	0.960	1.05
	0.682	0.783	0.864	0.961	1.04
	0.682	0.781	0.873	0.960	1.04
	0.678	0.765	0.874	0.963	1.05
	0.675	0.770	0.873	0.974	1.04
	0.679	0.768	0.873	0.970	1.05
	0.679	0.772	0.871	0.971	1.05
Avg(ALPM)					
	0.679	0.770	0.869	0.964	1.05
Average Standard Liters Per Minute, Avg(SLPM)					
$SLPM = ALPM \times \left(\frac{[(Pb - Pv) / 29.92] \times [293 / (273 + T)]}{C} \right)$ $C = (5/9) \times (F - 32)$					

Vapor Pressure (Pv) Table	
(C)	(in-Hg)
15	0.50
16	0.54
17	0.57
18	0.61
19	0.65
20	0.69
21	0.73
22	0.78
23	0.83
24	0.88
25	0.94
26	0.99
27	1.06
28	1.12
29	1.18
30	1.25
31	1.33
32	1.40

Remarks:

- Remarks:
- ① When calibrating Rotameter reading 90 (SS), pump flow fault occurred about every 1 minute.
 - ② Could not calibrate 77(SS) since the 65 ball & jumps back & forth w/o stopping, waited for 10 minutes, it would not pump.
 - ③ Calibrated 100, 110 and 120 (SS) reading w/o 5.96L.
 - ④ When calibrating reading 110, 120 (SS), pump fault occurred several times.
 - ⑤ Calibration line leak check OK.

PUMP CALIBRATION SHEET

Project: L-818-2-B
 Date: 5/28/43
 Time: 11 AM
 Pump ID: R1 1B - high flow

Barometric Pressure. (Pb): 30.02 (in-Hg)
 Temperature. (T): 70 (F)
 Operator: T.C.

Post Calibration

15.5

Rotameter Reading (Bottom of the Ball)					
40	100	110			
Sampling Medium:					
2 TL + 200					
Actual Liters Per Minutes, ALPM					
0.754	0.837	0.945			
0.742	0.834	0.944			
0.748	0.833	0.944			
0.750	0.834	0.948			
0.749	0.836	0.937			
0.750	0.836	0.940			
0.744	0.839	0.942			
0.747	0.832	0.937			
0.747	0.832	0.935			
0.746	0.828	0.932			
0.742	0.832	0.936			
0.750	0.833	0.937			
0.749	0.839	0.934			
0.744	0.834	0.943			
0.745	0.837	0.937			
0.744	0.840	0.937			
0.747	0.840	0.934			
Avg(ALPM)					
0.748	0.828	0.934			
Average Standard Liters Per Minute, Avg(SLPM)					
$SLPM = ALPM \times \left[\frac{(Pb - Pv)}{29.92} \times \frac{293}{(273 + T)} \right]$ $C = (5/9) \times (F - 32)$					

Vapor Pressure (Pv) Table	
(C)	(In-Hg)
15	0.50
16	0.54
17	0.57
18	0.61
19	0.65
20	0.69
21	0.73
22	0.78
23	0.83
24	0.88
25	0.94
26	0.99
27	1.06
28	1.12
29	1.18
30	1.25
31	1.33
32	1.40

Remarks:

Remarks: ① flow rate occurred when calibrating readings 100 and 110.
 ②

PUMP CALIBRATION SHEET

Project: LC305B2-3
 Date: 5-21-82
 Time: 1:20 PM
 Pump ID: R2/B

Barometric Pressure, (Pb): 29.83 (in-Hg)
 Temperature, (T): 75 (F)
 Operator: Don

Post Calibration only

Rotameter Reading (Bottom of the Ball)					
50	55	60			
Sampling Medium					
27C wa					
Actual Liters Per Minutes, ALPM					
0.0473	0.0472	0.0421			
0.0486	0.0445	0.0422			
0.0586	0.0385	0.0421			
0.0424	0.0734	0.0422			
0.0691	0.0704	0.0425			
0.0491	0.0727	0.0422			
0.0635	0.0793	0.0421			
0.0692	0.0704	0.0420			
0.0647	0.0716	0.0422			
0.0698	0.0706	0.0419			
0.0696	0.0701	0.0420			
0.0607	0.0747	0.0424			
0.0699	0.0702	0.0423			
0.0648	0.0801	0.0427			
0.0679	0.0802	0.0424			
0.0676	0.0802	0.0424			
0.0678	0.0796	0.0423			
Avg(ALPM)					
0.0690	0.0795	0.0423			
Average Standard Liters Per Minute, Avg(SLPM)					
$SLPM = ALPM \times \left[\left(\frac{Pb - Pv}{29.92} \right) \times \left(\frac{293}{273 + T} \right) \right]$ $C = (5/9) \times (F - 32)$					

Vapor Pressure (Pv) Table	
(C)	(In-Hg)
15	0.50
16	0.54
17	0.57
18	0.61
19	0.65
20	0.69
21	0.73
22	0.78
23	0.83
24	0.88
25	0.94
26	0.99
27	1.06
28	1.12
29	1.18
30	1.25
31	1.33
32	1.40

Remarks:

Remarks:

PUMP CALIBRATION SHEET

Project: LCRBL 2-3
 Date: 5/2/03
 Time: 1:20
 Pump ID: R3 3

Barometric Pressure, (Pb): 76.23 (in-Hg)
 Temperature, (T): 70 (F)
 Operator: RL

Post-Calibration for LCRBL 2-3 and Pre-Calibration for LCRBL 2-1

Rotameter Reading (Bottom of the Ball)					
20	90	100	110	120	
Sampling Medium					
276 2005					
Actual Liters Per Minutes, ALPM					
0.650	0.772	0.867	0.952	1.06	
0.675	0.776	0.867	0.957	1.06	
0.677	0.777	0.860	0.964	1.05	
0.682	0.776	0.868	0.962	1.07	
0.684	0.772	0.864	0.962	1.05	
0.675	0.771	0.868	0.960	1.06	
0.683	0.775	0.871	0.962	1.07	
0.684	0.782	0.867	0.956	1.07	
0.687	0.781	0.871	0.963	1.06	
0.683	0.781	0.871	0.960	1.07	
0.682	0.774	0.864	0.963	1.07	
0.683	0.773	0.873	0.965	1.05	
0.683	0.770	0.870	0.953	1.06	
0.684	0.770	0.873	0.961	1.06	
0.683	0.782	0.871	0.955	1.06	
0.685	0.781	0.871	0.963	1.05	
0.681	0.778	0.867	0.957	1.06	
Avg(ALPM)					
0.682	0.777	0.867	0.961	1.06	
Average Standard Liters Per Minute, Avg(SLPM)					
$SLPM = ALPM \times \left(\left[\frac{Pb - Pv}{29.92} \right] \times \left[\frac{293}{(273 + T)} \right] \right)$ $C = (5/9) \times (F - 32)$					

Vapor Pressure (Pv) Table	
(C)	(in-Hg)
15	0.50
16	0.54
17	0.57
18	0.61
19	0.65
20	0.69
21	0.73
22	0.78
23	0.83
24	0.88
25	0.94
26	0.99
27	1.06
28	1.12
29	1.18
30	1.25
31	1.33
32	1.40

Remarks:

Remarks:

1. Flowmeter accurate at 120.
 2. Flowmeter accurate for LCRBL 2-1

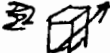
APPENDIX G
METEOROLOGICAL MONITORING DATA

METEOROLOGICAL EQUIPMENT SITING DATA SHEET

Project: LK-B0B2 2

Project Site: Oyster Bay Landfill

Operators: MB SM JW

Instrument No. 1 (old)	
Location: camp ground 3' to amb. upwind sampler, wind sensor is about 6' high.	
Initial Battery Voltage: 12.7	
Wind Dir. Reference:  34° ~~from~~ clockwise ^{from} ~~to~~ AMN.	
True WD = Measured WD +/- () =	
Date & Julian Day to Set Up: 146 5/26/93	
Start Time (Local): 8:48 EDT	
Date & Julian Day to Take Down: 5/27/93 (147)	
Stop Time (Local): 8:30	
Remarks: <u>OLD INSTR</u> WD = 216° TAIL TO NW STACK	
Final Voltage = 12.66	
Ph = 30.6	

Instrument No.2 (new)

Location: atop the landfill

Initial Battery Voltage: 12.95

Wind Dir. Reference:

29° east or clockwise from
M. North.

True WD = Measured WD + (-) =

Date & Julian Day to Set Up:
5/20/93, Jday = 140, Thursday

Start Time (Local): 1605 EDT

Date & Julian Day to Take Down:
5/27/93 (147)

Stop Time (Local): 1352 EDT

Remarks:
5/20/93 - scattered shower

Final Battery Vol. = 12.1
Pressure = 29.79

Take the met box down at the
end of test to charge. The true
wind everything else is left
atop the landfill.

R.H. sensor is not working.
got the RH reading of -26.3,
not right at all

LKBOBL2-3

(5/28/93 Download)

Upwind ambient air
sample location, camp-
ground East gate.

Test day = 5/26/93.

to

5/27/93.

5/26/93 = 146

5/27/93 = 147

old data

109.	02+0140.	03+0915.	04+0.500	05+08.63	06+0.285	07+072.1	08+49.70
29.76	10+0.000	11+14.28					
109.	02+0140.	03+0930.	04+0.500	05+08.64	06+0.422	07+072.3	08+49.94
29.77	10+0.000	11+14.28					
109.	02+0140.	03+0945.	04+0.500	05+08.62	06+0.216	07+072.6	08+50.26
29.76	10+0.000	11+14.28					
109.	02+0140.	03+1000.	04+0.500	05+08.68	06+0.247	07+072.8	08+49.73
29.76	10+0.000	11+14.28					
109.	02+0140.	03+1000.	04+0.500	05+08.64	06+0.441	07+072.4	08+49.91
29.76	10+0.000	11+14.28					
109.	02+0140.	03+1015.	04+0.500	05+08.74	06+0.262	07+072.9	08+49.59
29.75	10+0.000	11+14.28					
109.	02+0140.	03+1030.	04+0.500	05+08.66	06+0.275	07+073.0	08+49.64
29.76	10+0.000	11+14.28					
109.	02+0140.	03+1045.	04+0.500	05+08.69	06+0.266	07+073.1	08+49.68
29.76	10+0.000	11+14.28					
109.	02+0140.	03+1100.	04+0.500	05+08.73	06+0.256	07+073.2	08+49.73
29.75	10+0.000	11+14.28					
109.	02+0140.	03+1100.	04+0.500	05+08.70	06+0.419	07+073.0	08+49.66
29.76	10+0.000	11+14.28					
109.	02+0140.	03+1115.	04+0.500	05+08.69	06+0.282	07+073.3	08+49.73
29.75	10+0.000	11+14.28					
109.	02+0140.	03+1130.	04+0.500	05+08.79	06+0.203	07+073.5	08+49.85
29.75	10+0.000	11+14.28					
109.	02+0140.	03+1145.	04+0.500	05+08.78	06+0.252	07+073.7	08+49.85
29.76	10+0.000	11+14.28					
109.	02+0140.	03+1200.	04+0.500	05+08.75	06+0.273	07+073.8	08+49.56
29.76	10+0.000	11+14.28					
109.	02+0140.	03+1200.	04+0.500	05+08.75	06+0.485	07+073.6	08+49.75
29.76	10+0.000	11+14.28					
109.	02+0140.	03+1215.	04+0.500	05+08.76	06+0.259	07+073.9	08+49.31
29.76	10+0.000	11+14.28					
109.	02+0140.	03+1230.	04+0.500	05+08.81	06+0.244	07+073.9	08+49.09
29.75	10+0.000	11+14.28					
109.	02+0140.	03+1245.	04+0.500	05+08.74	06+0.299	07+074.0	08+48.92
29.76	10+0.000	11+14.28					
109.	02+0140.	03+1300.	04+0.500	05+08.72	06+0.288	07+074.1	08+48.86
29.76	10+0.000	11+14.28					
109.	02+0140.	03+1300.	04+0.500	05+08.76	06+0.493	07+074.0	08+49.05
29.76	10+0.000	11+14.28					
109.	02+0140.	03+1315.	04+0.500	05+08.88	06+0.510	07+074.1	08+48.06
29.74	10+0.020	11+13.27					
109.	02+0140.	03+1330.	04+0.500	05+08.86	06+0.416	07+073.6	08+46.73
29.48	10+0.030	11+13.03					
109.	02+0140.	03+1345.	04+0.500	05+08.93	06+0.118	07+072.7	08+48.21
29.75	10+0.020	11+13.52					
109.	02+0140.	03+1400.	04+0.500	05+08.78	06+0.277	07+071.8	08+48.39
29.5	10+0.000	11+14.26					
109.	02+0140.	03+1400.	04+0.500	05+08.86	06+0.561	07+073.1	08+47.85
29.73	10+0.070	11+14.26					
109.	02+0140.	03+1415.	04+0.500	05+08.65	06+0.309	07+071.0	08+48.61
29.4	10+0.000	11+14.27					
109.	02+0140.	03+1430.	04+0.500	05+08.73	06+0.280	07+070.3	08+49.52
29.74	10+0.000	11+14.28					
109.	02+0140.	03+1445.	04+0.500	05+08.64	06+0.276	07+69.71	08+50.41
29.74	10+0.000	11+14.28					
109.	02+0140.	03+1500.	04+0.500	05+08.61	06+0.235	07+69.27	08+51.23
29.74	10+0.000	11+14.28					
109.	02+0140.	03+1500.	04+0.500	05+08.66	06+0.446	07+070.0	08+49.94
29.74	10+0.000	11+14.28					

01+0109.	02+0145.	03+2115.	04+0.500	05+08.68	06+0.259	07+071.1	08+52.14
09+29.93	10+0.000	11+14.26					
01+0109.	02+0145.	03+2130.	04+0.500	05+08.71	06+0.240	07+071.0	08+51.57
09+29.94	10+0.000	11+14.26					
01+0109.	02+0145.	03+2145.	04+0.500	05+08.61	06+0.278	07+071.0	08+51.78
09+29.94	10+0.000	11+14.26					
01+0109.	02+0145.	03+2200.	04+0.500	05+08.70	06+0.233	07+071.1	08+51.93
09+29.95	10+0.000	11+14.26					
01+0115.	02+0145.	03+2200.	04+0.500	05+08.67	06+0.452	07+071.1	08+51.86
09+29.94	10+0.000	11+14.26					
01+0109.	02+0145.	03+2215.	04+0.500	05+08.72	06+0.258	07+071.1	08+51.19
09+29.95	10+0.000	11+14.27					
01+0109.	02+0145.	03+2230.	04+0.500	05+08.67	06+0.277	07+071.1	08+51.39
09+29.95	10+0.000	11+14.27					
01+0109.	02+0145.	03+2245.	04+0.500	05+08.72	06+0.249	07+071.1	08+51.68
09+29.96	10+0.000	11+14.26					
01+0109.	02+0145.	03+2300.	04+0.500	05+08.67	06+0.263	07+071.2	08+51.93
09+29.96	10+0.000	11+14.27					
01+0115.	02+0145.	03+2300.	04+0.500	05+08.70	06+0.426	07+071.1	08+51.55
09+29.96	10+0.000	11+14.27					
01+0109.	02+0145.	03+2315.	04+0.500	05+08.72	06+0.286	07+071.3	08+51.82
09+29.97	10+0.000	11+14.27					
01+0109.	02+0145.	03+2330.	04+0.500	05+08.67	06+0.274	07+071.2	08+50.70
09+29.97	10+0.000	11+14.27					
01+0109.	02+0145.	03+2345.	04+0.500	05+08.67	06+0.271	07+071.1	08+50.76
09+29.98	10+0.000	11+14.26					
01+0109.	02+0145.	03+2400.	04+0.500	05+08.68	06+0.271	07+071.1	08+50.85
09+29.99	10+0.000	11+14.26					
01+0115.	02+0145.	03+2400.	04+0.500	05+08.69	06+0.433	07+071.2	08+51.04
09+29.98	10+0.000	11+14.26					
01+0109.	02+0146.	03+0015.	04+0.500	05+08.66	06+0.268	07+071.1	08+50.92
09+29.99	10+0.000	11+14.27					
01+0109.	02+0146.	03+0030.	04+0.500	05+08.66	06+0.261	07+071.2	08+50.99
09+29.99	10+0.000	11+14.27					
01+0109.	02+0146.	03+0045.	04+0.500	05+08.67	06+0.268	07+071.2	08+51.01
09+30.00	10+0.000	11+14.27					
01+0109.	02+0146.	03+0100.	04+0.500	05+08.64	06+0.286	07+071.2	08+49.91
09+30.00	10+0.000	11+14.27					
01+0115.	02+0146.	03+0100.	04+0.500	05+08.66	06+0.436	07+071.2	08+50.71
09+29.99	10+0.000	11+14.27					
01+0109.	02+0146.	03+0115.	04+0.500	05+08.60	06+0.248	07+071.1	08+49.73
09+30.00	10+0.000	11+14.27					
01+0109.	02+0146.	03+0130.	04+0.500	05+08.67	06+0.235	07+071.0	08+50.02
09+30.00	10+0.000	11+14.28					
01+0109.	02+0146.	03+0145.	04+0.500	05+08.71	06+0.244	07+071.1	08+50.28
09+30.00	10+0.000	11+14.27					
01+0109.	02+0146.	03+0200.	04+0.500	05+08.71	06+0.288	07+071.1	08+50.52
09+30.01	10+0.000	11+14.27					
01+0115.	02+0146.	03+0200.	04+0.500	05+08.67	06+0.447	07+071.1	08+50.14
09+30.00	10+0.000	11+14.27					
01+0109.	02+0146.	03+0215.	04+0.500	05+08.63	06+0.282	07+071.2	08+50.70
09+30.01	10+0.000	11+14.28					
01+0109.	02+0146.	03+0230.	04+0.500	05+08.62	06+0.260	07+071.3	08+50.83
09+30.01	10+0.000	11+14.27					
01+0109.	02+0146.	03+0245.	04+0.500	05+08.68	06+0.280	07+071.3	08+50.84
09+30.01	10+0.000	11+14.28					
01+0109.	02+0146.	03+0300.	04+0.500	05+08.75	06+0.275	07+071.3	08+50.47
09+30.01	10+0.000	11+14.27					
01+0115.	02+0146.	03+0300.	04+0.500	05+08.67	06+0.425	07+071.3	08+50.71
09+30.01	10+0.000	11+14.27					

01+0109.	02+0146.	03+0315.	04+0.500	05+08.65	06+0.276	07+071.2	08+49.12
09+30.01	10+0.000	11+14.28					
01+0109.	02+0146.	03+0330.	04+0.500	05+08.61	06+0.269	07+071.1	08+49.22
09+30.01	10+0.000	11+14.28					
01+0109.	02+0146.	03+0345.	04+0.500	05+08.70	06+0.242	07+071.1	08+49.33
09+30.01	10+0.000	11+14.28					
01+0109.	02+0146.	03+0400.	04+0.500	05+08.58	06+0.277	07+071.0	08+49.38
09+30.02	10+0.000	11+14.28					
01+0115.	02+0146.	03+0400.	04+0.500	05+08.64	06+0.424	07+071.1	08+49.27
09+30.01	10+0.000	11+14.28					
01+0109.	02+0146.	03+0415.	04+0.500	05+08.61	06+0.274	07+071.0	08+49.40
09+30.02	10+0.000	11+14.27					
01+0109.	02+0146.	03+0430.	04+0.500	05+08.71	06+0.243	07+071.0	08+49.43
09+30.03	10+0.000	11+14.27					
01+0109.	02+0146.	03+0445.	04+0.500	05+08.64	06+0.265	07+071.0	08+49.51
09+30.03	10+0.000	11+14.28					
01+0109.	02+0146.	03+0500.	04+0.500	05+08.77	06+0.265	07+071.0	08+49.60
09+30.04	10+0.000	11+14.28					
01+0115.	02+0146.	03+0500.	04+0.500	05+08.68	06+0.444	07+071.0	08+49.49
09+30.03	10+0.000	11+14.28					
01+0109.	02+0146.	03+0515.	04+0.500	05+08.66	06+0.292	07+071.0	08+49.66
09+30.04	10+0.000	11+14.28					
01+0109.	02+0146.	03+0530.	04+0.500	05+08.59	06+0.280	07+071.0	08+49.71
09+30.04	10+0.000	11+14.27					
01+0109.	02+0146.	03+0545.	04+0.500	05+08.64	06+0.262	07+071.1	08+49.70
09+30.04	10+0.000	11+14.27					
01+0109.	02+0146.	03+0600.	04+0.500	05+08.72	06+0.231	07+071.0	08+49.54
09+30.05	10+0.000	11+14.28					
01+0115.	02+0146.	03+0600.	04+0.500	05+08.65	06+0.412	07+071.0	08+49.65
09+30.04	10+0.000	11+14.28					
01+0109.	02+0146.	03+0615.	04+0.500	05+08.62	06+0.247	07+071.0	08+49.40
09+30.05	10+0.000	11+14.28					
01+0109.	02+0146.	03+0630.	04+0.500	05+08.65	06+0.286	07+071.0	08+49.36
09+30.06	10+0.000	11+14.28					
01+0109.	02+0146.	03+0645.	04+0.500	05+08.63	06+0.256	07+070.9	08+49.35
09+30.06	10+0.000	11+14.28					
01+0109.	02+0146.	03+0700.	04+0.500	05+08.63	06+0.269	07+070.9	08+49.34
09+30.06	10+0.000	11+14.28					
01+0115.	02+0146.	03+0700.	04+0.500	05+08.63	06+0.399	07+070.9	08+49.36
09+30.06	10+0.000	11+14.28					
01+0109.	02+0146.	03+0715.	04+0.500	05+08.62	06+0.265	07+070.9	08+49.15
09+30.06	10+0.000	11+14.28					
01+0109.	02+0146.	03+0730.	04+0.500	05+08.64	06+0.236	07+070.7	08+47.85
09+30.06	10+0.000	11+14.28					
01+0109.	02+0146.	03+0745.	04+0.500	05+08.71	06+0.239	07+070.5	08+47.99
09+30.06	10+0.000	11+14.28					
01+0109.	02+0146.	03+0800.	04+0.500	05+08.55	06+0.278	07+070.2	08+47.50
09+30.06	10+0.020	11+13.23					
01+0115.	02+0146.	03+0800.	04+0.500	05+08.63	06+0.447	07+070.6	08+48.12
09+30.06	10+0.020	11+13.23					
01+0109.	02+0146.	03+0815.	04+0.500	05+08.48	06+0.200	07+69.38	08+48.23
09+30.06	10+0.010	11+12.99					
01+0109.	02+0146.	03+0830.	04+0.500	05+08.49	06+0.211	07+69.33	08+48.07
09+30.04	10+0.000	11+12.80					
01+0109.	02+0146.	03+0845.	04+3.979	05+288.2	06+57.50	07+67.86	08+49.84
09+30.03	10+0.010	11+12.70					
01+0109.	02+0146.	03+0900.	04+5.475	05+255.7	06+31.34	07+63.33	08+55.20
09+30.04	10+0.000	11+12.71					
01+0115.	02+0146.	03+0900.	04+2.614	05+330.5	06+60.78	07+67.48	08+50.34
09+30.04	10+0.020	11+12.71					

01+0109.	02+0146.	03+0915.	04+5.422	05+286.7	06+32.78	07+62.41	08+56.97
09+30.03	10+0.000	11+12.73					
01+0109.	02+0146.	03+0930.	04+5.500	05+253.5	06+26.15	07+62.45	08+57.10
09+30.03	10+0.000	11+12.73					
01+0109.	02+0146.	03+0945.	04+5.548	05+251.4	06+24.22	07+62.27	08+57.23
09+30.03	10+0.000	11+12.74					
01+0109.	02+0146.	03+1000.	04+5.634	05+260.4	06+30.03	07+63.36	08+56.25
09+30.03	10+0.000	11+12.74					
01+0115.	02+0146.	03+1000.	04+5.526	05+262.5	06+31.65	07+62.62	08+56.89
09+30.03	10+0.000	11+12.74					
01+0109.	02+0146.	03+1015.	04+5.913	05+270.4	06+44.93	07+63.26	08+55.91
09+30.02	10+0.000	11+12.75					
01+0109.	02+0146.	03+1030.	04+4.237	05+290.4	06+34.17	07+62.70	08+56.53
09+30.03	10+0.000	11+12.75					
01+0109.	02+0146.	03+1045.	04+5.481	05+293.6	06+32.30	07+62.36	08+56.50
09+30.03	10+0.000	11+12.75					
01+0109.	02+0146.	03+1100.	04+4.348	05+267.3	06+40.17	07+62.39	08+57.08
09+30.03	10+0.000	11+12.74					
01+0115.	02+0146.	03+1100.	04+4.995	05+281.0	06+39.83	07+62.68	08+56.50
09+30.03	10+0.000	11+12.74					
01+0109.	02+0146.	03+1115.	04+4.291	05+273.2	06+34.17	07+62.83	08+57.01
09+30.03	10+0.000	11+12.74					
01+0109.	02+0146.	03+1130.	04+4.727	05+260.3	06+30.37	07+62.98	08+56.58
09+30.03	10+0.000	11+12.74					
01+0109.	02+0146.	03+1145.	04+5.424	05+251.3	06+29.10	07+63.20	08+55.91
09+30.04	10+0.000	11+12.74					
01+0109.	02+0146.	03+1200.	04+6.147	05+252.1	06+28.10	07+63.15	08+55.46
09+30.03	10+0.000	11+12.74					
01+0115.	02+0146.	03+1200.	04+5.147	05+259.0	06+31.71	07+63.04	08+56.24
09+30.03	10+0.000	11+12.74					
01+0109.	02+0146.	03+1215.	04+4.548	05+262.7	06+34.23	07+63.43	08+55.49
09+30.03	10+0.000	11+12.74					
01+0109.	02+0146.	03+1230.	04+5.693	05+245.7	06+29.08	07+64.29	08+54.52
09+30.03	10+0.000	11+12.74					
01+0109.	02+0146.	03+1245.	04+5.014	05+264.8	06+37.33	07+65.79	08+53.60
09+30.04	10+0.000	11+12.74					
01+0109.	02+0146.	03+1300.	04+5.384	05+255.4	06+33.22	07+66.68	08+52.18
09+30.04	10+0.000	11+12.75					
01+0115.	02+0146.	03+1300.	04+5.160	05+257.0	06+34.38	07+65.05	08+53.95
09+30.04	10+0.000	11+12.75					
01+0109.	02+0146.	03+1315.	04+5.879	05+241.6	06+33.71	07+67.33	08+51.92
09+30.04	10+0.000	11+12.75					
01+0109.	02+0146.	03+1330.	04+6.717	05+245.8	06+34.33	07+68.50	08+51.05
09+30.04	10+0.000	11+12.75					
01+0109.	02+0146.	03+1345.	04+6.237	05+291.5	06+35.27	07+68.85	08+50.19
09+30.02	10+0.000	11+12.75					
01+0109.	02+0146.	03+1400.	04+5.533	05+276.7	06+42.98	07+69.73	08+49.26
09+30.02	10+0.000	11+12.75					
01+0115.	02+0146.	03+1400.	04+6.091	05+263.3	06+42.35	07+68.60	08+50.61
09+30.03	10+0.000	11+12.75					
01+0109.	02+0146.	03+1415.	04+6.485	05+282.9	06+41.14	07+070.5	08+47.70
09+30.02	10+0.000	11+12.76					
01+0109.	02+0146.	03+1430.	04+6.257	05+281.4	06+36.90	07+071.1	08+45.64
09+30.02	10+0.000	11+12.77					
01+0109.	02+0146.	03+1445.	04+5.996	05+264.0	06+36.02	07+071.7	08+45.30
09+30.02	10+0.000	11+12.77					
01+0109.	02+0146.	03+1500.	04+6.240	05+270.1	06+39.45	07+071.8	08+44.67
09+30.02	10+0.000	11+12.77					
01+0115.	02+0146.	03+1500.	04+6.245	05+274.5	06+39.20	07+071.3	08+45.83
09+30.02	10+0.000	11+12.77					

11+0109.	02+0146.	03+1515.	04+6.415	05+240.2	06+26.51	07+072.3	08+43.51
09+30.02	10+0.000	11+12.77					
11+0109.	02+0146.	03+1530.	04+5.030	05+301.4	06+36.45	07+071.5	08+43.97
09+30.01	10+0.000	11+12.76					
11+0109.	02+0146.	03+1545.	04+5.206	05+281.7	06+40.68	07+071.3	08+43.11
09+30.01	10+0.000	11+12.76					
11+0109.	02+0146.	03+1600.	04+5.548	05+279.7	06+34.13	07+071.1	08+42.97
09+30.00	10+0.000	11+12.76					
11+0115.	02+0146.	03+1600.	04+5.550	05+275.2	06+41.47	07+071.6	08+43.39
09+30.01	10+0.000	11+12.76					
11+0109.	02+0146.	03+1615.	04+5.725	05+291.5	06+37.23	07+072.2	08+41.88
09+30.00	10+0.000	11+12.75					
11+0109.	02+0146.	03+1630.	04+5.326	05+278.5	06+33.39	07+073.1	08+41.20
09+30.00	10+0.000	11+12.75					
11+0109.	02+0146.	03+1645.	04+6.168	05+299.8	06+36.53	07+073.1	08+40.25
09+30.00	10+0.000	11+12.75					
11+0109.	02+0146.	03+1700.	04+07.11	05+256.5	06+28.46	07+072.6	08+39.64
09+30.00	10+0.000	11+12.75					
11+0115.	02+0146.	03+1700.	04+6.082	05+281.1	06+37.81	07+072.8	08+40.74
09+30.00	10+0.000	11+12.75					
11+0109.	02+0146.	03+1715.	04+5.029	05+268.9	06+34.18	07+072.7	08+39.20
09+30.00	10+0.000	11+12.75					
11+0109.	02+0146.	03+1730.	04+5.836	05+271.7	06+36.92	07+072.8	08+38.99
09+30.00	10+0.000	11+12.75					
11+0109.	02+0146.	03+1745.	04+4.864	05+295.3	06+39.85	07+072.9	08+39.00
09+30.00	10+0.000	11+12.75					
11+0109.	02+0146.	03+1800.	04+4.775	05+309.8	06+36.73	07+073.0	08+38.94
09+30.00	10+0.000	11+12.73					
11+0115.	02+0146.	03+1800.	04+5.126	05+286.2	06+40.71	07+072.9	08+39.03
09+30.00	10+0.000	11+12.73					
11+0109.	02+0146.	03+1815.	04+4.731	05+298.2	06+45.67	07+072.6	08+39.02
09+30.00	10+0.000	11+12.73					
11+0109.	02+0146.	03+1830.	04+6.023	05+346.7	06+17.41	07+071.4	08+40.58
09+30.00	10+0.000	11+12.73					
11+0109.	02+0146.	03+1845.	04+5.560	05+345.2	06+19.91	07+070.5	08+41.49
09+30.00	10+0.000	11+12.72					
11+0109.	02+0146.	03+1900.	04+5.854	05+339.3	06+23.81	07+69.99	08+41.59
09+30.00	10+0.000	11+12.73					
11+0115.	02+0146.	03+1900.	04+5.542	05+334.9	06+33.79	07+071.1	08+40.67
09+30.00	10+0.000	11+12.73					
11+0109.	02+0146.	03+1915.	04+4.288	05+347.8	06+20.98	07+69.43	08+42.26
09+30.00	10+0.000	11+12.71					
11+0109.	02+0146.	03+1930.	04+4.658	05+341.4	06+20.95	07+68.82	08+42.83
09+30.00	10+0.000	11+12.71					
11+0109.	02+0146.	03+1945.	04+3.490	05+352.0	06+15.03	07+67.93	08+43.75
09+29.99	10+0.000	11+12.70					
11+0109.	02+0146.	03+2000.	04+2.311	05+349.3	06+16.15	07+66.61	08+45.41
09+29.99	10+0.000	11+12.69					
11+0115.	02+0146.	03+2000.	04+3.687	05+347.7	06+18.86	07+68.20	08+43.56
09+30.00	10+0.000	11+12.69					
11+0109.	02+0146.	03+2015.	04+1.435	05+327.9	06+27.05	07+64.80	08+50.32
09+29.99	10+0.000	11+12.69					
11+0109.	02+0146.	03+2030.	04+1.057	05+318.7	06+17.50	07+61.82	08+59.14
09+29.99	10+0.000	11+12.68					
11+0109.	02+0146.	03+2045.	04+0.981	05+308.6	06+17.91	07+59.53	08+64.43
09+29.99	10+0.000	11+12.67					
11+0109.	02+0146.	03+2100.	04+1.007	05+331.1	06+16.06	07+57.80	08+69.54
09+29.99	10+0.000	11+12.67					
11+0115.	02+0146.	03+2100.	04+1.120	05+321.5	06+21.87	07+60.99	08+60.86
09+29.99	10+0.000	11+12.67					

01+0109.	02+0146.	03+2115.	04+1.148	05+342.0	06+19.00	07+56.87	08+073.2
09+29.99	10+0.000	11+12.65					
01+0109.	02+0146.	03+2130.	04+1.379	05+355.0	06+18.58	07+56.30	08+076.2
09+29.99	10+0.000	11+12.65					
01+0109.	02+0146.	03+2145.	04+0.894	05+277.6	06+37.76	07+55.42	08+080.0
09+29.99	10+0.000	11+12.63					
01+0109.	02+0146.	03+2200.	04+0.874	05+266.4	06+33.81	07+54.61	08+088.5
09+30.00	10+0.000	11+12.63					
01+0115.	02+0146.	03+2200.	04+1.073	05+313.4	06+48.99	07+55.80	08+079.5
09+29.99	10+0.000	11+12.63					
01+0109.	02+0146.	03+2215.	04+1.147	05+317.8	06+21.77	07+53.81	08+091.7
09+30.00	10+0.000	11+12.63					
01+0109.	02+0146.	03+2230.	04+2.142	05+353.6	06+12.31	07+54.65	08+087.8
09+30.00	10+0.000	11+12.62					
01+0109.	02+0146.	03+2245.	04+1.781	05+340.1	06+21.00	07+55.53	08+079.9
09+30.00	10+0.000	11+12.62					
01+0109.	02+0146.	03+2300.	04+1.101	05+325.3	06+26.63	07+55.00	08+080.8
09+30.00	10+0.000	11+12.61					
01+0115.	02+0146.	03+2300.	04+1.543	05+334.5	06+25.15	07+54.75	08+085.1
09+30.00	10+0.000	11+12.61					
01+0109.	02+0146.	03+2315.	04+0.854	05+256.1	06+43.03	07+53.40	08+085.4
09+29.99	10+0.000	11+12.61					
01+0109.	02+0146.	03+2330.	04+1.098	05+316.9	06+27.27	07+52.16	08+090.9
09+29.99	10+0.000	11+12.60					
01+0109.	02+0146.	03+2345.	04+0.975	05+307.9	06+08.75	07+51.31	08+093.0
09+29.99	10+0.000	11+12.59					
01+0109.	02+0146.	03+2400.	04+1.025	05+323.2	06+09.87	07+50.59	08+094.5
09+29.99	10+0.000	11+12.59					
01+0115.	02+0146.	03+2400.	04+0.988	05+304.6	06+35.65	07+51.86	08+091.0
09+29.99	10+0.000	11+12.59					
01+0109.	02+0147.	03+0015.	04+1.222	05+348.9	06+16.59	07+50.15	08+095.9
09+29.99	10+0.000	11+12.59					
01+0109.	02+0147.	03+0030.	04+0.831	05+311.4	06+07.42	07+49.76	08+096.4
09+29.98	10+0.000	11+12.59					
01+0109.	02+0147.	03+0045.	04+0.910	05+292.1	06+14.96	07+49.19	08+097.4
09+29.98	10+0.000	11+12.58					
01+0109.	02+0147.	03+0100.	04+1.037	05+292.0	06+19.74	07+48.82	08+098.4
09+29.98	10+0.000	11+12.58					
01+0115.	02+0147.	03+0100.	04+1.000	05+310.6	06+27.78	07+49.48	08+097.0
09+29.98	10+0.000	11+12.58					
01+0109.	02+0147.	03+0115.	04+0.935	05+312.3	06+08.33	07+48.72	08+098.9
09+29.98	10+0.000	11+12.58					
01+0109.	02+0147.	03+0130.	04+0.760	05+292.6	06+09.15	07+48.36	08+098.9
09+29.97	10+0.000	11+12.57					
01+0109.	02+0147.	03+0145.	04+1.031	05+299.8	06+18.62	07+48.12	08+099.5
09+29.97	10+0.000	11+12.57					
01+0109.	02+0147.	03+0200.	04+0.956	05+312.5	06+08.73	07+48.15	08+099.7
09+29.96	10+0.000	11+12.57					
01+0115.	02+0147.	03+0200.	04+0.920	05+304.4	06+14.68	07+48.34	08+099.3
09+29.97	10+0.000	11+12.57					
01+0109.	02+0147.	03+0215.	04+0.789	05+277.6	06+28.32	07+47.93	08+099.6
09+29.96	10+0.000	11+12.57					
01+0109.	02+0147.	03+0230.	04+1.114	05+251.1	06+32.79	07+47.94	08+099.8
09+29.96	10+0.000	11+12.57					
01+0109.	02+0147.	03+0245.	04+0.758	05+268.4	06+33.01	07+48.56	08+099.6
09+29.96	10+0.000	11+12.56					
01+0109.	02+0147.	03+0300.	04+0.806	05+350.0	06+45.69	07+48.41	08+099.2
09+29.95	10+0.000	11+12.57					
01+0115.	02+0147.	03+0300.	04+0.867	05+281.4	06+50.44	07+48.21	08+099.6
09+29.96	10+0.000	11+12.57					

01+0109.	02+0147.	03+0315.	04+0.918	05+311.4	06+10.33	07+48.07	08+099.4
09+29.95	10+0.000	11+12.56					
01+0109.	02+0147.	03+0330.	04+0.970	05+276.8	06+24.47	07+47.76	08+099.7
09+29.95	10+0.000	11+12.56					
01+0109.	02+0147.	03+0345.	04+1.488	05+218.3	06+21.72	07+47.82	08+100.3
09+29.94	10+0.000	11+12.56					
01+0109.	02+0147.	03+0400.	04+2.030	05+217.8	06+14.84	07+48.67	08+100.2
09+29.94	10+0.000	11+12.55					
01+0115.	02+0147.	03+0400.	04+1.351	05+255.3	06+45.56	07+48.08	08+099.9
09+29.94	10+0.000	11+12.55					
01+0109.	02+0147.	03+0415.	04+2.671	05+217.1	06+17.25	07+50.47	08+098.5
09+29.93	10+0.000	11+12.55					
01+0109.	02+0147.	03+0430.	04+3.112	05+213.7	06+09.40	07+53.10	08+093.8
09+29.93	10+0.000	11+12.55					
01+0109.	02+0147.	03+0445.	04+3.770	05+211.4	06+08.14	07+54.66	08+089.8
09+29.93	10+0.000	11+12.56					
01+0109.	02+0147.	03+0500.	04+4.204	05+213.9	06+08.59	07+55.45	08+086.1
09+29.94	10+0.000	11+12.56					
01+0115.	02+0147.	03+0500.	04+3.439	05+214.0	06+11.62	07+53.42	08+092.0
09+29.93	10+0.000	11+12.56					
01+0109.	02+0147.	03+0515.	04+4.292	05+213.3	06+08.44	07+55.67	08+084.5
09+29.94	10+0.000	11+12.56					
01+0109.	02+0147.	03+0530.	04+4.788	05+211.7	06+09.19	07+56.11	08+083.4
09+29.95	10+0.000	11+12.57					
01+0109.	02+0147.	03+0545.	04+3.408	05+221.7	06+14.66	07+56.53	08+082.2
09+29.95	10+0.000	11+12.56					
01+0109.	02+0147.	03+0600.	04+3.790	05+212.9	06+11.60	07+56.99	08+080.5
09+29.95	10+0.000	11+12.57					
01+0115.	02+0147.	03+0600.	04+4.070	05+214.8	06+11.90	07+56.32	08+082.6
09+29.95	10+0.000	11+12.57					
01+0109.	02+0147.	03+0615.	04+4.133	05+209.9	06+11.08	07+57.43	08+078.6
09+29.96	10+0.000	11+12.57					
01+0109.	02+0147.	03+0630.	04+4.644	05+216.1	06+13.93	07+58.59	08+074.5
09+29.96	10+0.000	11+12.57					
01+0109.	02+0147.	03+0645.	04+5.671	05+228.3	06+16.69	07+60.58	08+66.93
09+29.96	10+0.000	11+12.57					
01+0109.	02+0147.	03+0700.	04+6.449	05+239.9	06+18.76	07+62.33	08+61.05
09+29.97	10+0.000	11+12.58					
01+0115.	02+0147.	03+0700.	04+5.224	05+223.4	06+19.19	07+59.73	08+070.3
09+29.96	10+0.000	11+12.58					
01+0109.	02+0147.	03+0715.	04+6.441	05+247.2	06+22.20	07+63.24	08+58.08
09+29.97	10+0.000	11+12.58					
01+0109.	02+0147.	03+0730.	04+5.584	05+254.3	06+27.31	07+63.93	08+56.69
09+29.97	10+0.000	11+12.58					
01+0109.	02+0147.	03+0745.	04+6.085	05+254.7	06+25.32	07+64.48	08+55.57
09+29.98	10+0.000	11+12.59					
01+0109.	02+0147.	03+0800.	04+6.909	05+256.5	06+27.89	07+64.60	08+54.90
09+29.99	10+0.000	11+12.60					
01+0115.	02+0147.	03+0800.	04+6.255	05+253.1	06+26.00	07+64.06	08+56.31
09+29.98	10+0.000	11+12.60					
01+0109.	02+0147.	03+0815.	04+08.57	05+249.3	06+24.22	07+64.31	08+55.18
09+29.99	10+0.000	11+12.61					
01+0109.	02+0147.	03+0830.	04+07.08	05+269.9	06+37.36	07+64.23	08+55.50
09+30.00	10+0.000	11+12.61					
01+0109.	02+0147.	03+0845.	04+07.39	05+273.8	06+33.17	07+64.00	08+55.23
09+30.00	10+0.000	11+12.61					
01+0109.	02+0147.	03+0900.	04+07.31	05+276.6	06+33.93	07+64.08	08+54.48
09+30.01	10+0.000	11+12.61					
01+0115.	02+0147.	03+0900.	04+07.59	05+267.1	06+34.23	07+64.16	08+55.10
09+30.00	10+0.000	11+12.61					

01+0109.	02+0147.	03+0915.	04+08.85	05+268.5	06+31.19	07+64.15	08+49.15
09+30.01	10+0.000	11+12.61					
01+0109.	02+0147.	03+0930.	04+09.06	05+275.3	06+33.86	07+63.96	08+45.00
09+30.02	10+0.000	11+12.62					
01+0109.	02+0147.	03+0945.	04+08.07	05+278.8	06+33.06	07+64.44	08+42.24
09+30.02	10+0.000	11+12.63					
01+0109.	02+0147.	03+1000.	04+07.45	05+285.6	06+33.68	07+65.03	08+38.01
09+30.03	10+0.000	11+12.63					
01+0115.	02+0147.	03+1000.	04+08.36	05+277.0	06+33.53	07+64.40	08+43.60
09+30.02	10+0.000	11+12.63					
01+0109.	02+0147.	03+1015.	04+08.61	05+303.3	06+32.48	07+64.33	08+36.83
09+30.03	10+0.000	11+12.63					
01+0109.	02+0147.	03+1030.	04+08.91	05+303.4	06+34.13	07+63.71	08+37.07
09+30.03	10+0.000	11+12.63					
01+0109.	02+0147.	03+1045.	04+6.784	05+302.9	06+34.58	07+64.72	08+37.72
09+30.03	10+0.000	11+12.64					
01+0109.	02+0147.	03+1100.	04+07.53	05+278.9	06+39.36	07+65.76	08+37.75
09+30.04	10+0.000	11+12.64					
01+0115.	02+0147.	03+1100.	04+07.96	05+297.5	06+36.68	07+64.63	08+37.34
09+30.03	10+0.000	11+12.64					
01+0109.	02+0147.	03+1115.	04+08.95	05+258.7	06+29.58	07+65.38	08+38.20
09+30.04	10+0.000	11+12.64					
01+0109.	02+0147.	03+1130.	04+08.53	05+251.1	06+29.45	07+65.96	08+37.91
09+30.04	10+0.000	11+12.65					
01+0109.	02+0147.	03+1145.	04+08.04	05+266.6	06+35.34	07+66.72	08+37.06
09+30.05	10+0.000	11+12.65					
01+0109.	02+0147.	03+1200.	04+08.44	05+255.5	06+32.58	07+66.85	08+36.57
09+30.05	10+0.000	11+12.65					
01+0115.	02+0147.	03+1200.	04+08.49	05+257.9	06+32.29	07+66.23	08+37.44
09+30.04	10+0.000	11+12.65					
01+0109.	02+0147.	03+1215.	04+08.06	05+263.2	06+35.69	07+67.11	08+36.54
09+30.05	10+0.000	11+12.65					
01+0109.	02+0147.	03+1230.	04+07.28	05+261.9	06+33.76	07+67.62	08+35.90
09+30.05	10+0.000	11+12.66					
01+0109.	02+0147.	03+1245.	04+07.77	05+287.9	06+37.20	07+68.02	08+33.20
09+30.06	10+0.000	11+12.66					

LKB0BL2-3

(5/28/93 download)

atop the landfill

Test day = 5/26/93 to 5/27/93
 11 11
 146 14

New DAT

1109.	02+0140.	03+0915.	04+0.500	05+3.236	06+0.000	07+0.029	08-60.43
7-269.2	10+29.59	11+0.000	12+14.26				
1+0109.	02+0140.	03+0930.	04+0.500	05+3.226	06+0.000	07+0.030	08-60.43
7-269.3	10+29.60	11+0.000	12+14.27				
1+0109.	02+0140.	03+0945.	04+0.500	05+3.227	06+0.000	07+0.037	08-60.42
7-269.4	10+29.59	11+0.000	12+14.27				
1+0109.	02+0140.	03+1000.	04+0.500	05+3.221	06+0.000	07+0.026	08-60.42
7-269.1	10+29.59	11+0.000	12+14.27				
1+0121.	02+0140.	03+1000.	04+0.500	05+3.227	06+0.279	07+0.042	08-60.42
7-269.3	10+29.59	11+0.000	12+14.27				
1+0109.	02+0140.	03+1015.	04+0.500	05+3.221	06+0.000	07+0.023	08-60.42
7-269.2	10+29.58	11+0.000	12+14.28				
1+0109.	02+0140.	03+1030.	04+0.500	05+3.225	06+0.000	07+0.021	08-60.42
7-269.3	10+29.59	11+0.000	12+14.28				
1+0109.	02+0140.	03+1045.	04+0.500	05+3.222	06+0.000	07+0.020	08-60.42
7-269.2	10+29.59	11+0.000	12+14.28				
1+0109.	02+0140.	03+1100.	04+0.500	05+3.222	06+0.000	07+0.018	08-60.42
7-269.3	10+29.58	11+0.000	12+14.29				
1+0121.	02+0140.	03+1100.	04+0.500	05+3.222	06+0.257	07+0.021	08-60.42
7-269.2	10+29.58	11+0.000	12+14.28				
1+0109.	02+0140.	03+1115.	04+0.500	05+3.227	06+0.000	07+0.024	08-60.42
7-269.3	10+29.58	11+0.000	12+14.29				
1+0109.	02+0140.	03+1130.	04+0.500	05+3.217	06+0.000	07+0.036	08-60.42
7-269.4	10+29.58	11+0.000	12+14.29				
1+0109.	02+0140.	03+1145.	04+0.500	05+3.221	06+0.000	07+0.017	08-60.43
7-269.3	10+29.58	11+0.000	12+14.29				
1+0109.	02+0140.	03+1200.	04+0.500	05+3.222	06+0.000	07+0.019	08-60.44
7-269.2	10+29.59	11+0.000	12+14.30				
1+0121.	02+0140.	03+1200.	04+0.500	05+3.222	06+0.263	07+0.035	08-60.43
7-269.3	10+29.58	11+0.000	12+14.29				
1+0109.	02+0140.	03+1215.	04+0.500	05+3.220	06+0.000	07+0.019	08-60.44
7-269.2	10+29.59	11+0.000	12+14.30				
1+0109.	02+0140.	03+1230.	04+0.500	05+3.223	06+0.000	07+0.034	08-60.44
7-269.2	10+29.58	11+0.000	12+14.30				
1+0109.	02+0140.	03+1245.	04+0.500	05+3.220	06+0.000	07+0.034	08-60.44
7-269.1	10+29.59	11+0.000	12+14.31				
1+0109.	02+0140.	03+1300.	04+0.500	05+3.217	06+0.000	07+0.025	08-60.44
7-269.4	10+29.59	11+0.000	12+14.31				
1+0121.	02+0140.	03+1300.	04+0.500	05+3.220	06+0.153	07+0.036	08-60.44
7-269.2	10+29.59	11+0.000	12+14.30				
1+0109.	02+0140.	03+1315.	04+0.500	05+3.205	06+0.000	07+0.018	08-60.42
7-269.2	10+29.57	11+0.000	12+13.60				
1+0109.	02+0140.	03+1330.	04+0.500	05+3.202	06+0.000	07+0.014	08-60.42
7-269.2	10+29.50	11+0.000	12+13.23				
1+0109.	02+0140.	03+1345.	04+0.500	05+3.197	06+0.000	07+0.019	08-60.40
7-269.2	10+29.58	11+0.000	12+13.07				
1+0109.	02+0140.	03+1400.	04+0.500	05+3.214	06+0.000	07+0.033	08-60.43
7-269.1	10+29.58	11+0.000	12+13.86				
1+0121.	02+0140.	03+1400.	04+0.500	05+3.204	06+0.000	07+0.025	08-60.41
7-269.2	10+29.56	11+0.000	12+13.44				
1+0109.	02+0140.	03+1415.	04+0.500	05+3.217	06+0.000	07+0.032	08-60.42
7-269.0	10+29.57	11+0.000	12+14.32				
1+0109.	02+0140.	03+1430.	04+0.500	05+3.234	06+0.000	07+0.033	08-60.42
7-269.3	10+29.57	11+0.000	12+14.33				
1+0109.	02+0140.	03+1445.	04+0.500	05+3.220	06+0.000	07+0.046	08-60.41
7-269.3	10+29.56	11+0.000	12+14.33				
1+0109.	02+0140.	03+1500.	04+0.500	05+3.233	06+0.000	07+0.030	08-60.42
7-269.3	10+29.56	11+0.000	12+14.33				
1+0121.	02+0140.	03+1500.	04+0.500	05+3.226	06+0.109	07+0.047	08-60.42
7-269.2	10+29.57	11+0.000	12+14.33				

01+0109.	02+0145.	03+2115.	04+2.403	05+229.1	06+16.72	07+0.020	08+66.76
09-262.5	10+29.64	11+0.000	12+12.30				
01+0109.	02+0145.	03+2130.	04+2.798	05+264.5	06+59.87	07+0.051	08+67.00
09-262.5	10+29.64	11+0.000	12+12.29				
01+0109.	02+0145.	03+2145.	04+2.850	05+291.6	06+08.88	07+0.028	08+68.25
09-262.5	10+29.64	11+0.000	12+12.29				
01+0109.	02+0145.	03+2200.	04+4.999	05+293.5	06+07.70	07+0.060	08+070.7
09-262.6	10+29.65	11+0.000	12+12.29				
01+0121.	02+0145.	03+2200.	04+3.262	05+271.4	06+40.18	07+0.071	08+68.17
09-262.5	10+29.64	11+0.000	12+12.29				
01+0109.	02+0145.	03+2215.	04+07.64	05+275.1	06+08.73	07+0.048	08+072.0
09-262.8	10+29.65	11+0.000	12+12.29				
01+0109.	02+0145.	03+2230.	04+6.236	05+270.1	06+6.429	07+0.038	08+071.6
09-262.8	10+29.65	11+0.000	12+12.28				
01+0109.	02+0145.	03+2245.	04+08.54	05+289.8	06+16.02	07+0.108	08+071.6
09-262.8	10+29.65	11+0.000	12+12.28				
01+0109.	02+0145.	03+2300.	04+08.48	05+306.2	06+11.75	07+0.088	08+072.1
09-262.9	10+29.66	11+0.000	12+12.28				
01+0121.	02+0145.	03+2300.	04+07.72	05+285.1	06+18.05	07+0.091	08+071.8
09-262.8	10+29.65	11+0.000	12+12.28				
01+0109.	02+0145.	03+2315.	04+08.83	05+295.0	06+10.79	07+0.086	08+071.9
09-263.0	10+29.66	11+0.000	12+12.28				
01+0109.	02+0145.	03+2330.	04+07.61	05+303.1	06+11.06	07+0.075	08+071.3
09-263.0	10+29.67	11+0.000	12+12.28				
01+0109.	02+0145.	03+2345.	04+07.71	05+298.8	06+09.24	07+0.065	08+070.7
09-262.9	10+29.67	11+0.000	12+12.27				
01+0109.	02+0145.	03+2400.	04+07.19	05+293.7	06+10.53	07+0.067	08+070.2
09-262.9	10+29.68	11+0.000	12+12.27				
01+0121.	02+0145.	03+2400.	04+07.83	05+297.6	06+11.05	07+0.076	08+071.0
09-263.0	10+29.67	11+0.000	12+12.27				
01+0109.	02+0146.	03+0015.	04+08.76	05+308.0	06+17.54	07+0.100	08+69.62
09-262.9	10+29.68	11+0.000	12+12.27				
01+0109.	02+0146.	03+0030.	04+10.09	05+303.8	06+13.77	07+0.086	08+69.36
09-262.9	10+29.68	11+0.000	12+12.27				
01+0109.	02+0146.	03+0045.	04+09.76	05+295.1	06+09.72	07+0.075	08+68.89
09-262.9	10+29.69	11+0.000	12+12.27				
01+0109.	02+0146.	03+0100.	04+09.67	05+291.6	06+09.83	07+0.069	08+68.39
09-262.8	10+29.69	11+0.000	12+12.26				
01+0121.	02+0146.	03+0100.	04+09.57	05+299.5	06+14.63	07+0.083	08+69.06
09-262.9	10+29.69	11+0.000	12+12.27				
01+0109.	02+0146.	03+0115.	04+08.97	05+298.3	06+10.52	07+0.075	08+68.01
09-262.8	10+29.69	11+0.000	12+12.26				
01+0109.	02+0146.	03+0130.	04+09.99	05+295.0	06+11.14	07+0.073	08+67.71
09-262.8	10+29.69	11+0.000	12+12.26				
01+0109.	02+0146.	03+0145.	04+11.14	05+295.8	06+11.69	07+0.081	08+67.27
09-262.8	10+29.69	11+0.000	12+12.26				
01+0109.	02+0146.	03+0200.	04+11.06	05+293.0	06+10.73	07+0.077	08+67.07
09-262.8	10+29.69	11+0.000	12+12.26				
01+0121.	02+0146.	03+0200.	04+10.29	05+295.6	06+11.19	07+0.078	08+67.52
09-262.8	10+29.69	11+0.000	12+12.26				
01+0109.	02+0146.	03+0215.	04+09.91	05+296.1	06+10.15	07+0.077	08+66.86
09-262.8	10+29.70	11+0.000	12+12.26				
01+0109.	02+0146.	03+0230.	04+08.19	05+303.6	06+13.06	07+0.077	08+66.29
09-262.8	10+29.70	11+0.000	12+12.26				
01+0109.	02+0146.	03+0245.	04+08.37	05+296.9	06+11.16	07+0.079	08+65.78
09-262.8	10+29.69	11+0.000	12+12.26				
01+0109.	02+0146.	03+0300.	04+6.903	05+304.9	06+10.08	07+0.079	08+65.00
09-262.8	10+29.69	11+0.000	12+12.26				
01+0121.	02+0146.	03+0300.	04+08.34	05+300.4	06+11.84	07+0.082	08+65.98
09-262.8	10+29.70	11+0.000	12+12.26				

01+0109.	02+0146.	03+0315.	04+6.207	05+305.6	06+11.13	07+0.079	08+64.32
09-262.8	10+29.69	11+0.000	12+12.25				
01+0109.	02+0146.	03+0330.	04+6.882	05+299.9	06+09.93	07+0.066	08+63.89
09-262.8	10+29.69	11+0.000	12+12.25				
01+0109.	02+0146.	03+0345.	04+6.553	05+303.7	06+10.18	07+0.075	08+63.53
09-262.8	10+29.69	11+0.000	12+12.25				
01+0109.	02+0146.	03+0400.	04+07.19	05+302.8	06+14.69	07+0.086	08+63.29
09-262.8	10+29.70	11+0.000	12+12.25				
01+0121.	02+0146.	03+0400.	04+6.708	05+303.0	06+11.82	07+0.078	08+63.76
09-262.8	10+29.70	11+0.000	12+12.25				
01+0109.	02+0146.	03+0415.	04+08.51	05+317.4	06+13.93	07+0.088	08+62.93
09-262.8	10+29.71	11+0.000	12+12.24				
01+0109.	02+0146.	03+0430.	04+07.62	05+325.6	06+10.73	07+0.073	08+62.33
09-262.7	10+29.71	11+0.000	12+12.24				
01+0109.	02+0146.	03+0445.	04+08.33	05+326.8	06+12.21	07+0.086	08+61.89
09-262.7	10+29.71	11+0.000	12+12.24				
01+0109.	02+0146.	03+0500.	04+07.64	05+317.9	06+13.22	07+0.086	08+61.13
09-262.6	10+29.72	11+0.000	12+12.24				
01+0121.	02+0146.	03+0500.	04+08.02	05+322.0	06+13.30	07+0.084	08+62.07
09-262.7	10+29.71	11+0.000	12+12.24				
01+0109.	02+0146.	03+0515.	04+07.70	05+318.7	06+10.93	07+0.075	08+60.72
09-262.6	10+29.72	11+0.000	12+12.24				
01+0109.	02+0146.	03+0530.	04+07.06	05+306.1	06+14.60	07+0.090	08+60.43
09-262.6	10+29.72	11+0.000	12+12.24				
01+0109.	02+0146.	03+0545.	04+09.29	05+311.6	06+15.63	07+0.084	08+60.28
09-262.6	10+29.72	11+0.000	12+12.23				
01+0109.	02+0146.	03+0600.	04+09.21	05+304.7	06+14.05	07+0.084	08+60.06
09-262.6	10+29.73	11+0.000	12+12.23				
01+0121.	02+0146.	03+0600.	04+08.32	05+310.3	06+14.95	07+0.086	08+60.37
09-262.6	10+29.72	11+0.000	12+12.23				
01+0109.	02+0146.	03+0615.	04+07.43	05+305.2	06+16.07	07+0.098	08+59.76
09-262.6	10+29.73	11+0.000	12+12.23				
01+0109.	02+0146.	03+0630.	04+6.828	05+283.7	06+11.69	07+0.077	08+59.56
09-262.6	10+29.74	11+0.000	12+12.23				
01+0109.	02+0146.	03+0645.	04+07.52	05+292.2	06+12.65	07+0.083	08+59.76
09-262.6	10+29.74	11+0.000	12+12.23				
01+0109.	02+0146.	03+0700.	04+07.58	05+297.8	06+14.67	07+0.086	08+60.04
09-262.6	10+29.74	11+0.000	12+12.23				
01+0121.	02+0146.	03+0700.	04+07.34	05+294.7	06+15.91	07+0.090	08+59.78
09-262.6	10+29.74	11+0.000	12+12.23				
01+0109.	02+0146.	03+0715.	04+08.91	05+295.9	06+13.00	07+0.082	08+59.81
09-262.6	10+29.74	11+0.000	12+12.23				
01+0109.	02+0146.	03+0730.	04+08.71	05+299.2	06+14.22	07+0.092	08+59.77
09-262.6	10+29.74	11+0.000	12+12.23				
01+0109.	02+0146.	03+0745.	04+08.90	05+300.6	06+13.53	07+0.076	08+59.82
09-262.6	10+29.74	11+0.000	12+12.23				
01+0109.	02+0146.	03+0800.	04+08.30	05+296.2	06+16.07	07+0.088	08+60.30
09-262.6	10+29.75	11+0.000	12+12.23				
01+0121.	02+0146.	03+0800.	04+08.71	05+298.0	06+14.39	07+0.085	08+59.92
09-262.6	10+29.74	11+0.000	12+12.23				
01+0109.	02+0146.	03+0815.	04+12.44	05+277.8	06+13.21	07+0.078	08+60.52
09-262.6	10+29.74	11+0.000	12+12.23				
01+0109.	02+0146.	03+0830.	04+13.70	05+281.3	06+13.13	07+0.082	08+60.22
09-262.6	10+29.75	11+0.000	12+12.23				
01+0109.	02+0146.	03+0845.	04+12.79	05+280.0	06+11.48	07+0.076	08+60.51
09-262.6	10+29.76	11+0.000	12+12.23				
01+0109.	02+0146.	03+0900.	04+12.40	05+274.5	06+14.03	07+0.075	08+60.61
09-262.6	10+29.75	11+0.000	12+12.23				
01+0121.	02+0146.	03+0900.	04+12.83	05+278.4	06+13.25	07+0.078	08+60.46
09-262.6	10+29.75	11+0.000	12+12.23				

01+0109.	02+0146.	03+0915.	04+11.95	05+288.3	06+15.12	07+0.075	08+60.52
09-262.6	10+29.76	11+0.000	12+12.23				
01+0109.	02+0146.	03+0930.	04+13.85	05+274.4	06+13.37	07+0.077	08+60.35
09-262.5	10+29.76	11+0.000	12+12.23				
01+0109.	02+0146.	03+0945.	04+13.26	05+269.8	06+10.00	07+0.072	08+60.56
09-262.5	10+29.76	11+0.000	12+12.23				
01+0109.	02+0146.	03+1000.	04+12.66	05+274.7	06+16.13	07+0.075	08+61.30
09-262.6	10+29.75	11+0.000	12+12.23				
01+0121.	02+0146.	03+1000.	04+12.93	05+276.7	06+15.46	07+0.075	08+60.68
09-262.6	10+29.76	11+0.000	12+12.23				
01+0109.	02+0146.	03+1015.	04+12.69	05+282.3	06+23.77	07+0.080	08+60.89
09-262.5	10+29.75	11+0.000	12+12.23				
01+0109.	02+0146.	03+1030.	04+11.04	05+294.7	06+12.93	07+0.076	08+60.36
09-262.5	10+29.76	11+0.000	12+12.23				
01+0109.	02+0146.	03+1045.	04+11.86	05+293.1	06+12.02	07+0.074	08+60.27
09-262.5	10+29.76	11+0.000	12+12.23				
01+0109.	02+0146.	03+1100.	04+09.43	05+285.3	06+14.01	07+0.078	08+60.61
09-262.5	10+29.76	11+0.000	12+12.23				
01+0121.	02+0146.	03+1100.	04+11.25	05+288.9	06+17.11	07+0.079	08+60.53
09-262.5	10+29.76	11+0.000	12+12.23				
01+0109.	02+0146.	03+1115.	04+09.53	05+284.8	06+15.90	07+0.079	08+60.89
09-262.5	10+29.76	11+0.000	12+12.23				
01+0109.	02+0146.	03+1130.	04+11.05	05+276.7	06+13.31	07+0.086	08+61.07
09-262.5	10+29.76	11+0.000	12+12.23				
01+0109.	02+0146.	03+1145.	04+13.01	05+269.5	06+12.92	07+0.067	08+61.12
09-262.6	10+29.77	11+0.000	12+12.23				
01+0109.	02+0146.	03+1200.	04+14.58	05+269.5	06+19.22	07+0.076	08+61.14
09-262.6	10+29.76	11+0.000	12+12.23				
01+0121.	02+0146.	03+1200.	04+12.04	05+275.1	06+16.75	07+0.078	08+61.05
09-262.6	10+29.76	11+0.000	12+12.23				
01+0109.	02+0146.	03+1215.	04+11.09	05+287.2	06+14.70	07+0.080	08+61.44
09-262.6	10+29.76	11+0.000	12+12.23				
01+0109.	02+0146.	03+1230.	04+13.09	05+268.3	06+14.93	07+0.076	08+61.99
09-262.6	10+29.76	11+0.000	12+12.23				
01+0109.	02+0146.	03+1245.	04+11.73	05+278.8	06+20.38	07+0.083	08+62.91
09-262.6	10+29.76	11+0.000	12+12.23				
01+0109.	02+0146.	03+1300.	04+12.41	05+273.4	06+16.35	07+0.084	08+63.49
09-262.6	10+29.76	11+0.000	12+12.23				
01+0121.	02+0146.	03+1300.	04+12.08	05+276.9	06+18.13	07+0.083	08+62.46
09-262.6	10+29.76	11+0.000	12+12.23				
01+0109.	02+0146.	03+1315.	04+11.16	05+270.8	06+21.72	07+0.085	08+64.71
09-262.5	10+29.76	11+0.000	12+12.24				
01+0109.	02+0146.	03+1330.	04+13.37	05+266.1	06+18.91	07+0.089	08+65.72
09-262.6	10+29.75	11+0.000	12+12.24				
01+0109.	02+0146.	03+1345.	04+12.60	05+289.9	06+15.97	07+0.087	08+66.10
09-262.6	10+29.75	11+0.000	12+12.24				
01+0109.	02+0146.	03+1400.	04+12.87	05+288.3	06+18.38	07+0.102	08+66.77
09-262.6	10+29.75	11+0.000	12+12.25				
01+0121.	02+0146.	03+1400.	04+12.50	05+278.8	06+21.54	07+0.093	08+65.82
09-262.6	10+29.75	11+0.000	12+12.24				
01+0109.	02+0146.	03+1415.	04+13.33	05+292.5	06+19.71	07+0.087	08+67.62
09-262.6	10+29.75	11+0.000	12+12.25				
01+0109.	02+0146.	03+1430.	04+14.01	05+288.0	06+15.24	07+0.078	08+67.95
09-262.6	10+29.75	11+0.000	12+12.25				
01+0109.	02+0146.	03+1445.	04+12.16	05+279.3	06+24.06	07+0.089	08+68.89
09-262.6	10+29.74	11+0.000	12+12.25				
01+0109.	02+0146.	03+1500.	04+12.79	05+286.1	06+21.74	07+0.096	08+68.87
09-262.6	10+29.74	11+0.000	12+12.25				
01+0121.	02+0146.	03+1500.	04+13.07	05+286.6	06+20.95	07+0.089	08+68.33
09-262.6	10+29.74	11+0.000	12+12.25				

01+0109.	02+0146.	03+1515.	04+13.76	05+262.0	06+13.86	07+0.085	08+69.70
09-262.7	10+29.74	11+0.000	12+12.25				
01+0109.	02+0146.	03+1530.	04+12.07	05+295.7	06+21.61	07+0.093	08+68.62
09-262.7	10+29.74	11+0.000	12+12.25				
01+0109.	02+0146.	03+1545.	04+10.24	05+290.6	06+20.67	07+0.096	08+69.09
09-262.8	10+29.73	11+0.000	12+12.25				
01+0109.	02+0146.	03+1600.	04+14.49	05+289.9	06+17.47	07+0.077	08+69.28
09-262.8	10+29.72	11+0.000	12+12.25				
01+0121.	02+0146.	03+1600.	04+12.64	05+284.5	06+22.86	07+0.090	08+69.17
09-262.7	10+29.73	11+0.000	12+12.25				
01+0109.	02+0146.	03+1615.	04+13.46	05+299.1	06+20.49	07+0.091	08+69.86
09-262.8	10+29.72	11+0.000	12+12.24				
01+0109.	02+0146.	03+1630.	04+11.01	05+301.6	06+20.55	07+0.086	08+070.7
09-262.8	10+29.72	11+0.000	12+12.24				
01+0109.	02+0146.	03+1645.	04+13.87	05+295.6	06+15.99	07+0.082	08+070.5
09-262.8	10+29.72	11+0.000	12+12.24				
01+0109.	02+0146.	03+1700.	04+14.43	05+278.3	06+17.69	07+0.071	08+070.6
09-262.8	10+29.72	11+0.000	12+12.24				
01+0121.	02+0146.	03+1700.	04+13.19	05+293.6	06+20.84	07+0.083	08+070.4
09-262.8	10+29.72	11+0.000	12+12.24				
01+0109.	02+0146.	03+1715.	04+12.67	05+278.0	06+13.24	07+0.081	08+070.7
09-262.8	10+29.72	11+0.000	12+12.24				
01+0109.	02+0146.	03+1730.	04+12.50	05+288.3	06+15.57	07+0.078	08+070.7
09-262.8	10+29.72	11+0.000	12+12.24				
01+0109.	02+0146.	03+1745.	04+11.58	05+302.9	06+20.41	07+0.085	08+070.7
09-262.8	10+29.72	11+0.000	12+12.23				
01+0109.	02+0146.	03+1800.	04+09.84	05+316.6	06+24.33	07+0.094	08+070.5
09-262.8	10+29.72	11+0.000	12+12.23				
01+0121.	02+0146.	03+1800.	04+11.65	05+296.1	06+23.79	07+0.085	08+070.6
09-262.8	10+29.72	11+0.000	12+12.23				
01+0109.	02+0146.	03+1815.	04+09.40	05+311.1	06+23.25	07+0.089	08+070.4
09-262.8	10+29.72	11+0.000	12+12.23				
01+0109.	02+0146.	03+1830.	04+11.89	05+340.5	06+18.52	07+0.070	08+69.15
09-262.8	10+29.72	11+0.000	12+12.23				
01+0109.	02+0146.	03+1845.	04+10.35	05+347.2	06+16.27	07+0.072	08+68.61
09-262.8	10+29.73	11+0.000	12+12.22				
01+0109.	02+0146.	03+1900.	04+09.78	05+333.3	06+15.07	07+0.079	08+68.32
09-262.8	10+29.73	11+0.000	12+12.22				
01+0121.	02+0146.	03+1900.	04+10.36	05+333.3	06+22.86	07+0.080	08+69.13
09-262.8	10+29.72	11+0.000	12+12.23				
01+0109.	02+0146.	03+1915.	04+08.05	05+343.4	06+16.27	07+0.084	08+67.92
09-262.8	10+29.73	11+0.000	12+12.22				
01+0109.	02+0146.	03+1930.	04+08.23	05+333.8	06+12.38	07+0.085	08+67.51
09-262.8	10+29.73	11+0.000	12+12.21				
01+0109.	02+0146.	03+1945.	04+6.767	05+339.5	06+11.59	07+0.078	08+66.96
09-262.8	10+29.73	11+0.000	12+12.21				
01+0109.	02+0146.	03+2000.	04+3.673	05+2.418	06+16.63	07+0.096	08+66.27
09-262.8	10+29.73	11+0.000	12+12.20				
01+0121.	02+0146.	03+2000.	04+6.680	05+344.6	06+17.92	07+0.105	08+67.16
09-262.8	10+29.73	11+0.000	12+12.21				
01+0109.	02+0146.	03+2015.	04+2.663	05+24.19	06+21.97	07+0.079	08+65.52
09-262.8	10+29.73	11+0.000	12+12.20				
01+0109.	02+0146.	03+2030.	04+2.033	05+42.51	06+13.61	07+0.028	08+64.69
09-262.8	10+29.74	11+0.000	12+12.20				
01+0109.	02+0146.	03+2045.	04+1.505	05+27.63	06+15.30	07+0.026	08+63.90
09-262.7	10+29.74	11+0.000	12+12.19				
01+0109.	02+0146.	03+2100.	04+1.721	05+341.3	06+26.09	07+0.076	08+63.00
09-262.6	10+29.74	11+0.000	12+12.19				
01+0121.	02+0146.	03+2100.	04+1.980	05+20.08	06+30.00	07+0.071	08+64.28
09-262.7	10+29.74	11+0.000	12+12.20				

01+0109.	02+0146.	03+2115.	04+4.566	05+341.6	06+4.337	07+0.033	08+62.70
09-262.6	10+29.74	11+0.000	12+12.18				
01+0109.	02+0146.	03+2130.	04+5.154	05+349.6	06+07.86	07+0.033	08+62.16
09-262.6	10+29.75	11+0.000	12+12.18				
01+0109.	02+0146.	03+2145.	04+4.326	05+350.6	06+08.97	07+0.033	08+62.08
09-262.6	10+29.75	11+0.000	12+12.18				
01+0109.	02+0146.	03+2200.	04+4.559	05+337.0	06+08.51	07+0.033	08+62.20
09-262.6	10+29.75	11+0.000	12+12.17				
01+0121.	02+0146.	03+2200.	04+4.651	05+344.7	06+09.48	07+0.037	08+62.28
09-262.6	10+29.75	11+0.000	12+12.18				
01+0109.	02+0146.	03+2215.	04+4.486	05+325.4	06+08.59	07+0.040	08+61.90
09-262.6	10+29.76	11+0.000	12+12.17				
01+0109.	02+0146.	03+2230.	04+6.421	05+342.6	06+07.79	07+0.033	08+61.11
09-262.6	10+29.76	11+0.000	12+12.16				
01+0109.	02+0146.	03+2245.	04+5.955	05+347.8	06+6.147	07+0.031	08+60.59
09-262.6	10+29.76	11+0.000	12+12.16				
01+0109.	02+0146.	03+2300.	04+5.340	05+356.8	06+09.30	07+0.026	08+60.44
09-262.6	10+29.76	11+0.000	12+12.16				
01+0121.	02+0146.	03+2300.	04+5.551	05+343.2	06+13.96	07+0.045	08+61.01
09-262.6	10+29.76	11+0.000	12+12.16				
01+0109.	02+0146.	03+2315.	04+3.912	05+355.4	06+09.64	07+0.049	08+59.99
09-262.6	10+29.75	11+0.000	12+12.15				
01+0109.	02+0146.	03+2330.	04+2.664	05+5.258	06+16.15	07+0.039	08+58.88
09-262.5	10+29.75	11+0.000	12+12.15				
01+0109.	02+0146.	03+2345.	04+1.925	05+321.3	06+15.33	07+0.027	08+58.57
09-262.5	10+29.75	11+0.000	12+12.15				
01+0109.	02+0146.	03+2400.	04+1.566	05+307.4	06+08.97	07+0.006	08+58.59
09-262.4	10+29.75	11+0.000	12+12.15				
01+0121.	02+0146.	03+2400.	04+2.517	05+337.3	06+27.22	07+0.082	08+59.01
09-262.5	10+29.75	11+0.000	12+12.15				
01+0109.	02+0147.	03+0015.	04+1.301	05+313.4	06+15.81	07+0.013	08+58.50
09-262.4	10+29.75	11+0.000	12+12.14				
01+0109.	02+0147.	03+0030.	04+1.436	05+280.9	06+42.98	07+0.019	08+57.79
09-262.4	10+29.74	11+0.000	12+12.14				
01+0109.	02+0147.	03+0045.	04+2.514	05+222.3	06+4.480	07+0.009	08+58.97
09-262.4	10+29.74	11+0.000	12+12.13				
01+0109.	02+0147.	03+0100.	04+3.203	05+212.3	06+2.117	07+0.024	08+59.31
09-262.4	10+29.74	11+0.000	12+12.13				
01+0121.	02+0147.	03+0100.	04+2.113	05+253.6	06+49.16	07+0.031	08+58.64
09-262.4	10+29.74	11+0.000	12+12.14				
01+0109.	02+0147.	03+0115.	04+3.661	05+215.1	06+1.639	07+0.016	08+58.69
09-262.4	10+29.74	11+0.000	12+12.13				
01+0109.	02+0147.	03+0130.	04+4.947	05+205.5	06+4.366	07+0.019	08+58.77
09-262.4	10+29.73	11+0.000	12+12.13				
01+0109.	02+0147.	03+0145.	04+5.164	05+204.0	06+6.098	07+0.019	08+57.85
09-262.4	10+29.72	11+0.000	12+12.13				
01+0109.	02+0147.	03+0200.	04+4.595	05+210.4	06+3.661	07+0.020	08+57.32
09-262.4	10+29.72	11+0.000	12+12.13				
01+0121.	02+0147.	03+0200.	04+4.592	05+208.8	06+6.067	07+0.025	08+58.16
09-262.4	10+29.73	11+0.000	12+12.13				
01+0109.	02+0147.	03+0215.	04+5.269	05+216.6	06+5.200	07+0.025	08+56.42
09-262.4	10+29.72	11+0.000	12+12.13				
01+0109.	02+0147.	03+0230.	04+5.720	05+237.0	06+4.825	07+0.031	08+54.83
09-262.3	10+29.71	11+0.000	12+12.12				
01+0109.	02+0147.	03+0245.	04+5.107	05+235.8	06+5.734	07+0.023	08+54.67
09-262.3	10+29.71	11+0.000	12+12.12				
01+0109.	02+0147.	03+0300.	04+5.549	05+234.0	06+6.945	07+0.026	08+54.98
09-262.3	10+29.71	11+0.000	12+12.12				
01+0121.	02+0147.	03+0300.	04+5.411	05+230.9	06+10.08	07+0.032	08+55.23
09-262.3	10+29.71	11+0.000	12+12.12				

01+0109.	02+0147.	03+0315.	04+5.793	05+234.8	06+5.224	07+0.027	08+55.72
09-262.3	10+29.71	11+0.000	12+12.12				
01+0109.	02+0147.	03+0330.	04+6.258	05+234.0	06+4.506	07+0.020	08+55.95
09-262.3	10+29.70	11+0.000	12+12.11				
01+0109.	02+0147.	03+0345.	04+07.41	05+230.6	06+5.295	07+0.031	08+55.53
09-262.3	10+29.70	11+0.000	12+12.11				
01+0109.	02+0147.	03+0400.	04+07.32	05+233.9	06+6.021	07+0.031	08+55.23
09-262.2	10+29.70	11+0.000	12+12.11				
01+0121.	02+0147.	03+0400.	04+6.693	05+233.3	06+5.527	07+0.028	08+55.61
09-262.3	10+29.70	11+0.000	12+12.11				
01+0109.	02+0147.	03+0415.	04+07.44	05+228.5	06+08.45	07+0.044	08+55.41
09-262.2	10+29.70	11+0.000	12+12.11				
01+0109.	02+0147.	03+0430.	04+07.62	05+229.0	06+07.31	07+0.048	08+55.28
09-262.2	10+29.69	11+0.000	12+12.11				
01+0109.	02+0147.	03+0445.	04+08.29	05+231.7	06+07.29	07+0.049	08+55.59
09-262.2	10+29.69	11+0.000	12+12.11				
01+0109.	02+0147.	03+0500.	04+08.66	05+234.7	06+07.40	07+0.058	08+55.92
09-262.2	10+29.69	11+0.000	12+12.11				
01+0121.	02+0147.	03+0500.	04+08.00	05+231.0	06+08.03	07+0.051	08+55.55
09-262.2	10+29.69	11+0.000	12+12.11				
01+0109.	02+0147.	03+0515.	04+08.94	05+234.9	06+08.11	07+0.063	08+56.09
09-262.3	10+29.69	11+0.000	12+12.11				
01+0109.	02+0147.	03+0530.	04+09.63	05+239.2	06+08.27	07+0.062	08+56.61
09-262.3	10+29.69	11+0.000	12+12.11				
01+0109.	02+0147.	03+0545.	04+09.13	05+250.4	06+07.74	07+0.049	08+56.89
09-262.3	10+29.70	11+0.000	12+12.11				
01+0109.	02+0147.	03+0600.	04+09.63	05+247.9	06+6.791	07+0.060	08+57.61
09-262.3	10+29.70	11+0.000	12+12.11				
01+0121.	02+0147.	03+0600.	04+09.33	05+243.1	06+09.98	07+0.061	08+56.80
09-262.3	10+29.70	11+0.000	12+12.11				
01+0109.	02+0147.	03+0615.	04+09.35	05+245.4	06+07.48	07+0.062	08+57.87
09-262.3	10+29.70	11+0.000	12+12.11				
01+0109.	02+0147.	03+0630.	04+10.96	05+247.5	06+07.50	07+0.062	08+58.95
09-262.3	10+29.70	11+0.000	12+12.11				
01+0109.	02+0147.	03+0645.	04+13.58	05+253.2	06+09.55	07+0.071	08+60.59
09-262.4	10+29.70	11+0.000	12+12.11				
01+0109.	02+0147.	03+0700.	04+14.88	05+260.4	06+09.53	07+0.065	08+61.75
09-262.4	10+29.71	11+0.000	12+12.11				
01+0121.	02+0147.	03+0700.	04+12.19	05+251.6	06+10.35	07+0.070	08+59.79
09-262.3	10+29.70	11+0.000	12+12.11				
01+0109.	02+0147.	03+0715.	04+16.02	05+265.5	06+11.59	07+0.072	08+62.32
09-262.4	10+29.71	11+0.000	12+12.11				
01+0109.	02+0147.	03+0730.	04+14.67	05+269.8	06+11.33	07+0.076	08+62.75
09-262.4	10+29.71	11+0.000	12+12.11				
01+0109.	02+0147.	03+0745.	04+14.24	05+272.8	06+14.08	07+0.094	08+63.08
09-262.4	10+29.72	11+0.000	12+12.11				
01+0109.	02+0147.	03+0800.	04+16.66	05+276.3	06+13.52	07+0.084	08+62.98
09-262.4	10+29.72	11+0.000	12+12.11				
01+0121.	02+0147.	03+0800.	04+15.40	05+271.1	06+13.29	07+0.083	08+62.79
09-262.4	10+29.71	11+0.000	12+12.11				
01+0109.	02+0147.	03+0815.	04+20.05	05+271.3	06+11.69	07+0.072	08+62.66
09-262.4	10+29.72	11+0.000	12+12.11				
01+0109.	02+0147.	03+0830.	04+19.40	05+282.3	06+13.37	07+0.074	08+62.32
09-262.4	10+29.73	11+0.000	12+12.12				
01+0109.	02+0147.	03+0845.	04+19.68	05+285.5	06+13.29	07+0.080	08+61.85
09-262.4	10+29.73	11+0.000	12+12.12				
01+0109.	02+0147.	03+0900.	04+17.15	05+284.4	06+15.37	07+0.085	08+61.96
09-262.3	10+29.74	11+0.000	12+12.12				
01+0121.	02+0147.	03+0900.	04+19.07	05+280.9	06+14.63	07+0.078	08+62.20
09-262.4	10+29.73	11+0.000	12+12.12				

01+0109.	02+0147.	03+0915.	04+22.78	05+282.4	06+17.62	07+0.083	08+62.04
09-262.4	10+29.74	11+0.000	12+12.13				
01+0109.	02+0147.	03+0930.	04+23.66	05+286.8	06+13.30	07+0.079	08+61.86
09-262.4	10+29.74	11+0.000	12+12.13				
01+0109.	02+0147.	03+0945.	04+19.86	05+285.9	06+11.54	07+0.078	08+62.36
09-262.5	10+29.74	11+0.000	12+12.13				
01+0109.	02+0147.	03+1000.	04+20.35	05+294.5	06+16.74	07+0.086	08+62.35
09-262.5	10+29.75	11+0.000	12+12.13				
01+0121.	02+0147.	03+1000.	04+21.66	05+287.4	06+15.61	07+0.082	08+62.15
09-262.5	10+29.74	11+0.000	12+12.13				
01+0109.	02+0147.	03+1015.	04+20.83	05+300.4	06+16.35	07+0.086	08+61.73
09-262.6	10+29.76	11+0.000	12+12.13				
01+0109.	02+0147.	03+1030.	04+20.03	05+298.6	06+13.11	07+0.080	08+61.54
09-262.6	10+29.76	11+0.000	12+12.13				
01+0109.	02+0147.	03+1045.	04+18.45	05+306.3	06+17.37	07+0.075	08+62.15
09-262.6	10+29.76	11+0.000	12+12.13				
01+0109.	02+0147.	03+1100.	04+18.45	05+295.2	06+22.02	07+0.079	08+62.50
09-262.5	10+29.76	11+0.000	12+12.13				
01+0121.	02+0147.	03+1100.	04+19.44	05+300.2	06+17.92	07+0.082	08+61.98
09-262.6	10+29.76	11+0.000	12+12.13				
01+0109.	02+0147.	03+1115.	04+20.79	05+274.4	06+13.06	07+0.076	08+62.67
09-262.5	10+29.76	11+0.000	12+12.14				
01+0109.	02+0147.	03+1130.	04+19.26	05+271.0	06+15.15	07+0.082	08+63.48
09-262.5	10+29.76	11+0.000	12+12.14				
01+0109.	02+0147.	03+1145.	04+18.64	05+278.2	06+16.28	07+0.080	08+63.92
09-262.5	10+29.77	11+0.000	12+12.14				
01+0109.	02+0147.	03+1200.	04+18.51	05+276.4	06+20.19	07+0.083	08+64.13
09-262.5	10+29.77	11+0.000	12+12.14				
01+0121.	02+0147.	03+1200.	04+19.30	05+275.0	06+16.57	07+0.080	08+63.55
09-262.5	10+29.76	11+0.000	12+12.14				
01+0109.	02+0147.	03+1215.	04+18.55	05+273.9	06+16.41	07+0.084	08+64.35
09-262.5	10+29.77	11+0.000	12+12.14				
01+0109.	02+0147.	03+1230.	04+16.74	05+277.3	06+15.24	07+0.083	08+64.84
09-262.5	10+29.77	11+0.000	12+12.14				
01+0109.	02+0147.	03+1245.	04+18.30	05+286.7	06+13.37	07+0.085	08+64.97
09-262.5	10+29.77	11+0.000	12+12.15				
01+0109.	02+0147.	03+1300.	04+19.77	05+278.6	06+16.88	07+0.078	08+65.62
09-262.6	10+29.77	11+0.000	12+12.15				
01+0121.	02+0147.	03+1300.	04+18.34	05+279.1	06+16.22	07+0.083	08+64.95
09-262.5	10+29.77	11+0.000	12+12.15				
01+0109.	02+0147.	03+1315.	04+19.51	05+285.8	06+15.51	07+0.081	08+65.72
09-262.6	10+29.78	11+0.000	12+12.15				
01+0109.	02+0147.	03+1330.	04+18.86	05+279.0	06+14.21	07+0.081	08+66.52
09-262.6	10+29.78	11+0.000	12+12.15				
01+0109.	02+0147.	03+1345.	04+19.08	05+292.4	06+22.22	07+0.089	08+66.61
09-262.6	10+29.78	11+0.000	12+12.15				

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

Second Year of Monitoring

Fourth Quarter Report

Prepared for:

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

Prepared by:

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FEBRUARY 1994

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

SECOND YEAR OF MONITORING

FOURTH QUARTER REPORT

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

SECOND YEAR OF MONITORING

FOURTH QUARTER REPORT

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

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, soil gas and soil gas pressure in areas at and surrounding the 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, the New York State Department of Conservation (NYSDEC) and analytical laboratories, developed a complete protocol and analysis strategy for meeting the general requirements stipulated by the Consent Decree.

As stipulated in the Consent Decree, the ambient air quality, soil gas quality and soil gas pressure were to be monitored at several positions around the landfill. The samples were to be analyzed using approved protocols and the results were to be tabulated. Four sampling events were conducted during the initial year of the program and four monitoring events were scheduled for the second year.

This report contains the results of the fourth quarter sampling effort of the second year of monitoring (second year, fourth quarter sampling event). The sampling effort was conducted on August 23 and 24, 1993. Sections 2.0 and 3.0 of this report contain the sampling protocol and investigation methodology for air and soil gas including sample collection, sample handling and analytical procedures applied for this program. Section 4.0 provides a discussion of results. Section 5 contains the soil gas pressure sampling procedures and test results.

The tetrachloroethene Annual Guideline Concentration (AGC) value of 0.075 ug/m³ stated in the latest New York State Department of Environmental Conservation (DEC) Air Guide-1 document (1991 Edition) has been changed by the DEC to 1.2 ug/m³. This change is reflected in this report. The second year, first quarter tetrachloroethene results will be reevaluated with the new AGC value and presented later in the second year annual ambient air and soil gas quality monitoring summary report.

2.0 METHODOLOGY AND PROTOCOLS

2.1 PROGRAM DEFINITION

In conformance with the Remedial Action Plan (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 provides data and analyses for four of the components listed in the RAP: (1) ambient air sampling; (2) 30" deep subsurface gas sampling; (3) subsurface gas sampling at various depths; and (4) soil gas pressure readings. The ambient air, soil gas and well pressure sampling procedures used during the field effort, in general, follow those developed during the first year of sampling.

The primary objective of the sampling program is to examine the ambient air concentration of trace volatile organic compounds (VOCs) in the vicinity of the Old Bethpage Landfill. During the second year fourth quarter sampling event, four ambient air Volatile Organic Sampling Train (VOST) samples were collected over a 24-hour period at three locations and two consecutive 12-hour ambient air SUMMA® canister samples were colocated at one of the downwind ambient air VOST sampling locations. Short-term (ten minute) subsurface soil gas grab samples were collected at the fifteen locations specified in the Consent Decree. Soil gas pressure readings were taken at three locations. All of these locations are provided on the attached Figure 2.1.

The program also involves the collection of meteorological data from atop the landfill and at the upwind ambient air sampling location. This data is used 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 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. Sampling is to continue on a quarterly basis, unless the monitoring program is modified by a change to the Consent Decree. The ambient air samples are to be analyzed for VOCs.

The sample collection program was modified as discussed in the reports for the first year. Changes were made to the ambient air sampling scope stated in the RAP to account for site geometry. The selected ambient air sampling locations for this quarter are shown in Figure 2.1. Concurrent 24-hour ambient air samples were taken at locations A1 and A4, and two 24-hour samples and two consecutive 12-hour samples were taken at location A2/A3 for a total of four 24-hour ambient air samples and two 12-hour samples. The reason for collecting two 24-hour samples and two 12-hour samples at a single site (A2/A3) was to provide two flow ranges and two methods of ambient sampling. The first rounds of sampling had identified considerable ranges in ambient concentrations of various VOCs. Therefore, the two ranges of sample volumes were required to avoid mass loading limits on the samples and to achieve acceptable analytical sensitivity for the target compound list.

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. Again, the second year monitoring program also includes the collection of quarterly soil gas samples. In this second year 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 requires 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 was required on a quarterly basis during the initial year of the program. The second year monitoring program also includes quarterly sampling at well M9 at all four depths.

As in the initial year of sampling, 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 less than 68°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 Methodology for the collection of large volumes was developed to identify low VOC concentrations in ambient air.
- 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 in the initial year and deemed unacceptable because of low total volume capacity, potential leaks and contamination.
- 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.

Although evacuated canisters were previously deemed unacceptable by RTP up to this point for ambient air monitoring, equipment certification and analytical improvements have been claimed by a number of authorities. Therefore, two consecutive 12-hour SUMMA canister VOC samples were collected at the A2/A3 colocated site.

A summary of the volatile organic compounds that can be evaluated by using the modified VOST and SUMMA canister methodologies is presented in Table 2.1 along with corresponding New York State Department of Environmental Conservation (NYSDEC) ambient air guidelines. This target compound list (TCL) for the second year of monitoring is consistent with the VOC constituents being evaluated in the thermal oxidizer testing portion of the Consent Decree yet is slightly more extensive due to the

TABLE 2.1

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

PROGRAM TARGET COMPOUND LIST WITH
NYSDEC AMBIENT AIR GUIDELINES

VOC COMPOUND NAME	TOXICITY	CURRENT SGC (ug/m3)		CURRENT AGC (ug/m3)		FORMER AGC (ug/m3)
Benzene	H	30	(p)	0.12	(E,U)	100
Benzyl Chloride	H	500	(r)	0.02	(E,U)	16.7
Bromodichloromethane	H			0.02	(D)	0.03(1)
Bromoform	M	1,200	(t)	12	(T)	11.9(1)
Bromomethane						
Carbon Disulfide	M	710	(r)	7	(D)	100
Carbon Tetrachloride	H	1,300	(r)	0.07	(E,U)	100
Chlorobenzene	M	11,000	(p)	20	(E)	1,170
Chloroethane	L	630,000	(t)	63,000	(T)	52,000
Chloroform	M	980	(r)	23	(R)	167
Chloromethane	M	22,000	(d)	770	(D)	2,100
3-Chloropropene	M	710	(T)	7.1	(T)	10
Dibromochloromethane	M			0.1	(D)	0.03(1)
1,2-Dibromoethane	H	38	(R)	0.004	(E,U)	0.002
1,2-Dichlorobenzene (o)	M	30,000	(t)	200	(E)	1,000
1,3-Dichlorobenzene (m)	M	30,000	(a)	200	(A)	714(1)
1,4-Dichlorobenzene (p)	M*	110,000*		700(1)		
Dichlorodifluoromethane						
1,1-Dichloroethane	L	190,000	(t)	500	(E)	9,524(1)
1,2-Dichloroethane	M	950	(r)	0.039	(E,U)	0.2
1,1-Dichloroethene	H	2,000	(t)	0.02	(E,U)	66.7
trans-1,2-Dichloroethene	M			360	(D)	360(1)
1,2-Dichloropropane	M	83,000	(t)	0.15	(D)	833(1)
cis-1,3-Dichloropropene						
trans-1,3-Dichloropropene						
1,2-Dichloro-1,1,2,2-tetrafluoroethane						
Ethylbenzene	M	100,000	(t)	1,000	(T)	1,450
1-Ethyl-2-methylbenzene(2)						
1-Ethyl-4-methylbenzene(2)	M			0.1	(d*)	0.03(1)
Hexachlorobutadiene	M	50	(T)	0.05	(E,U)	0.8
Methylene Chloride	M	41,000	(t)	27	(D,U)	1,170
Styrene	M	51,000	(t)	510	(T)	716
1,1,2,2-Tetrachloroethane	M	1,600	(t)	0.02	(E,U)	23.2
Tetrachloroethene	M	81,000	(t)	1.2(3)	(D,U)	1,120
Toluene	L	89,000	(r)	2,000	(t)	7,500
1,2,4-Trichlorobenzene	H	3,700	(T)	9.0	(E)	133
1,1,1-Trichloroethane	L	450,000	(t)	1,000	(E)	38,000
1,1,2-Trichloroethane	M	13,000	(t)	0.06	(E,U)	150
Trichloroethene	M	33,000	(r)	0.45	(D,U)	900
Trichlorofluoromethane	L	560,000	(t)	700	(E)	
1,1,2-Trichloro-1,2,2-trifluoroethane	L	1,800,000	(T)	90,000	(D)	90,476(1)
1,2,4-Trimethylbenzene						
1,3,5-Trimethylbenzene	M	29,000	(A)	290	(A)	
Vinyl Chloride	H	1,300	(t)	0.02	(E,U)	0.4
Xylenes (Total)	M	100,000	(t)	300	(t)	1,450(4)

TABLE 2.1
Continued

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

PROGRAM TARGET COMPOUND LIST WITH
NYSDEC AMBIENT AIR GUIDELINES

TENTATIVELY IDENTIFIED COMPOUNDS(5)	TOXICITY	CURRENT SGC (ug/m3)		CURRENT AGC (ug/m3)		FORMER AGC (ug/m3)
Acetone	L	140,000	(r)	14,000	(R)	35,600
Benzaldehyde						
2-Butanone	M	140,000	(t)	300	(E)	1967
2-Chloroethyl Vinyl Ether						
cis-1,2-Dichloroethene	M	190,000	(a)	1,900	(A)	1,880(1)
Freon 13	L	43,000	(a)	530	(A)	133,333(1)
2-Hexanone						
4-Methyl-2-Pentanone	M	48,000	(r)	480	(R)	683

FOOTNOTES:

SGC - Short-term guideline concentration (current as of June 1991).

AGC - Annual guideline concentration (current as of June 1991, former as of 1986, 9/89 Edition).

(1) Proposed Value.

(2) Two isomer forms of Ethylmethylbenzene (25550-14-5) reported as total Ethylmethylbenzene.

(3) Tetrachloroethene AGC current as of November 22, 1991.

(4) 1450 total for ortho and para xylenes and 1450 total for meta xylene.

(5) Tentatively Identified Compound (TIC) using EPA SW846 Method 8240. Six additional non-target compound GC/MS peaks with the largest analytical response were also targeted per VOST analysis.

Toxicity - H for High; M for moderate; and L for low by NYSDEC.

(a) - SGC based on NYSDEC structure-activity analogy.

(d) - SGC derived by NYSDEC, Division of Air Resources, Bureau of Air Toxics, Toxics Assessment Section.

(d*)- AGC assigned Moderate toxicity "de minimis" limit.

(p) - SGC derived from proposed ACGIH TLV-TWA (1990-1991).

(r) - SGC derived from NIOSH REL-TWA (1988).

(t) - SGC derived from ACGIH TLV-TWA (1990-1991).

(A) - AGC based on NYSDEC structure-activity analogy.

(D) - AGC derived from NYSDEC, Division of Air Resources, Bureau of Air Toxics, Toxics Assessment Section.

(E) - AGC based on derivation by USEPA.

(I) - AGC based on RFC developed by USEPA - Integrated Risk Information System (IRIS), input pending.

(R) - AGC derived from NIOSH REL-TWA (1988).

(T) - AGC derived from ACGIH TLV-TWA (1990-1991).

(U) - AGC is the ambient air concentration which corresponds to an excess cancer risk of one in one million after lifetime exposure.

additional SUMMA target compounds. It should be noted that these additional SUMMA target compounds could be tentatively identified in the VOST analysis if present in significant levels. Fourth quarter VOST related target compound list changes (ketones now tentatively identified) reflect laboratory GC/MS program alterations (MS mass 44 scan delay) detailed in Section 3.4. Vinyl acetate is no longer quantifiable due to the modified scan range where vinyl acetate's two (2) significant ions for identification fall below mass 45. Also since the second year third quarter test, the contract laboratory, Research Triangle Laboratories (RTL) has updated their TCL to exclude dibromomethane, dichlorodifluoromethane and iodomethane. RTP has made a special request for the addition of 1-ethyl-2-methylbenzene and 1-ethyl-4-methylbenzene to the TCL, which RTL granted.

2.2.2 Modified VOST Sampler

The Volatile Organic Sampling Train (VOST) is one of three EPA methods identified to collect VOCs from stacks. 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 degrees centigrade (°C) 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.

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, two pre-conditioned VOST

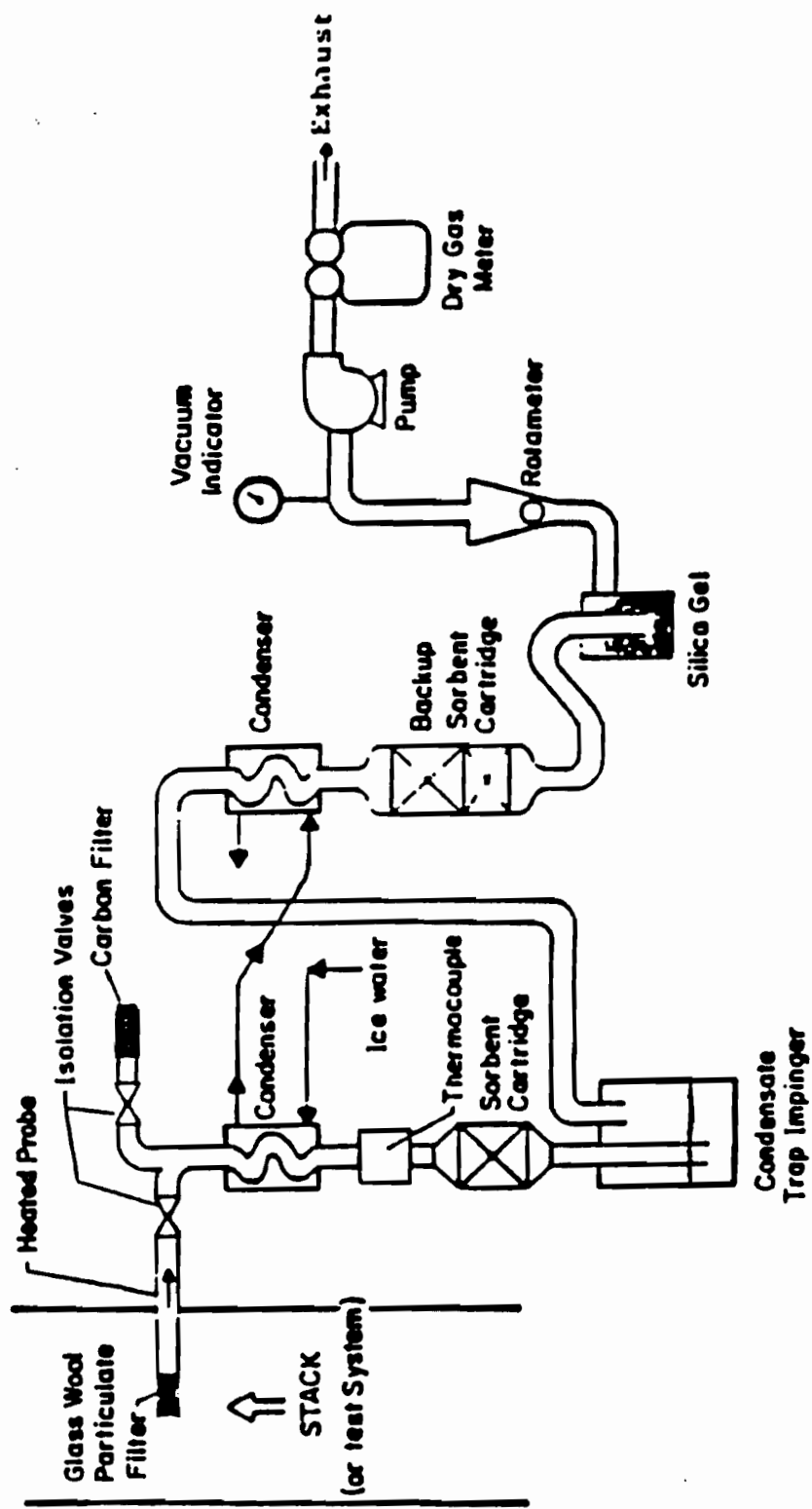


FIGURE 2.2: SCHEMATIC OF EPA REFERENCED
VOLATILE ORGANIC SAMPLING TRAIN
(VOST)

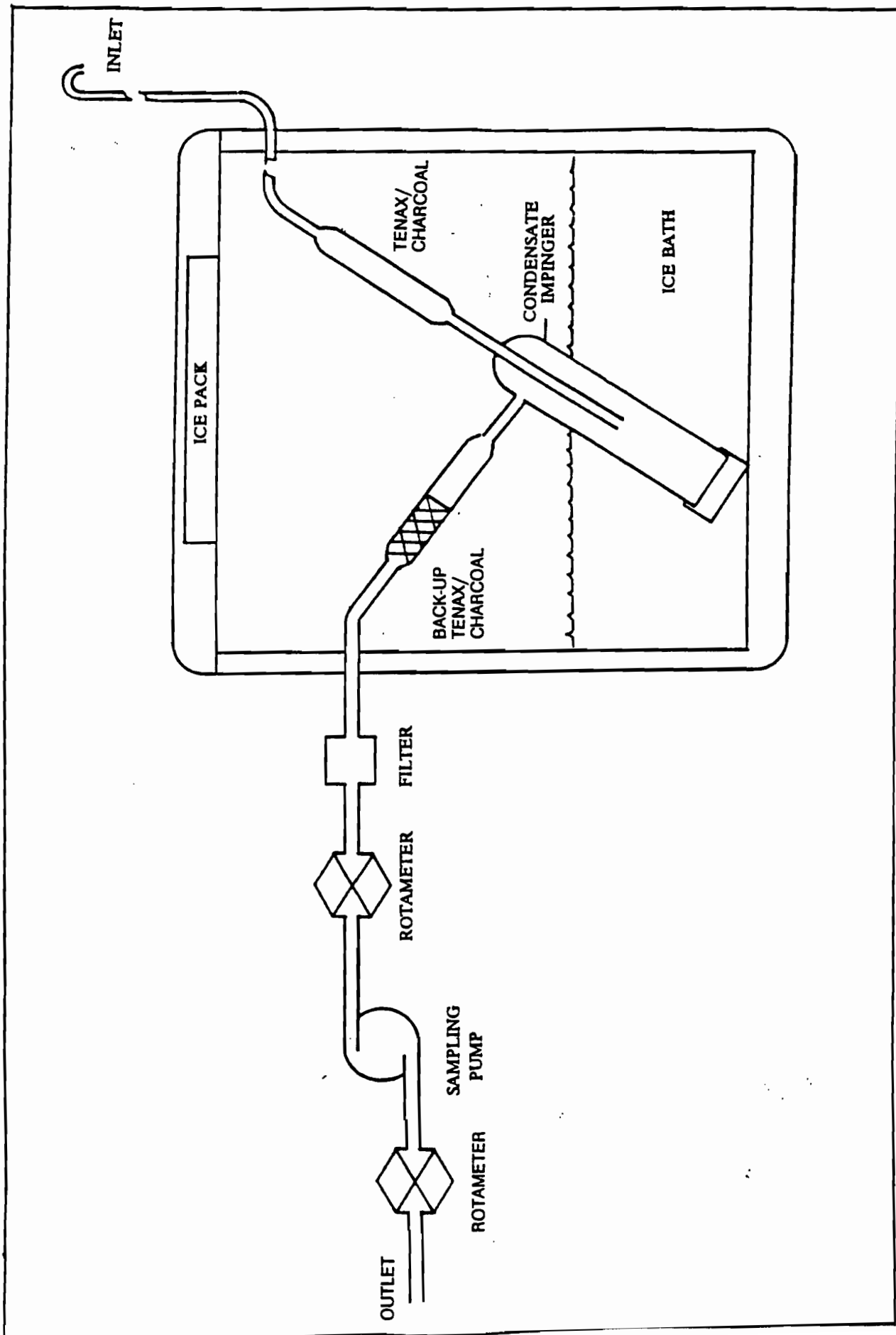


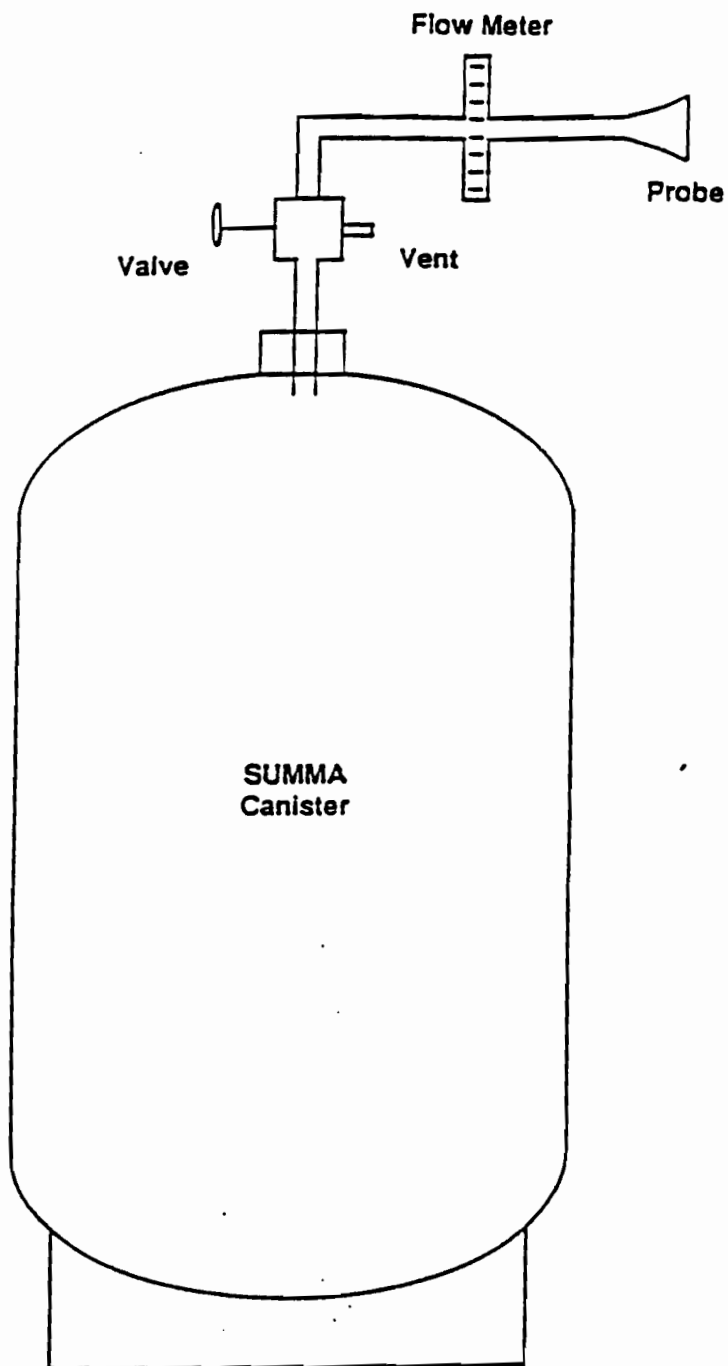
FIGURE 2.3: MODIFIED VOST SAMPLER

Tenax/Charcoal sorbent traps, condensate impinger, aluminum tube holder, ice bath and ice pack, sampling cane and cooler enclosure. The VOST Tenax/Charcoal sorbent traps 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 dry gas meter. The ice bath, ice pack and condensate impinger were used instead of two condensers in the EPA reference method. Two Tenax/Charcoal traps were used in order to account for possible breakthrough in the high volume samples and were used throughout the program for method uniformity among all sources.

2.2.3 SUMMA® Passivated Canister Sampling

The SUMMA® passivated canister is one of four EPA methods identified to collect VOCs from ambient air. A schematic diagram of the principal components of the SUMMA® passivated canister is shown in Figure 2.4. The SUMMA® passivated canister sampler consists of a six (6) liter stainless steel container, with pressure tested, leak free welded joints, electrochemically passivated by the SUMMA® process. Each canister has chromatographic grade stainless steel tubing, stainless steel components and SWAGELOK® fittings, and a custom NUPRO® valve. Each canister also has a sampling "control tree" which includes a -30" Hg to 30 psi vacuum/pressure gauge, a purge crossarm, a 2 micron particulate filter and air-tight end cap.

The canister draws a sample of ambient air through components that regulate a rate of sampling into the pre-evacuated canister. The canister is evacuated to within 3" Hg of 1 atmosphere. As the valve is opened for sampling, the differential pressure causes the sample to flow into the canister. This technique allows whole air samples to be taken through a 2 to 500 standard cubic centimeter per minute (scc/min) mechanically adjustable flow controller. After the air is collected, the canister valve is closed, the sampling "control tree" is detached, and an identification tag is attached to the canister. The canister is then forwarded to RTL for analysis. More details on this method are provided in Appendix B.



RTP Environmental Associates, Inc.®

FIGURE 2.4: PASSIVATED CANISTER SAMPLING

2.2.4 VOST Sample Volume Selection

The selection of sample volumes for both air and soil gas samples for this study were 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 quantitation is based on nanogram concentrations of constituents, appropriate sample volumes were necessary to provide the desired analytical sensitivity.

In general, analytical instruments can detect between a few nanograms to thousands of nanograms of individual constituents in a sample. The analytical instrument's lower quantitation limit range for this case was set between 20 and 260 nanograms. The upper quantitation limit (calibration limit) was nominally set at approximately 50 times the lower quantitation limit. 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 (approximately 1000 liters) and low volume (approximately 100 liters) sample sizes were selected.

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.

2.2.5 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. 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 preassigned time period. This capability

TABLE 2.2

**OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX**

**GENERAL RELATIONSHIP BETWEEN MICRO-TIP
READINGS AND SAMPLE VOLUME**

MICRO-TIP READINGS (ppm)*	SAMPLE VOLUME (liters)
<0.1 to 0.5	1,000 to 10
0.5 to 2	10 to 1
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.

is particularly important in the ambient air sampling event. It is possible to collect ambient air samples 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, thus providing a greater sampling time.

SKC electronic calibrator Model 712 is used before and after each sampling event to calibrate two (2) Supelco rotameters (one high flow (0.7 Lpm), one low flow (0.070 Lpm) to a desired nominal flow rate. It is also used prior to testing to establish a relationship between actual pump volume flow rates and their corresponding rotameter readings. Inconsistencies between both rotameters could reveal a pump leak. These calibration data together with the Supelco rotameter readings recorded during sampling, are then used after all monitoring events to establish the sample volumes collected during each test. The 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 and the Supelco rotameters is around $\pm 2\%$.

A Photovac Micro-Tip meter was also used during the monitoring program before and after each sampling event to measure the total VOC concentration. It is a hand held instantaneously reading analyzer that measures the total concentration of all ionizable compounds (in ppm). The 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 were collected during the ambient air quality and soil gas tests. Meteorological data provide information on ambient weather 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 an 8 and a 12 foot meteorological tower, each containing a 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 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 each 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 second year fourth quarterly 24-hour ambient air sampling event was conducted on August 23 and 24, 1993. Three locations at the Old Bethpage Landfill were selected as illustrated on Figure 2.1 based on weather forecast data that indicated persistent northwesterly winds and steady to falling barometric pressure. At locations A1 and A4, a high volume, 24-hour ambient air samples were collected using the modified VOST sampler. At locations A2 and A3, a high volume and low volume

24-hour modified VOST sample and two 12-hour SUMMA® evacuated canister samples, CAN1 and CAN2 were collected. The critical sampling 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 six (6) feet south of the Bethpage State Park property line, ninety (90) feet west of Round Swamp Road as shown in Figure 2.1. Sampler A4 was positioned on the east side of the landfill one hundred (100) feet north northwest of soil gas well M5. Samplers at both A1 and A4 were set to continuously collect at a 0.7 Lpm nominal flow rate over a 24-hour period. These settings would allow for the collection of two 1,000 liter samples on each at A1 and A4. The reason the pump was set at 0.7 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 liters over the 24-hour period. Samplers A1 and A4 began sampling at 1022 EDT and 0956 EDT on August 23, 1993 respectively.

Samplers A2, A3, CAN1 and CAN2 were set up 180 feet southwest of the air stripper. Sampler A2 was set to continuously collect a 1,000 liter integrated sample at 0.7 Lpm over the 24-hour period, the same set-up as for samplers A1 and A4. Sampler A3 was set to collect a low volume sample. To achieve this, a sampling manifold was constructed with two (2) SKC single stage universal constant-flow controllers in parallel. A Supelco low flow rotameter was positioned in line with one of the constant-flow controllers downstream of the sorbent traps prior to the SKC pump inlet. The remaining constant-flow controller was opened to atmosphere and connected in parallel with the other flow controller immediately upstream of the SKC pump inlet. The adjustment pod to the constant-flow controller connected to the sorbent traps was turned to register the desired 0.07 Lpm flow rate on the in-line rotameter. The remaining constant-flow controller was adjusted to maintain the total flow to

TABLE 3.1
OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Fourth Quarter

SUMMARY OF AMBIENT AIR SAMPLING

SITE ID*	SAMPLE ID(1)	TESTING DATE	DURATION (minutes)	SAMPLING HEIGHT (inches)	NOMINAL FLOWRATE (l/min)	DESIRED QUANTITY (liter)	ACTUAL QUANTITY(2) (liter)
A-1	2-4A1	8/23-24/93	991	40	0.7	1,000	991
A-2	2-4A2	8/23-24/93	1,440	40	0.7	1,000	1,040
A-3	2-4A3	8/23-24/93	1,178	40	0.07	100	82.3
A-4	2-4A4	8/23-24/93	1,440	40	0.7	1,000	1,070
A-2/3	2-4CAN1	8/23/93	571	40	0.01(3)	6	6
A-2/3	2-4CAN2	8/23/93	602	40	0.01(3)	6	6

SUMMARY OF SUBSURFACE SOIL GAS SAMPLING

SITE ID(1)	SAMPLE ID	TESTING DATE	DURATION (minutes)	SAMPLING DEPTH (inches)	NOMINAL FLOWRATE (l/min)	DESIRED QUANTITY (liter)	ACTUAL QUANTITY(2) (liter)
F1	2-4F1	8/23/93	10	30	1.0	10	10.9
M2	2-4M2	8/23/93	10	30	1.0	10	10.4
M4	2-4M4	8/23/93	10	30	1.0	10	9.85
M5	2-4M5	8/23/93	10	30	1.0	10	10.0
M6	2-4M6	8/23/93	10	30	1.0	10	10.0
M9 (10')	2-4M9(10)	8/23/93	10	10 feet	1.0	10	10.2
M9 (20')	2-4M9(20)	8/23/93	10	20 feet	1.0	10	9.78
M9 (30')	2-4M9(30)	8/23/93	10	30 feet	1.0	10	10.1
M9 (40')	2-4M9(40)	8/23/93	10	40 feet	1.0	10	10.1
M13	2-4M13	8/23/93	10	30	1.0	10	9.81
M16	2-4M16	8/23/93	10	30	1.0	10	10.4
M21	2-4M21	8/23/93	10	30	1.0	10	9.79
M22	2-4M22	8/23/93	10	30	1.0	10	10.1
M28	2-4M28	8/23/93	10	30	1.0	10	10.4
M31	2-4M31	8/23/93	10	30	1.0	10	10.5
M34	2-4M34	8/23/93	10	30	1.0	10	10.7
M37	2-4M37	8/23/93	10	30	1.0	10	9.97
M39	2-4M39	8/23/93	10	30	1.0	10	9.96

(1) See Figure 2.1 for ambient air and soil gas sampling locations.

A1: High volume ambient upwind sample collected 6 feet south of property line to golf course, 90 feet from Round Swamp Road.

A2: High volume ambient downwind sample collected 180 feet southwest of the Air Stripper tower.

A3: Low volume ambient downwind (A2 duplicate) sample collected 180 feet southwest of the Air Stripper tower.

A4: High volume ambient downwind sample collected 100 feet north northwest of well M5.

CAN1: Six liter SUMMA canister collected 180 feet southwest of air stripper tower.

CAN2: Six liter SUMMA canister collected 180 feet southwest of air stripper tower.

(2) Corrected to ambient conditions.

(3) Flow rate decreases as evacuated canister approaches atmospheric pressure.

the SKC sampling pump within the operating range mentioned earlier. This would allow for the continuous collection of an integrated 100 liter sample over the 24-hour sampling period. The two six (6) liter SUMMA samplers, CAN1 and CAN2, were set to fill during two consecutive 12-hour sampling events. The canisters flow rates were calibrated to run at 12 cc/min (0.012 L/min) at a negative pressure of -30 in Hg. At this rate the canister should fill in 8.3 hours. However, the control tree orifice of the canisters do not control the flow rate as the canister reaches ambient pressure. The 12 cc/min is only an estimate to fill the canister in 12 hours. Thus, samplers CAN1 and CAN2 ran for a duration of 9.5 hours and 10.0 hours, respectively. Samplers A2, A3 and CAN1 began sampling at 0917, 0928 and 0923 EDT on August 23, 1993 respectively. Sampler CAN2 began sampling at 0045 EDT on August 24, 1993.

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. Based on the above ambient concentrations, flow rates were set at 0.7 Lpm for A1, A2 and A4 and 0.07 Lpm for A3. 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 nine to ten times during the 24-hour sampling period. Rotameter readings during these site checks were within established ranges. Sampling proceeded according to plan over the 24-hour sampling periods for sites A1, A2 and A4. However, when site A3 was inspected at 0448 EDT on August 24, 1993, the observed pump operation was sporadic and this condition was not correctable. A pump fault finally occurred at 506 EDT. The duration of time that A3 was sampling ambient air was 19.6 hours (1,178 minutes).

The VOC final ambient concentrations at the A1, A2/A3 and A4 sampling sites was 0.0 ppm based on the Micro-Tip reading. Pump elapsed run time readings were recorded, VOST traps were removed, and the condensates (if available) were collected in VOA vials. All sorbent trap shipping tubes were labeled and shipped to the analytical laboratory as per the established protocol.

The analytical laboratories for this test were Research Triangle Laboratories (RTL) and Coast-to-Coast Analytical Services (CCAS). The laboratories received all sorbent traps and VOA vials in good condition. The 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. The RTL analytical report is provided in Appendix D. Field data forms and equipment calibrations are provided in Appendix E and F, respectively. Meteorological data are provided in Appendix G.

3.3 SOIL GAS SAMPLING

The soil gas sampling elements of the Consent Decree require soil gas samples to be extracted from several 30" deep subsurface gas wells and from 10', 20', 30' and 40' deep subsurface gas wells at M9. The decree does not specify the sample volume, 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 elements of the work scope in the Consent Decree, RAP Attachment 2, RTP developed the protocols and procedures outlined in Section 2.3 of this report 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 probe that was attached to the sampler inlet line in place of the sampling cane. Prior to use, the stainless steel sample probe was heated to purge any organics attached to the probe surfaces. After purging, the probes were capped to prevent inadvertent exposure to trace VOCs. The sampling 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 with 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 teflon tape, tygon tubing and a 1/4" open

bore bulk head union with a brass screw-on cap 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 brass screw-on cap 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 screw-on nut and ferrul. The Micro-Tip was turned on and operated for approximately 30 seconds to extract the stagnant well gases. 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 traps at each well. At the end of the sample, the Micro-Tip was again 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. The RTL analytical report is provided in Appendix D. Field data forms and equipment calibrations are provided in Appendix E and F, respectively. Meteorological data are provided in Appendix G.

3.4 ANALYTICAL LABORATORY PROCEDURES

Prepackaged clean VOST tubes and certified clean SUMMA evacuated canisters 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 and the SUMMA sampling equipment was placed in a clean storage environment.

RTL was forwarded a list of the VOCs that were initially identified as the target compound list for this monitoring program. RTP's laboratory instructions required reported sample splitting and breakthrough results for a limited set of VOST trap pairs prior to analyzing the remaining samples. RTL was instructed to perform a splitless analysis of the low volume downwind ambient sample (A3) (front and back traps combined as one sample) and for all soil gas samples and to report mass loading

results to RTP. RTL experienced relatively high concentrations of several compounds including chloromethane, trichlorofluoromethane, toluene, xylenes and benzene. Upon reviewing A3's mass loading RTP instructed RTL to split the high volume downwind ambient samples A2 and A4 upwind high volume ambient sample A1 all at 5:1. The soil gas sample mass loadings were found low enough to continue the non-split strategy for all remaining soil gas samples. RTL inadvertently ran soil gas sample F1 after ambient air sample A2 and in failing to discontinue the sample split, ran F1 with a 7:1 split by mistake. Also, soil gas sample M5 was lost due to a GC/MS system malfunction. The initial round of analyses included the above mentioned limited sample splitting activities in order to identify maximum mass loadings for each sample set (ambient air and soil gas) and to assign analytical splitting requirements for the remaining samples (avoiding detector saturation and GC/MS run abortion) at the same time maximizing analytical sensitivity.

In the second year, first quarter analytical effort, high levels of carbon dioxide had in a few cases obscured early eluting target compound peaks. To avoid this RTP recommended to RTL that a MS mass 44 scan delay be implemented. The mass 44 scan delay allowed for the analysis of all targeted compounds but may not allow for (semi-) quantitation of tentatively identified compounds with molecular weights less than or equal to 44. The laboratory report (Appendix D) provides a complete description of the analysis of samples. As a result of the scan delay, major data capture and confidence improvements for chloromethane, vinyl chloride, bromomethane, chloroethane and trichlorofluoromethane were made. Target ketones (acetone, 2-butanone, 2-hexanone and 4-methyl-2-pentanone) were tentatively identified when detected by using secondary ion matches at the expected retention time. This ID procedure was used with caution due to the lack of available confirmation ion ratios. Quantitation of the ketone levels detected are also considered estimates due to calibrations using the primary ion versus the sample using, in some cases, its secondary ion for identification. It should be noted that any ion ratio quantitation made with a single ion integration is much more accurate than a total ion quantitation as specified by the procedure used to calculate tentatively identified compounds (TICs). Also, vinyl acetate (a former target compound) and non targeted TICs with primary and secondary ion matches below mass 45 cannot be identified. This procedure was deemed acceptable by RTP given the significance of the early eluting compounds versus targeted ketones relative to AGC values and observed first year concentrations.

Ambient air high volume downwind sample A2 and soil gas well sample M39 were previously estimated to have the highest mass loadings of the ambient air and soil gas sample sets and therefore, were analyzed for breakthrough. Mass loading estimates were made relative to sampler position (downwind) and sample volume (high) for the ambient air samples. The maximum soil gas sample VOC mass loading was estimated by identifying the highest final total hydrocarbon reading (Micro-Tip) of all soil gas samples where moisture in the well was not suspect.

Separate front and back trap analyses on sample A2 revealed 56% trichlorofluoromethane, > 54% carbon disulfide and > 37% methylene chloride breakthrough. Until now, RTP has only encountered significant (> 25%) breakthrough levels for this program during the last field effort (Second Year, Third Quarter). In examining these levels, RTP has, as with the last effort, exhausted all possible laboratory analytical procedures and sampling activities which may have biased these values high (i.e. GC/MS system contamination/carry over, mislabeling, GC/MS malfunction, etc.). RTP has not identified a clear explanation for sample A2 breakthrough with the exception that the elevated humidity levels during these last two efforts caused preferential collection of moisture forcing these target compounds to find available sites on the back trap. Unfortunately, RTP was not notified of the Sample A2 breakthrough results and therefore, Sample A1 breakthrough analysis were not requested. As stated in the second year, third quarter report, in case of reoccurring breakthrough in the second year fourth quarter effort, RTP was to collect colocated EPA Method TO-14 SUMMA canisters for comparison to Sample A2/A3 ambient VOST sample results. This comparison is presented in Section 4.1.

Significant breakthrough, based on the Sample M39 target compound report was not observed. Carbon disulfide was reported at the detection limit in the M39 back trap, however, due to the lack of reporting confidence this was ignored. Also, because of a condensate recovery failure in the field, soil gas wells M13, M16 and M21 were resampled providing a duplicate sample for comparison. The comparison is presented in Section 4.2. The RTL and CCAS reports are presented in Appendix D.

4.0 DISCUSSION OF RESULTS

4.1 AMBIENT AIR CONCENTRATIONS

For the second year fourth quarter sampling event at the Old Bethpage Landfill, the ambient air concentrations at selected sites were monitored over a 24-hour period on August 23 and 24, 1993. The sites have been identified and the monitoring and analysis methods are 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 for the air samples collected at the Old Bethpage Landfill. These values are in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) and have been adjusted for flow volumes (as calibrated from the digital flow meter), temperature and barometric pressure. That is, samples A1, A2 and A4 are adjusted to total sample volumes of 991, 1040 and 1070 liters, respectively. Sample A3 was a low volume sample with a total sample volume of 82.3 liters. The table includes the lower quantitation limit for each sample. VOC concentration differences between A2 and A3 (co-located samplers) may be due to one or more of the following: variable and/or localized VOC releases and/or analytical inaccuracies inherent with sample splitting (Sample A2 only). All ambient air sample concentrations have been adjusted for trip and field blank concentrations.

The values presented for sampler A1 provide VOC concentrations that are considered background levels. Sampler A1 was positioned upwind of the landfill and meteorological observations during the entire sampling period indicate wind directions from the south and west. These data are presented in Appendix G. Meteorological monitoring data from atop the landfill (Appendix G) also indicate that samplers A2, A3 and the canisters were positioned downwind of the landfill during the entire sampling period.

As noted in Table 4.1, three target VOCs were measured to exceed the level of their assigned current (as of June 1991) annual guideline concentration (AGC) value at both upwind and downwind ambient air sampling locations. These were benzene, carbon tetrachloride and combined 1-ethyl-2-methylbenzene and 1-ethyl-4-methylbenzene. This single occurrence should not be interpreted as an exceedance of the ambient air guideline. Note that other target compounds may have existed in levels

TABLE 4.1
OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Fourth Quarter

AMBIENT AIR VOST SAMPLE RESULTS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE					BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION(1)	A1	A2	A3	A4	Canister	FB	TB	AGC	AGC
VOC COMPOUND NAME	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ng)		(ug/m3)	(ug/m3)
Benzene	<0.242	<0.298	1.25	<0.294	<0.733			0.12	100
Benzyl chloride (4)								0.02	16.7
Bromodichloromethane					NA			0.02	0.03(2)
Bromoform					NA			12	11.9(2)
Bromomethane									
Carbon Disulfide		<0.269			NA			7	100
Carbon Tetrachloride	<0.222	<0.218	0.668	<0.187				0.07	100
Chlorobenzene								20	1,170
Chloroethane								63,000	52,000
Chloroform								23	167
Chloromethane			2.07		0.715			770	2,100
3-Chloropropene (4)								7.1	10
Dibromochloromethane					NA			0.1	0.03(2)
1,2-Dibromoethane (4)								0.004	0.002
1,2-Dichlorobenzene (o)		<0.163						200	1,000
1,3-Dichlorobenzene (m)								200	714(2)
1,4-Dichlorobenzene (p)								700(2)	
Dichlorodifluoromethane (4)		<0.875			1.51				
1,1-Dichloroethane								500	9,524(2)
1,2-Dichloroethane								0.039	0.2
1,1-Dichloroethene								0.02	66.7
trans-1,2-Dichloroethene					NA			360	360(2)
1,2-Dichloropropane								0.15	833(2)
cis-1,3-Dichloropropene									
trans-1,3-Dichloropropene									
1,2-Dichloro-1,1,2,2-tetrafluoroethane (4)									
Ethylbenzene		<0.173		<0.140				1,000	1,450
1-Ethyl-2-methylbenzene					NA				
1-Ethyl-4-methylbenzene	<0.484	<0.885	0.753	<0.832	NA			0.1	0.03(2)
Hexachlorobutadiene (4)								0.05	0.8
Methylene Chloride		<0.203	0.450		<1.01			27	1,170
Styrene								510	716
1,1,2,2-Tetrachloroethane								0.02	23.2
Tetrachloroethene	<0.605	<0.731	0.826	<0.720				1.2(3)	1,120
Toluene	<1.53	<1.96	2.31	<2.26	<1.65			2,000	7,500
1,2,4-Trichlorobenzene (4)								9	133
1,1,1-Trichloroethane	<0.333	<0.385	1.14	<0.308	<1.09			1,000	38,000
1,1,2-Trichloroethane								0.06	150
Trichloroethene								0.45	900
Trichlorofluoromethane	<0.787	<1.31	5.10	<0.495	1.23			700	
1,1,2-Trichloro-1,2,2-trifluoroethane (4)		<0.318						90,000	90,476(2)
1,2,4-Trimethylbenzene (4)									
1,3,5-Trimethylbenzene (4)								290	
Vinyl Chloride								0.02	0.4
Xylenes (Total)	<1.03	<1.58	1.58	<1.42				300	1450(5)

TABLE 4.1
Continued

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Fourth Quarter

AMBIENT AIR VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE					BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION(1)	A1	A2	A3	A4	Canister	FB	TB	AGC	AGC
VOC COMPOUND NAME	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ng)		(ug/m3)	(ug/m3)
Acetone	<0.192	<0.225		<0.185	NA			14,000	35,600
Benzaldehyde					NA				
2-Butanone			0.802		NA			300	1,967
2-Chloroethyl Vinyl Ether					NA				
cis-1,2-Dichloroethene								1,900	1,880(2)
Freon 13					NA			530	133,333(2)
2-Hexanone					NA				
4-Methyl-2-Pentanone					NA			480	683

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE					BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION(1)	A1	A2	A3	A4	Canister	FB	TB	AGC	AGC
VOC COMPOUND NAME	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ng)		(ug/m3)	(ug/m3)
1,2,3-Trimethylbenzene	<0.333	<0.760		<0.879	NA				
2-Ethylhexanal		<0.189			NA				

(1) See Figure 2.1 for ambient air and soil gas sampling locations

A1: High volume ambient upwind sample collected 6 feet south of property line to golf course, 90 feet west of Round Swamp Road.

A2: High volume ambient downwind sample collected 180 feet southwest of the Air Stripper tower.

A3: Low volume ambient downwind (A2 duplicate) sample collected 180 feet southwest of the Air Stripper tower.

A4: High volume ambient downwind sample collected 100 feet north northwest of well M5.

Canister: Low volume (6 liter) ambient downwind (A2 and A3 duplicate) sample collected 180 feet southwest of the Air Stripper tower.

FB: Field Blank

TB: Trip Blank

(2) Proposed value.

(3) Current ambient air Annual Guideline Concentration (AGC) for tetrachloroethene as of November 1991.

(4) Ten of the SUMMA target compounds were not VOST target compounds therefore, reported values for any of the VOCs in the VOST analyses are provided as tentatively identified (see A2 dichlorodifluoromethane and 1,1,2-trichloro-1,2,2-trifluoroethane).

(5) 1450 total for ortho and para xylenes and 1450 total for meta xylene.

NA - Because of the Target Compound List discrepancy between the VOST and SUMMA canister methodologies some VOCs reported for VOST were not available (NA) for the SUMMA canister samples.

All values are reported as ug/m3 except for field blank (FB) and trip blank (TB) mass loading results reported as nanograms (ng).

Field and trip blanks apply only to VOST samples.

Shaded in values exceed the level of the current (as of June 1991 or November 1991 for tetrachloroethene) and/or previous AGC values.

All blank values are less than the lower quantitation limit. The lower quantitation limit for each sample is:

A1 = 0.128 ug/m3

A2 = 0.154 ug/m3

A3 = 0.243 ug/m3

A4 = 0.131 ug/m3

Canister = 0.2 ppbv or 1.01 ug/m3 (@ <MW>=123)

FB = 20 ng

TB = 20 ng

exceeding their assigned AGC value, yet may have gone "undetected" (below the lower quantitation limit) since the lower quantitation limits (from 0.128 to 0.243 for VOST and 1.01 ug/m³ for canisters) are greater, in some cases, than some target compound AGC limits ($\geq$ 0.004 ug/m³).

A comparison of ambient VOST to SUMMA canister results is presented in Table 4.2. For the best comparison of the VOST and SUMMA methods, a review of those compounds reported for each method above the detection limit (no < values) should be performed. Those compounds are chloromethane, 1,1,1-trichloroethane and trichlorofluoromethane. By establishing a concentration range with the A2 and A3 samples for each VOC, each SUMMA sample concentration falls within that range and/or falls within a reasonable deviation of either the A2 or A3 value. It should be noted that this is a limited data set and to adequately assign a proper evaluation of these methods more data would be required.

4.2 SOIL GAS CONCENTRATIONS

Soil gas concentrations were monitored on August 23 and 24 1993 at all selected soil gas well sites identified in the Consent Decree. Table 4.3 provides a summary of soil gas well VOC concentrations. These concentration values are reported in micrograms per cubic meter (ug/m³) of soil gas. The table also includes the lower quantitation limit for each sample. All soil gas sample concentrations were adjusted for field blank mass loadings.

There are no state or federal guidelines for permissible soil gas concentrations of VOC. For a relative comparison, Table 4.3 provides the AGCs for ambient air quality. The shaded values indicate soil gas concentrations that exceed the level of the current (as of June 1991) NYSDEC AGC for ambient air. A value in excess of the AGC should not be interpreted as an exceedance of the ambient air guideline since these are soil gas levels not ambient air concentrations.

As noted in Table 4.3, two target VOCs (tetrachloroethene and trichloroethene) were measured in excess of the level of the current ambient air (as of June 1991) AGC limit at several soil gas well locations. Tetrachloroethene levels exceeded current (as of June 1991) AGC value at soil gas wells F1, M2, M4, M9(10'), M9(20'), M9(30'), M9(40'), M13, M16, M21, M28, M31, M34, M37 and M39. Trichloroethene was measured in excess of the current ambient air (as of June 1991) AGC value

TABLE 4.2

**OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX**

Second Year, Fourth Quarter

**COMPARISON OF SUMMA CANISTER WITH AMBIENT VOST RESULTS
AND DUPLICATE SOIL GAS SAMPLE VOST RESULTS**

SUMMA CANISTER VS. AMBIENT VOST RESULTS

SAMPLE IDENTIFICATION(1) VOC COMPOUND NAME(2)	SUMMA (ug/m3)	A2 (ug/m3)	A3 (ug/m3)
Benzene	<0.733	0.26	1.2
Chloromethane	0.715	<0.12	2.07
Methylene Chloride	<1.01	<0.07	0.45
Toluene	<1.65	1.93	2.31
1,1,1-Trichloroethane	~1.09	0.37	1.14
Trichlorofluoromethane	1.23	1.29	5.1

DUPLICATE SOIL GAS SAMPLE RESULTS

SAMPLE IDENTIFICATION(1) VOC COMPOUND NAME(2)	M13 (ug/m3)	M13.2 (ug/m3)	M16 (ug/m3)	M16.2 (ug/m3)	M21 (ug/m3)	M21.2 (ug/m3)
Carbon disulfide	<10.2	11.5	4.04	<2.01	<10.2	<2.04
Tetrachloroethene	16.3	20.8	5.38	4.53	4.80	6.11
Trichloroethene	<1.02	2.60	<1.92	<2.01	<1.02	<2.04

(1) See Figure 2.1 for ambient air and soil gas sampling locations.

(2) Reported values only.

OLD LA THPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
Second Year, Fourth Quarter
SOIL GAS VOST SAMPLE RESULTS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	7.34	1.92	2.03	NA	2.00	1.96	2.04	1.98	1.98	**	1.92	**	1.98	1.92	1.90	1.87	2.01	2.01	AGC	AGC
VOC COMPOUND NAME																				
Benzene				NA						<1.02		<1.02							0.12	100
Benzyl chloride				NA						NA		NA							0.02	16.7
Bromodichloromethane				NA						<2.04		<2.04							0.02	0.03(1)
Bromoform				NA						<2.04		<2.04							12	11.9
Bromomethane				NA						<2.04		<2.04								
Carbon Disulfide		2.02		NA				2.18	2.18	<10.2	4.04	<10.2		6.44	4.86	3.55		2.11	7	100
Carbon Tetrachloride				NA						<2.04		<2.04							0.07	100
Chlorobenzene				NA						<1.02		<1.02							20	1,170
Chloroethane				NA						<1.02		<1.02							63,000	52,000
Chloroform			4.47	NA						<6.12		<6.12		9.62			4.51		23	167
Chloromethane				NA						<1.02		<1.02					62.2		770	2,100
3-Chloropropene				NA						NA		NA							7.1	10
Dibromochloromethane				NA						<2.04		<2.04							0.1	0.03(1)
1,2-Dibromoethane				NA						<2.04		<2.04							0.004	0.002
1,2-Dichlorobenzene (o)				NA						NA		NA							200	1,000
1,3-Dichlorobenzene (m)				NA						NA		NA							200	714(1)
1,4-Dichlorobenzene (p)				NA						NA		NA							700(1)	
Dichlorodifluoromethane(2)				NA					<1.58	NA		NA					17.4		500	9,524(1)
1,1-Dichloroethane				NA				3.17	<1.02	<1.02		<1.02							0.039	0.2
1,2-Dichloroethane				NA						<2.04		<2.04							0.02	66.7
trans-1,2-Dichloroethene				NA						<2.04		<2.04							360	360(1)
1,2-Dichloropropane				NA						<1.02		<1.02							0.15	833(1)
cis-1,3-Dichloropropene				NA						<1.02		<1.02								
trans-1,3-Dichloropropene				NA						<1.02		<1.02								
1,2-Dichloro-1,1,2,2-tetrafluoroethane				NA						NA		NA								
Ethylbenzene				NA						<2.04		<2.04							1,000	1,450
1-Ethyl-2-methylbenzene				NA						NA		NA								
1-Ethyl-4-methylbenzene				NA						NA		NA							0.1	0.03
Hexachlorobutadiene				NA						NA		NA							0.05	0.8
Methylene Chloride				NA						<10.2		<10.2							27	1,170
Styrene				NA						<2.04		<2.04							510	716
1,1,2,2-Tetrachloroethane				NA						<2.04		<2.04							0.02	23.3
Tetrachloroethene	18.3	3.75	11.2	NA		9.41	8.28	81.2	188	16.3	8.38	4.80		18.3	11.40	4.68	6.32	35.1	1.2(3)	1,120
Toluene				NA						<2.04		<2.04					2.31		2,000	7,500
1,2,4-Trichlorobenzene				NA						NA		NA							9.0	133
1,1,1-Trichloroethane				NA				3.56	10.9	2.45		2.45					2.81		1,000	38,000

SOIL GAS VOST SAMPLE RESULTS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	7.34	1.92	2.03	NA	2.00	1.96	2.04	1.98	1.98	**	1.92	**	1.98	1.92	1.90	1.87	2.01	2.01	AGC	AGC
VOC COMPOUND NAME																				
1,1,2-Trichloroethane				NA						<2.04		<2.04							0.06	130
Trichloroethene(4)				NA						<1.02		<1.02							0.45	900
Trichlorofluoromethane	56.9			NA						4.46		NA							700	
1,1,2-Trichloro-1,2,2-trifluoroethane(5)				NA						12.9		NA							90,000	90,476(1)
1,2,4-Trimethylbenzene				NA								NA								
1,3,5-Trimethylbenzene				NA								NA							290	
Vinyl Chloride				NA						<1.02		<1.02							0.02	0.40
Xylenes (Total)				NA						<2.04		<2.04							300	1,450(4)

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	7.34	1.92	2.03	NA	2.00	1.96	2.04	1.98	1.98	**	1.92	**	1.98	1.92	1.90	1.87	2.01	2.01	AGC	AGC
VOC COMPOUND NAME																				
Acetone										22.4		11.2							14,000	35,600
Benzaldehyde										NA		NA								
2-Butanone		47.1								<2.04		<2.04					12.0		300	1,967
2-Chloroethyl Vinyl Ether										NA		NA								
cis-1,2-Dichloroethene										<2.04		<2.04							1,900	1,880(1)
Freon 13										NA		NA							530	133,333(1)
2-Hexanone										<1.02		<1.02								
4-Methyl-2-Pentanone										<1.02		<1.02							480	683

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	7.34	1.92	2.03	NA	2.00	1.96	2.04	1.98	1.98	**	1.92	**	1.98	1.92	1.90	1.87	2.01	2.01	AGC	AGC
VOC COMPOUND NAME																				
1,2-Dibromo-1,1,2,2-tetrachloroethane(6)		<9.23	3.05																	
Hexachloroethane(6)		<9.23																		
alpha-Pinene													18.8							

All values are reported in micrograms per cubic meter (ug/m3).

All blank values are less than the lower quantitation limit reported for each sample.

Values in shaded areas exceed the level of the current (as of 6/91 or 11/91 for Tetrachloroethene) and/or previous ambient air Annual Guideline Concentration (AGC) values.

NA - Because of the Target Compound List (TCL) discrepancy between the SUMMA canister methodology and VOST TCL and differences between laboratories some compounds were not available for reporting. Also sample M5 was lost (not available) due to laboratory error.

(1) Proposed Value

(2) Dichlorodifluoromethane was tentatively identified in sample M9(40) coeluting with Xenon, therefore the level for Dichlorodifluoromethane was reported less than the total combined mass loading/concentration.

(3) Current AGC for Tetrachloroethene as of November 1991.

(4) Do

(5) Tentatively identified.

(6) Coelution of 1,2-Dibromo-1,1,2,2-tetrachloroethane and hexachloroethane was observed in sample M2, therefore the level for each compound was reported less than the total combined mass loading/concentration.

at soil gas well M9(40'). Note that since the lower quantitation limits exceed several AGCs, other wells may exceed AGC levels of 1,2 dichloroethane, tetrachloroethene, 1,1,2-trichloroethane, trichloroethene and other compounds with a low ($< 7.34 \text{ ug/m}^3$) AGC value. Unfortunately, larger soil gas volumes can not be extracted to improve the lower quantitation limits because of the volume limits within the wells.

A comparison of duplicate soil gas samples is presented in Table 4.2. Once again the best comparison is with detected VOC data for each pair and each well eg., tetrachloroethene. Reviewing data for all three duplicate well samples reveals only a maximum 22% deviation. When comparing the rest of the data where we have at least one detected VOC value per duplicate pair the maximum deviation appears to be 255%. Both values could differ due to sampling and analytical limitations and inaccuracies and the fact that the duplicate sample was sampled the following day under different meteorological conditions. In all, this limited data set suggests reasonable repeatability in the VOST sampling and analytical results. Also note that the duplicate M13.2 sample carbon disulfide and trichloroethene levels exceeded their corresponding AGC.

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 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, (2) southeast of the landfill between TGV-1 and LGV-9 and (3) south of the landfill at either F-6 or F-9. 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. Soil gas pressure readings were continued for the second year of monitoring on a quarterly basis.

The soil gas pressure measurements were conducted on August 23, 1993. A 10 inch inclined manometer, manufactured by Dwyer Instruments, Inc. was used to monitor soil gas pressures at each well. The 0-1 inch inclined portion is divided into 0.01 inch increments with the remaining portion (1-10 inches) marked in 0.1 inch increments. There are two soil gas pressure 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 1136 EDT and 1254 EDT on August 23, 1993. Table 5.1 provides a summary of the soil gas pressure tests. The pressure readings indicate that most pressure probes were under negative or zero pressure at the time of the test. However, the lower well at PW1 exhibited a slight positive pressure of 0.06 in. H₂O. Both upper and lower wells at PW3 had a substantial negative pressure.

The readings suggest that there continue to be problems at the PW2 (10 foot) pressure probe as stated in previous reports. The lower level at PW2, however, maintains a reasonable negative pressure. The readings at PW1 were positive indicating soil gas controls were not operative near PW1 during the time of the test.

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

**MONITORING PROTOCOLS AND
SAMPLING EQUIPMENT DESCRIPTIONS**

AMBIENT AIR SAMPLING PROTOCOL

1. Obtain pre-conditioned VOST tubes from analytical laboratory and refrigerate with blue ice in the shipping cooler. Prior to testing, inspect the condition of the 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 both a high flow (0.70 Lpm) and low flow (0.07 Lpm) Supelco rotameter and set the desired SKC sampling pump flowrate according to manufacturer's specifications.
 - o Attach precalibrated SKC sampling pump and additional battery pack to the exterior of the sampling cooler. For the low flow ambient air sampling train only, attach the two (2) SKC single stage universal flow controllers, in parallel, connecting the pre-set (0.07 Lpm) controller in line with the pump, low flow rotameter and sample line downstream of the sorbent traps.
 - o Install aluminum trap holder and partially fill the cooler (1/4 full) with ice.
 - o Close the cooler lid, cap the sample line inlet and transport the sampling assembly and VOST traps to the selected sampling site.
3. Remove a pair of VOST traps from the shipping container and follow USEPA VOST procedures augmented as follows. Label each trap shipping container with sample number/location. Using precleaned wrenches, install the traps in the modified VOST sampling train.
4. Monitor total VOC concentrations with the portable Photovac Micro-Tip (Micro-Tip) and determine the acceptability of the precalibrated flow rates. Adjust the flow rate according to the Micro-Tip reading. Reading of zero for total VOCs indicates that 1000 liter volume on high flow samples is appropriate. For readings greater than zero, adjust high flow rate sampling interval to accumulate no more than 100 ug of total VOC on a pair of sorbent traps.

5. Perform a system leak check by drawing a vacuum across the entire sampling train by capping the sample inlet. Turn on the pump. Pump failure should occur within 40 seconds. If not, identify and repair the air leak and repeat.
6. Remove cap from sample inlet, start the sampling event by turning on the SKC pump and record the starting time.
7. Examine the pump operation for proper cycling and record rotameter reading, elapsed time, sample location, sample ID and other observations such as Micro-Tip 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. Note elapsed and clock times for each observation.
9. At the conclusion of 24-hour sampling period, record sample elapsed and clock times and check sample lines, ice levels, Micro-Tip reading and record observations in the field log. Perform a system leak check as per Item 5 above and note results.
10. Open the sampler lid and remove VOST shipping tubes from the storage/shipping container. Remove the VOST traps, from the sampling train, wrench tighten VOST caps and place in the pre-labeled (Item 3) shipping tubes. Remove the impinger trap, pour contents into a clean septum vial and top off with HPLC water. Label and place in storage/shipping container. Place the VOST shipping tubes in an air freight container with manifest.
11. Disassemble the sampling trains, clean and return to storage.
12. Send the sampling traps and vials to laboratory for analysis.

SOIL GAS SAMPLING PROTOCOL

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

1. Inspect all soil gas wells for damage and/or leaks and cap. Assemble a soil gas sampling probe consisting of a precleaned stainless steel tube and teflon sampling line and substitute for ambient air probe calibrate a high flow (1.0 Lpm) supelco rotameter.
2. Transport the sampling tubes and sampling train to the field sampling locations.
3. Record the well site ambient VOC reading.
4. Remove the cap from sampling well, insert sampling probe connected to the Micro-Tip and draw sufficient volume of sample to clear lines and sampling probe and well. Record the average and highest VOC reading during line clearing procedure by using the Micro-Tip.
5. Using the last recorded VOC value, determine the sample volume that would effectively place 10 to 100 ug of total VOC's into the VOST traps.
6. Remove the VOST trap pair from the shipping container, label trap and shipping container with sample number and location. Reconnect the soil gas sample probe to the modified VOST unit.
7. Turn on the sampling pump with a 0.5 Lpm to 1.0 Lpm sample rate for 10 minutes if the Micro-Tip reading is zero or for calculated sampling rate and interval if the Micro-Tip provides a non-zero result. Record the starting time and any abnormalities onsite.
8. Record the sampling ending time/rotameter reading. Turn off pump. Record the ambient total VOC reading at the end of the test.
9. Remove the sample VOST traps as per the ambient air sampling procedure.

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

METEOROLOGICAL MONITORING PROTOCOL

1. Establish the weather conditions appropriate for conducting the ambient air and soil gas survey. (Falling atmospheric pressure, steady wind direction over 24-hour period, rainfall less than 30 percent chance).
2. Assemble the 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 the sites 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 the end of test period and remove equipment. Note all problems/conditions that could influence data accuracy, quality or test results.
6. Prepare a data base in a format suitable for inclusion in the ambient air/soil gas survey.

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. 102 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 $\pm 5\%$ 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 continuously for 1,440 minutes at 0.70 Lpm (nominal). A GEL CEL battery was connected in parallel to the pump battery to provide sufficient power for the 24-hour period. The planned sample was 1,000 liters. Low flow samplers were scheduled to run continuously for the 1440 minute test period. The desired total sample volume was 100 liters.

Pre-calibrated Supelco rotameters were used for visual flow checks during sampling. The Supelco rotameters were calibrated using an 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 sampling units when using the VOST traps.

PUMP CALIBRATOR

An SKC Model 712 Electronic Calibrator (Digital Film Flowmeter) was used to pre-calibrate the nominal flow rate for all Supelco rotameters for field use in determining the pump flow rates during sample collection.

The 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 for both the pump calibrator and Supelco rotameter is stated at $\pm 2\%$.

The operator calibrated the Supelco rotameters prior to the test. A pre and post calibration and a comparison check on the rotameters was completed.

METHOD T014

DETERMINATION OF VOLATILE ORGANIC COMPOUNDS (VOCs) IN AMBIENT AIR USING SUMMA® PASSIVATED CANISTER SAMPLING AND GAS CHROMATOGRAPHIC ANALYSIS

1. Scope

- 1.1 This document describes a procedure for sampling and analysis of volatile organic compounds (VOCs) in ambient air. The method is based on collection of whole air samples in SUMMA® passivated stainless steel canisters. The VOCs are subsequently separated by gas chromatography and measured by mass-selective detector or multidetector techniques. This method presents procedures for sampling into canisters to final pressures both above and below atmospheric pressure (respectively referred to as pressurized and subatmospheric pressure sampling).
- 1.2 This method is applicable to specific VOCs that have been tested and determined to be stable when stored in pressurized and sub-atmospheric pressure canisters. Numerous compounds, many of which are chlorinated VOCs, have been successfully tested for storage stability in pressurized canisters (1,2). However, minimal documentation is currently available demonstrating stability of VOCs in subatmospheric pressure canisters.
- 1.3 The organic compounds that have been successfully collected in pressurized canisters by this method are listed in Table 1. These compounds have been successfully measured at the parts per billion by volume (ppbv) level.

2. Applicable Documents

2.1 ASTM Standards

- D1356 - Definition of Terms Related to Atmospheric Sampling and Analysis
- E260 - Recommended Practice for General Gas Chromatography Procedures
- E355 - Practice for Gas Chromatography Terms and Relationships

2.2 Other Documents

- U.S. Environmental Protection Agency Technical Assistance Document (3) Laboratory and Ambient Air Studies (4-17)

3. Summary of Method

- 3.1 Both subatmospheric pressure and pressurized sampling modes use an initially evacuated canister and a pump-ventilated sample line during sample collection. Pressurized sampling requires an additional pump to provide positive pressure to the sample canister. A sample of ambient air is drawn through a sampling train comprised of components that regulate the rate and duration of sampling into a pre-evacuated SUMMA® passivated canister.
- 3.2 After the air sample is collected, the canister valve is closed, an identification tag is attached to the canister, and the canister is transported to a predetermined laboratory for analysis.
- 3.3 Upon receipt at the laboratory, the canister tag data is recorded and the canister is attached to the analytical system. During analysis, water vapor is reduced in the gas stream by a Nafion® dryer (if applicable), and the VOCs are then concentrated by collection in a cryogenically-cooled trap. The cryogen is then removed and the temperature of the trap is raised. The VOCs originally collected in the trap are revolatilized, separated on a GC column, then detected by one or more detectors for identification and quantitation.
- 3.4 The analytical strategy for Method T014 involves using a high-resolution gas chromatograph (GC) coupled to one or more appropriate GC detectors. Historically, detectors for a GC have been divided into two groups: non-specific detectors and specific detectors. The non-specific detectors include, but are not limited to, the nitrogen-phosphorus detector (NPD), the flame ionization detector (FID), the electron capture detector (ECD) and the photoionization detector (PID). The specific detectors include the mass spectrometer (MS) operating in either the selected ion monitoring (SIM) mode or the SCAN mode, or the ion trap detector. The use of these detectors or a combination of these detectors as part of an analytical scheme is determined by the required specificity and sensitivity of the application. While the non-specific detectors are less expensive per analysis and in some cases more sensitive than the specific detector, they vary in specificity and sensitivity for a specific class of compounds. For instance, if multiple halogenated compounds are targeted,

an ECD is usually chosen; if only compounds containing nitrogen or phosphorus are of interest, a NPD can be used; or, if a variety of hydrocarbon compounds are sought, the broad response of the FID or PID is appropriate. In each of these cases, however, the specific identification of the compound within the class is determined only by its retention time, which can be subject to shifts or to interference from other nontargeted compounds. When misidentification occurs, the error is generally a result of a cluttered chromatogram, making peak assignment difficult. In particular, the more volatile organics (chloroethanes, ethyltoluenes, dichlorobenzenes, and various freons) exhibit less well defined chromatographic peaks, leading to misidentification using non-specific detectors. Quantitative comparisons indicate that the FID is more subject to error than the ECD because the ECD is a much more selective detector for a smaller class of compounds which exhibits a stronger response. Identification errors, however, can be reduced by: (a) employing simultaneous detection by different detectors or (b) correlating retention times from different GC columns for confirmation. In either case, interferences on the non-specific detectors can still cause error in identifying a complex sample. The non-specific detector system (GC-NPD-FID-ECD-PID), however, has been used for approximate quantitation of relatively clean samples. The nonspecific detector system can provide a "snapshot" of the constituents in the sample, allowing determination of:

- Extent of misidentification due to overlapping peaks,
- Position of the VOCs within or not within the concentration range of anticipated further analysis by specific detectors (GC-MS-SCAN-SIM) (if not, the sample is further diluted), and
- Existence of unexpected peaks which need further identification by specific detectors.

On the other hand, the use of specific detectors (MS coupled to a GC) allows positive compound identification, thus lending itself to more specificity than the multidetector GC. Operating in the SIM mode, the MS can readily approach the same sensitivity as the

multidetector system, but its flexibility is limited. For SIM operation, the MS is programmed to acquire data for a limited number of targeted compounds while disregarding other acquired information. In the SCAN mode, however, the MS becomes a universal detector, often detecting compounds which are not detected by the multidetector approach. The GC-MS-SCAN will provide positive identification, while the GC-MS-SIM procedure provides quantitation of a restricted "target compound" list of VOCs.

The analyst often must decide whether to use specific or non-specific detectors by considering such factors as project objectives, desired detection limits, equipment availability, cost and personnel capability in developing an analytical strategy.

A list of some of the advantages and disadvantages associated with non-specific and specific detectors may assist the analyst in the decision-making process.

Non-Specific Multidetector Analytical System

Advantages

- o Somewhat lower equipment cost than GC-MS
- o Less sample volume required for analysis
- o More sensitive
 - ECD may be 1000 times more sensitive than GC-MS

Disadvantages

- o Multiple detectors to calibrate
- o Compound identification not positive
- o Lengthy data interpretation (one hour each for analysis and data reduction)
- o Interference(s) from co-eluting compound(s)
- o Cannot identify unknown compounds
 - outside range of calibration
 - without standards
- o Does not differentiate targeted compounds from interfering compounds

Specific Detector Analytical System

GC-MS-SIM

Advantages

- o positive compound identification
- o greater sensitivity than GC-MS-SCAN
- o less operator interpretation than for multidetector GC
- o can resolve co-eluting peaks
- o more specific than the multi-detector GC

Disadvantages

- o can't identify non-specified compounds (ions)
- o somewhat greater equipment cost than multidetector GC
- o greater sample volume required than for multidetector GC
- o universality of detector sacrificed to achieve enhancement in sensitivity

GC-MS-SCAN

- o positive compound identification - o can identify all compounds - o less operator interpretation - o can resolve co-eluting peaks	- o lower sensitivity than GC-MS-SIM - o greater sample volume required than for multidetector GC - o somewhat greater equipment cost than multidetector GC

The analytical finish for the measurement chosen by the analyst should provide a definitive identification and a precise quantitation of volatile organics. In a large part, the actual approach to these two objectives is subject to equipment availability. Figure 1 indicates some of the favorite options that are used as an analytical finish. The GC-MS-SCAN option uses a capillary column GC coupled to a MS operated in a scanning mode and supported by spectral library search routines. This option offers the nearest approximation to unambiguous identification and covers a wide range of compounds as defined by the completeness of the spectral library. GC-MS-SIM mode is limited to a set of target compounds which are user defined and is more sensitive than GC-MS-SCAN by virtue of the longer dwell times at the restricted number of m/z values. Both these techniques, but especially the GC-MS-SIM option, can use a supplemental general non-specific detector to verify/identify the presence of VOCs. Finally, the option labelled GC-multidetector system uses a

combination of retention time and multiple general detector verification to identify compounds. However, interference due to nearly identical retention times can affect system quantitation when using this option.

Due to the low concentrations of VOCs encountered in urban air (typically less than 4 ppbv and the majority below 1 ppbv) along with their complicated chromatograms, Method T0-14 strongly recommends the specific detectors (GC-MS-SCAN-SIM) for positive identification and for primary quantitation to ensure that high-quality ambient data is acquired.

For the experienced analyst whose analytical system is limited to the non-specific detectors, Section 10.3 does provide guidelines and example chromatograms showing typical retention times and calibration response factors, and utilizing the non-specific detectors (GC-FID-ECD-PID) analytical system as the primary quantitative technique.

4. Significance

- 4.1 VOCs enter the atmosphere from a variety of sources, including petroleum refineries, synthetic organic chemical plants, natural gas processing plants, and automobile exhaust. Many of these VOCs are acutely toxic; therefore, their determination in ambient air is necessary to assess human health impacts.
- 4.2 Conventional methods for VOC determination use solid sorbent sampling techniques. The most widely used solid sorbent is Tenax®. An air sample is drawn through a Tenax®-filled cartridge where certain VOCs are trapped on the polymer. The sample cartridge is transferred to a laboratory and analyzed by GC-MS.
- 4.3 VOCs can also be successfully collected in stainless steel canisters. Collection of ambient air samples in canisters provides (1) convenient integration of ambient samples over a specific time period, (e.g., 24 hours); (2) remote sampling and central analysis; (3) ease of storing and shipping samples; (4) unattended sample collection; (5) analysis of samples from multiple sites with one analytical system; and (6) collection of sufficient sample volume to allow assessment of measurement precision and/or analysis of

samples by several analytical systems. However, care must be exercised in selecting, cleaning, and handling sample canisters and sampling apparatus to avoid losses or contamination of the samples. Contamination is a critical issue with canister-based sampling because the canister is the last element in the sampling train.

- 4.4 Interior surfaces of the canisters are treated by the SUMMA® passivation process, in which a pure chrome-nickel oxide is formed on the surface. This type of vessel has been used in the past for sample collection and has demonstrated sample storage stability of many specific organic compounds.
- 4.5 This method can be applied to sampling and analysis of not only VOCs, but also some selected semivolatile organic compounds (SVOCs). The term "semivolatile organic compounds" is used to broadly describe organic compounds that are too volatile to be collected by filtration air sampling but not volatile enough for thermal desorption from solid sorbents. SVOCs can generally be classified as those with saturation vapor pressures at 25°C between 10^{-1} and 10^{-7} mm Hg. VOCs are generally classified as those organics having saturated vapor pressures at 25°C greater than 10^{-1} mm Hg.

5. Definitions

Note: Definitions used in this document and in any user-prepared Standard Operating Procedures (SOPs) should be consistent with ASTM Methods D1356, E260, and E355. All abbreviations and symbols within this method are defined at point of use.

- 5.1 Absolute canister pressure = $P_g + P_a$, where P_g = gauge pressure in the canister (kPa, psi) and P_a = barometric pressure (see 5.2).
- 5.2 Absolute pressure - Pressure measured with reference to absolute zero pressure (as opposed to atmospheric pressure), usually expressed as kPa, mm Hg or psia.
- 5.3 Cryogen - A refrigerant used to obtain very low temperatures in the cryogenic trap of the analytical system. A typical cryogen is liquid oxygen (bp -183.0°C) or liquid argon (bp -185.7°C).

Certificate of Analysis

Bottle Type & QA Level: B Level 1

Description : 40 mL Amber Vial

Lot No.: B2058010

Date: 3-5-92

VOLATILES QUALITY CONTROL ANALYSIS

This is to certify that this lot was tested and found to comply with Eagle-Picher Environmental Services specifications for this product.

Compound Analyzed	Quantity Found (no/bottle)
Chloromethane.....	<40.
Bromomethane.....	<40.
Vinyl Chloride.....	<40.
Chloroethane.....	<40.
Methylene chloride.....	<80.
Acetone.....	<200.
Carbon disulfide.....	<40.
1,1-Dichloroethene.....	<40.
1,1-Dichloroethane.....	<40.
cis-1,2-Dichloroethene.....	<40.
Chloroform.....	<40.
1,2-Dibromo-3-chloropropane.....	<40.
1,2-Dichloroethane.....	<40.
trans-1,2-Dichloroethene.....	<40.
2-Butanone.....	<200.
1,1,1-Trichloroethane.....	<40.
Carbon tetrachloride.....	<40.
Bromodichloromethane.....	<40.
1,2-Dichloropropane.....	<40.
cis-1,3-Dichloropropene.....	<40.
Trichloroethene.....	<40.
Dibromochloromethane.....	<40.
1,1,2-Trichloroethane.....	<40.
Benzene.....	<40.
1,2-Dichlorobenzene.....	<40.
1,3-Dichlorobenzene.....	<40.
1,4-Dichlorobenzene.....	<40.
trans-1,3-Dichloropropene.....	<40.
Bromoform.....	<40.
Bromochloromethane.....	<40.
4-Methyl-2-pentanone.....	<200.
2-Hexanone.....	<200.
Tetrachloroethene.....	<40.
Toluene.....	<40.
1,1,2,2-Tetrachloroethane.....	<40.
Chlorobenzene.....	<40.
Ethylbenzene.....	<40.
Styrene.....	<40.
Xylenes (total).....	<40.

NOTE: ppb = $\frac{\text{Quantity (in nanograms)}}{\text{Container volume (in mL)}}$

Approved:

Date : 3-5-92

EAGLE P P Picher

ENVIRONMENTAL SERVICES

36 B. J. TUNNELL BLVD. EAST • MIAMI, OKLAHOMA 74354-3300 • (800) 331-7425

Graseby Nutech-RTL

Client : RTP Environmental Assoc. INC
 Sample ID : can 21
 File ID : C:\HPCHEM\1\DATA\081193\0601016.D
 Analyzed : 12-Aug-93

Batch: 299
 Sampling volume : 500 ml
 Description : TO-14 Sim
 Calibration range : 0.2 - 10.0 ppbv

Compound name	Result	CAS Number	Flags
Dichlorodifluoromethane	Bql	75-71-8	
Chloromethane	Bql	75-87-3	
1,2-Dichloro-1,1,2,2-tetrafluoroethane	Bql	76-14-2	
Vinyl chloride	Bql	75-01-4	
Bromomethane	Bql	74-83-9	
Chloroethane	Bql	75-00-3	
Trichlorofluoromethane	Bql	75-69-4	
1,1-Dichloroethene	Bql	75-35-4	
Methylene chloride	Bql	75-09-2	
3-Chloropropene	Bql	107-05-1	
1,1,2-Trichloro-1,2,2-trifluoroethane	Bql	76-13-1	
1,1-Dichloroethane	Bql	75-34-3	
cis-1,2-Dichloroethene	Bql	540-59-0	
Chloroform	Bql	67-68-3	
1,2-Dichloroethane	Bql	107-06-2	
1,1,1-Trichloroethane	Bql	71-55-6	
Benzene	Bql	71-43-2	
Carbon tetrachloride	Bql	56-23-5	
1,2-Dichloropropane	Bql	78-87-5	
Trichloroethene	Bql	79-01-6	
cis-1,3-Dichloropropene	Bql	10061-01-5	
trans-1,3-Dichloropropene	Bql	10061-02-6	
1,1,2-Trichloroethane	Bql	79-00-5	
Toluene	Bql	108-88-3	
1,2-Dibromoethane	Bql	74-95-3	
Tetrachloroethene	Bql	127-18-4	
Chlorobenzene	Bql	108-90-7	
Ethylbenzene	Bql	100-98-4	
m,p-Xylene (isomer coelution: min. 0.4ppbv)	Bql	1330-20-7	
Styrene	Bql	100-42-5	
1,1,2,2-Tetrachloroethane	Bql	79-34-5	
o-Xylene	Bql	95-47-6	
4-Ethyltoluene	Bql	622-96-8	
1,3,5-Trimethylbenzene	Bql	108-67-8	
1,2,4-Trimethylbenzene	Bql	96-63-6	
Benzyl chloride	Bql	100-44-7	
1,3-Dichlorobenzene	Bql	541-73-1	
1,4-Dichlorobenzene	Bql	106-46-7	
1,2-Dichlorobenzene	Bql	95-50-1	
1,2,4-Trichlorobenzene	Bql	120-82-1	
Hexachlorobutadiene	Bql	87-68-3	

Bql = below quantifiable limit

Dilution factor = 1

Graseby Nutech-RTL

Client : RTP Environmental Assoc. INC
 Sample ID : can 23
 File ID : C:\HPCHEM\1\DATA\081193\0201015.D
 Analyzed : 12-Aug-93

Batch: 289
 Sampling volume : 500 ml
 Description : TO-14 Sim
 Calibration range : 0.2 - 10.0 ppbv

Compound name	Result	CAS Number	Flags
Dichlorodifluoromethane	Bql	75-71-8	
Chloromethane	Bql	75-87-3	
1,2-Dichloro-1,1,2,2-tetrafluoroethane	Bql	78-14-2	
Vinyl chloride	Bql	75-01-4	
Bromomethane	Bql	74-83-9	
Chloroethane	Bql	75-00-3	
Trichlorofluoromethane	Bql	75-69-4	
1,1-Dichloroethene	Bql	75-35-4	
Methylene chloride	Bql	75-09-2	
3-Chloropropene	Bql	107-05-1	
1,1,2-Trichloro-1,2,2-trifluoroethane	Bql	76-13-1	
1,1-Dichloroethane	Bql	75-34-3	
cis-1,2-Dichloroethene	Bql	540-59-0	
Chloroform	Bql	67-66-3	
1,2-Dichloroethane	Bql	107-06-2	
1,1,1-Trichloroethane	Bql	71-55-6	
Benzene	Bql	71-43-2	
Carbon tetrachloride	Bql	56-23-5	
1,2-Dichloropropane	Bql	78-87-5	
Trichloroethene	Bql	79-01-6	
cis-1,3-Dichloropropene	Bql	10061-01-5	
trans-1,3-Dichloropropene	Bql	10061-02-6	
1,1,2-Trichloroethane	Bql	79-00-5	
Toluene	Bql	108-88-3	
1,2-Dibromoethane	Bql	74-95-3	
Tetrachloroethene	Bql	127-18-4	
Chlorobenzene	Bql	108-90-7	
Ethylbenzene	Bql	100-98-4	
m,p-Xylene (isomer coelution: min. 0.4ppbv)	Bql	1330-20-7	
Styrene	Bql	100-42-5	
1,1,2,2-Tetrachloroethane	Bql	79-34-5	
o-Xylene	Bql	95-47-6	
4-Ethyltoluene	Bql	622-96-8	
1,3,5-Trimethylbenzene	Bql	108-67-8	
1,2,4-Trimethylbenzene	Bql	95-63-6	
Benzyl chloride	Bql	100-44-7	
1,3-Dichlorobenzene	Bql	541-73-1	
1,4-Dichlorobenzene	Bql	106-46-7	
1,2-Dichlorobenzene	Bql	95-50-1	
1,2,4-Trichlorobenzene	Bql	120-82-1	
Hexachlorobutadiene	Bql	87-68-3	

Bql = below quantifiable limit

Dilution factor = 1

RESEARCH TRIANGLE LABORATORIES

REMOTE SAMPLING CONTAINER

* see p.2 for Calb. Info. *swg 8/13/93*

INTRODUCTION

Containers have been successfully used to collect whole air samples for subsequent analysis of trace amounts of specific gases.

Collection of ambient air in canisters provides long term sampling capabilities, remote sampling and central analysis, ease of storing and shipping samples, unattended sample collection, analysis of numerous samples with one analytical system and collections of sufficient sample volume to allow multiple analyses.

Sub-atmospheric pressure canister sampling has been used as part of the U.S. EPA Toxics Monitoring Stations (TAMS), Urban Air Toxic Pollutant Program (UTAP), and the non-methane organic compound (NMOC) sampling and analysis program.

SUMMARY OF METHOD

The canister draws a sample of ambient air through components that regulate a rate of sampling into a pre-evacuated SUMMA® passivated container.

The canister is evacuated to within 3" Hg of -1 atmosphere. When the valve is opened for sampling, the differential pressure causes the sample to flow into the canister. This technique may be used to collect "grab samples" or time integrated samples through a 2 to 500 scc/min mechanically adjustable flow controller.

(NOTE: flowrates are constant, $\pm 2\%$, until approximately 4" Hg vacuum.)

After the air sample is collected, the canister valve is closed, the sampling "control tree" is detached, and an identification tag is attached to the canister. The canister is then transported to a predetermined laboratory for analysis.

(NOTE: Canister sampling should follow guidelines in EPA Compendium Method TO 14, included upon request.)

(CAUTION: Care must be exercised in selecting, cleaning and handling containers. Contamination is the most critical issue.)

COMPONENTS

A 6 liter stainless steel container, with pressure tested, leak free welded joints, electrochemically passivated by the SUMMA® process. Each canister has chromatographic grade stainless steel tubing, stainless steel components and SWAGELOK® fittings, and a custom NUPRO® valve.

The sampling "control tree" includes a -30" Hg to 30 psi vacuum gauge, a purge cross, a 2 micron particulate filter and an air-tight end cap.

SAMPLING SEQUENCE

- PRE-
1. Flowrate verified
 2. Canister evacuated, valve closed
 3. Sampling "control tree" attached
 4. Air tight end cap removed
 5. Canister valve opened
- POST-
1. Close valve
 2. Attach end cap
 3. Detach "control tree"
 4. Document and prepare canister for transport

CLEANING

Cleaning is done by Research Triangle Laboratories by the following method:

The canister and sampling control tree must be "clean" before each use. Typically, stainless steel control tree components are placed in a beaker of methanol in an ultrasonic bath for 15 minutes. The components are then rinsed with HPLC grade deionized water and dried in a vacuum oven at 100 °C for 12 to 24 hours. The assembled control tree should be purged with humid zero air for 24 hours.

Container cleaning follows the TO 14 schedule.

CALIBRATION

Remote Sampling Canisters are flowrate set for a flow of 25 scc/min at the factory. If another flowrate is desired, the following flowrate sequence is recommended:

Nupro valve to canister should be closed. Attach calibrator to 2 micron filter inlet. Remove end cap from "cross" connection downstream of flow controller. Attach pump to cross connection. With pump on, determine desired setting. Turn pump off, detach calibration setup. Remove vacuum pump, replace end cap.

* 8/13/93 gws

Calb. 12 cc/min @ -30 in.Hg : Scope to fill 6 L canister in 12 hour sampling event. Note: 8.3 should fill the canister but the orifice doesn't controll at the same rate when the can reaches 50% full (approaching ambient pressure). The 12 cc/min rate is only an estimate to nearly fill a can by 12 hours.

Wind Mark III Wind Sensors

- Low Threshold
- Low Cost
- Low Power CMOS Design
- Lightweight
- Optional External Heaters

Climatronics' Wind Mark III (WM-III) Wind Sensors combine accuracy and reliability with low cost.

The WM-III sensors meet Environmental Protection Agency's (EPA) Prevention of Significant Deterioration (PSD) requirements. They are also well suited for general wind monitoring applications.

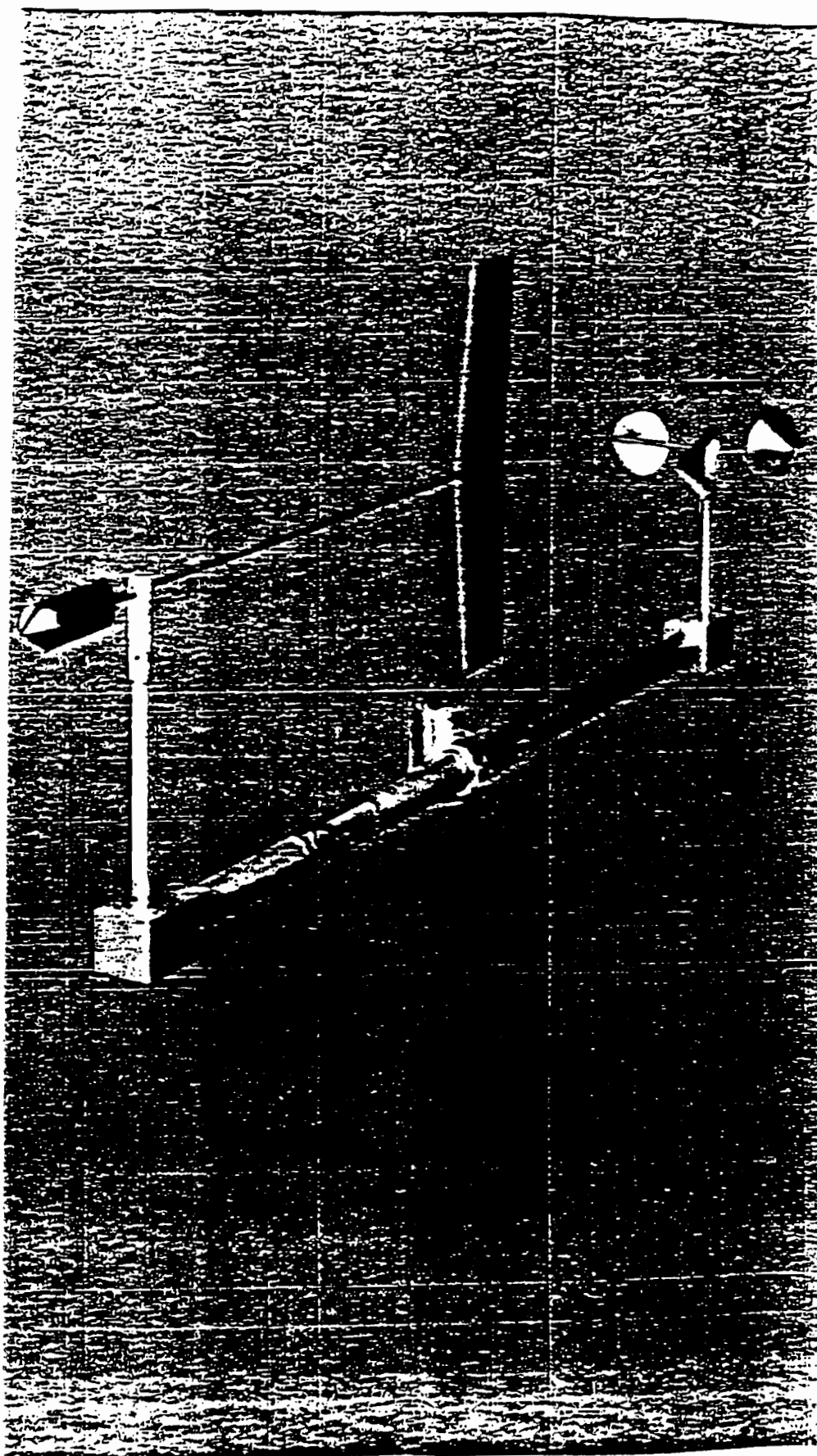
Wind speed is sensed by a three-cup anemometer and is converted to an electrical signal by a 20-kc photochopper, which uses a solid state light source for maximum reliability. Wind direction is sensed by a counterbalanced wind vane coupled to a precision, low-torque potentiometer. Both the wind speed and wind direction sensors use stainless steel precision ball bearings for maximum life and low threshold. Traceability to NBS is available as an option for each anemometer cup assembly by comparison testing against an NBS transfer standard in our wind tunnel test facility.

The sensors and their crossarm are an integral unit. The prewired crossarm mounts on a 3/4-inch IPS vertical pipe stub (1.05 inch O.D.). Orientation of the crossarm is along an East-West plane.

Optional external heaters for both sensors are available. These heaters consume approximately 40 watts of power and are thermostatically controlled.

The WM-III sensor is also available as a wind speed only (P/N 100108-1) or wind direction only (P/N 100108-2) instrument.

Recently, an improved, ruggedized aluminum cup (P/N 101286) and magnesium vane (P/N 101292) combination has been made part of the WM-III sensor package. The original stainless steel cups (P/N 100160) and vinylidene vane (P/N 100107) can still be provided as options. To safely transport the WM-III sensors with cups and vane, a transit case (P/N 100255) is available.



Signal conditioners for the WM-III sensors are available in modular form with a variety of full scale ranges, engineering units, outputs, and several other options. Please consult the Modular Meteorological System (MMS) and the Remote Meteorological System (RMS) bulletins for more details. The WM-III sensors are standard equipment in the Utility Wind System and the Electronic Weather Station (EWS). Please consult these bulletins for additional information.

SENSOR SPECIFICATIONS

PERFORMANCE	WM-III WIND SPEED	WM-III WIND DIRECTION
Accuracy	± 0.1 m/s (± 0.25 mph) or $\pm 1\%$	$\pm 3^\circ$
Threshold	< 0.45 m/s (< 1.00 mph)	< 0.45 m/s (< 1.00 mph)
Distance Constant	4.6m (15.0 ft.) of air max. 2.4m (8.0 ft.) of air max. - optional	4.6m (15.0 ft.) of air max. 2.4m (8.0 ft.) of air max. - optional
Damping Ratio		0.4 to 0.6 at 10° initial angle of attack
Operating Range	0-55 m/s (0-125 mph)	0° to 360° — mechanical 0° to 355° — electrical

ELECTRICAL SPECIFICATIONS

Signal Output	Nominal 2.0 Vpp into 4.7 K ohm, frequency proportional to wind speed, amplitude dependent on supply voltage	Variable DC voltage, magnitude proportional to wind direction.
Power Requirements*	6-12 Vdc at 1 mA nominal	Max. 5 mA through 2 K ohms

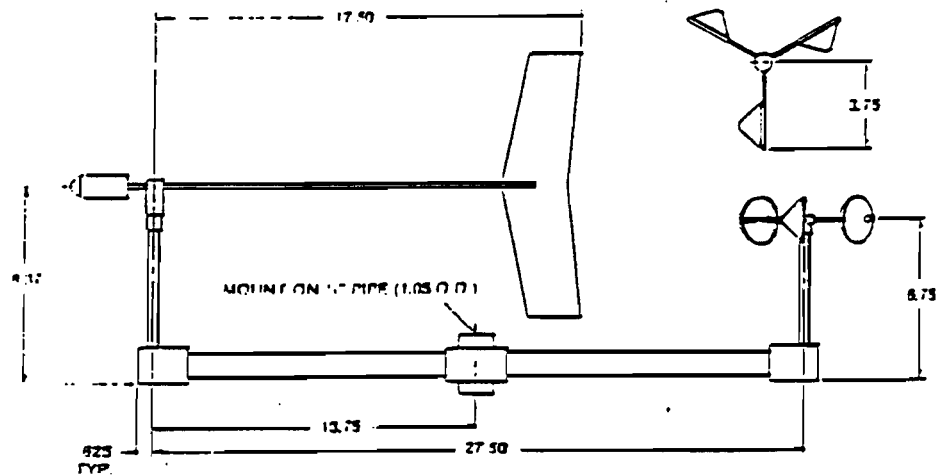
*Proper power provided by Climatronics' signal conditioner.

PHYSICAL SPECIFICATIONS

Weight	Less than 0.9 kg. (2 lbs.)	Less than 0.9 kg. (2 lbs.)
Turning Radius	9.5 cm (3.75 inch)	41.9 cm (17.5 inch)
Operating Temperature	-40° to 60° C (-40° to 140° F)	-40° to 60° C (-40° to 140° F)
Use with Signal Conditioner	P/N 100161 (MMS) P/N 100778 (RMS)	P/N 100161 (MMS) P/N 100779 (RMS)

SENSOR HEATER SPECIFICATIONS

Power Requirements	115 Vac, 60 Hz, 20 Watts per sensor	(P/N 101234)



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 30th Floor, New York, New York 10116
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 Cable: (516) 587-7585

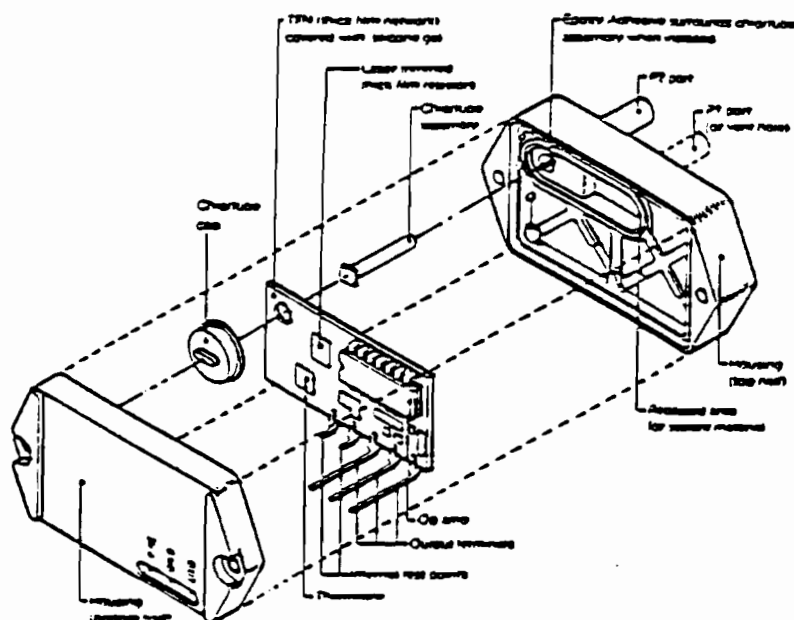
SOLID-STATE BAROMETRIC PRESSURE SENSOR

Climatronics' Solid-State Barometric Pressure Sensor (P/N 101448) uses a piezoresistive device to measure atmospheric pressure and is ideally suited to applications requiring exact measurement of pressure where the benefits of repeatability, low hysteresis and long-term stability are important. It offers state-of-the-art benefits of hybrid IC devices, including compactness, ruggedness, and reliability. Internal circuitry provides temperature compensation as an integral part of each device and is optimized on each unit as part of the calibration procedure.

The heart of the Solid-State Barometric Pressure Sensor is a small, square silicon chip with an integral sensing diaphragm and implanted piezoresistors. Pressure applied on the diaphragm causes it to flex, inducing a stress or strain in the buried resistors. The resistor values will change depending on the amount of pressure applied to the diaphragm. By providing a precisely-controlled reference voltage to the sensor's resistive network, an output voltage signal is produced which is proportional to the ambient pressure. Because of the unique construction, this output is very predictable, providing an ideal sensing element for barometric pressure sensors.

The range of this Solid-State Barometric Pressure Sensor is 600-1100mb. It can be used with Climatronics' modular signal conditioners or interfaced directly to a Remote Terminal Unit (RTU) for direct digital data acquisition.

EXPLODED VIEW



SPECIFICATIONS

Range	600mb to 1100mb (17.72" Hg. to 32.48" Hg.)
Accuracy (includes temperature, co- efficient, hys- teresis, and linea- rity)	±1.5mb
Resolution	Infinite
Temperature Range Compensated	-18°C to 63°C (0°F to 145°F)
Operating	-40°C to 85°C (-40°F to 185°F)
Elevation Range	Sea Level to 14,000 ft. Sea Level to 4265m
Input Voltage	+12 Vdc (nominal)
Output Voltage	1 to 5 Vdc
Power Required	0.18 Va
Size - Sensor Enclosure (Optional)	3"L x 2"W x 1½"H 7 1/8"L x 4½" W x 5 1/8" H



SENSOR SPECIFICATIONS — P/N 100108

WM-III Wind Speed

(P/N 100108-1)

Performance

Accuracy

± 0.11 m/s (0.25 mph) or $\pm 1.5\%$

Threshold

0.34 m/s (0.75 mph)

Distance Constant

4.6m (15.0 ft.) of air max.
2.4m (8.0 ft.) of air max. - optional

Damping Ratio

Operating Range

0-55 m/s (0-125 mph)

WM-III Wind Direction

(P/N 100108-2)

$\pm 2^\circ$

0.34 m/s (0.75 mph)

4.6m (15.0 ft.) of air max.
2.4m (8.0 ft.) of air max. - optional

0.4 to 0.5 at 10° initial angle of attack

0° to 360° — mechanical

0° to 540° — electrical

ELECTRICAL SPECIFICATIONS

Signal Output

Nominal 2.0 Vpp into 4.7 K ohm, frequency proportional to wind speed, amplitude dependent on supply voltage

Variable DC voltage, magnitude proportional to wind direction

Power Requirements

6-12 Vdc at 1 mA* nominal

Max. 5 mA through 2 K ohms*

*Proper power provided by translator module.

PHYSICAL SPECIFICATIONS

Weight

Less than 0.9 kg. (2 lbs.)

Less than 0.9 kg. (2 lbs.)

Turning Radius

9.5 cm (3.75 inch)

41.9 cm (16.5 inch)

Operating Temperature

-40° to 60° C (-40° to 140° F)

-40° to 60° C (-40° to 140° F)

Use with Translator

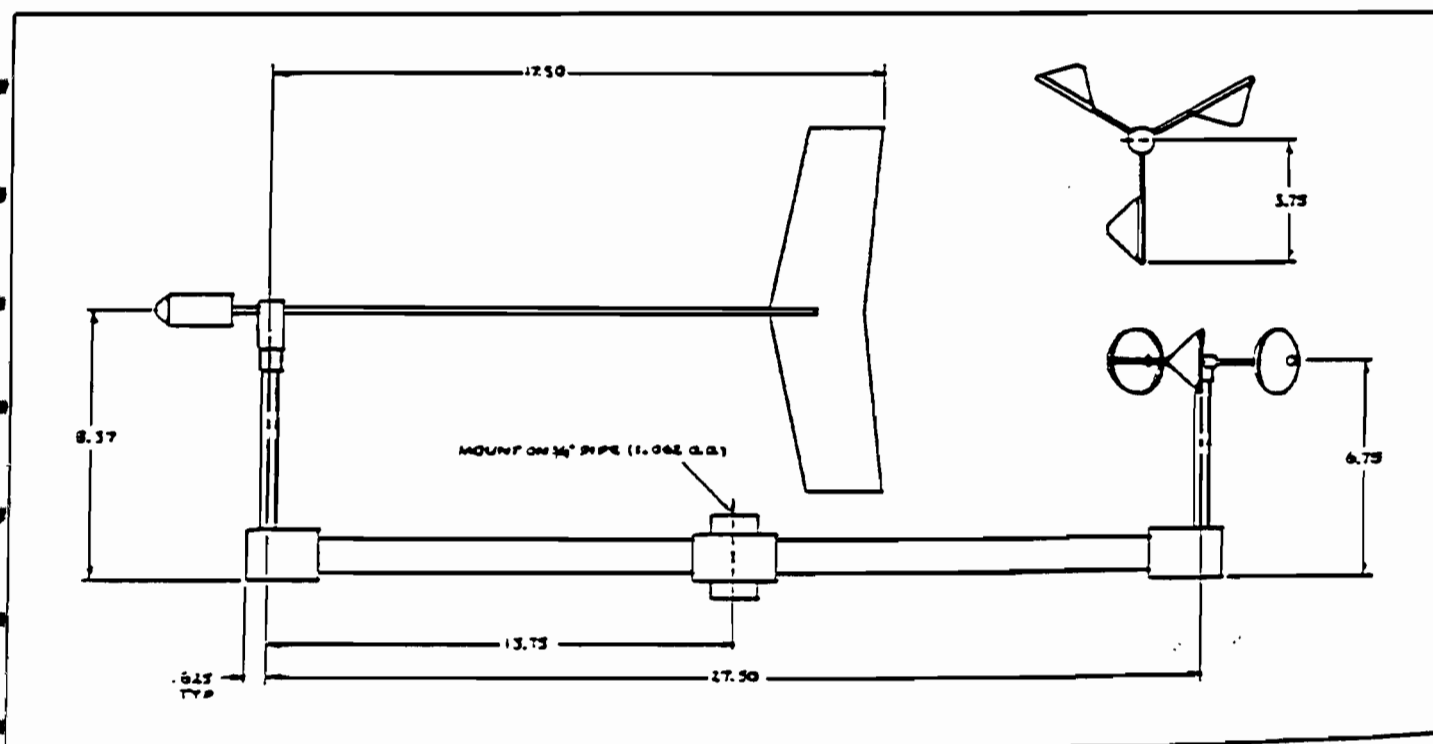
P/N 100163 (MMS)
P/N 100778 (RMS)

P/N 100163 (MMS)
P/N 100779 (RMS)

SENSOR HEATER SPECIFICATIONS

Power Requirements

P/N 101235 115 Vac; 60 Hz, 40 Watts per sensor





IMP-860 DATALOGGER

- o Direct sensor inputs
- o Control outputs
- o User programmable
- o Built-in data instruction set
- o Large internal data storage
- o Solid-state data cartridges
- o Phone line, dedicated line or radio telemetry
- o PC compatible
- o Low power
- o Choice of enclosures
- o Built-in surge protection

The IMP-860 Datalogger is an extremely versatile, state-of-the-art, digital data acquisition system designed for environmental monitoring applications. It can function as a remote, stand-alone station or can be operated with a central computer either by itself or in a network with other units.

Sensor inputs are accepted directly by the IMP-860, thereby eliminating the need for additional signal conditioning equipment. The signals will be processed as necessary, computations will be performed as required, and the data will be stored in internal memory for later retrieval by a remote computer or on a removable storage medium for manual retrieval.

User programming of the IMP-860 is easily accomplished using either an IBM PC-compatible computer or an operational, portable keyboard/display unit. A comprehensive set of programming instructions is included which allows a multitude of calculations to be performed on any desired channel, including interactions between channels. A standard program is available and can be modified by the user at any time.

The following electrical specifications are valid for an ambient temperature range of -25 °C to +50 °C unless otherwise specified.

ANALOG INPUTS

NUMBER OF CHANNELS: 12 single ended or 6 differential with any combination both were selectable

CHANNEL EXPANSION: Increments of 12 channels multiplexed through a single IMP-360 channel with the Model CAM32 Relay Scanner. Maximum of 5 CAM32s possible.

ACCURACY OF VOLTAGE MEASUREMENTS AND ANALOG OUTPUT VOLTAGES: 0.2% of FSR, 0.1% of FSR (0 to 40 °C).

RANGE AND RESOLUTION: Ranges are software selectable for any channel. Resolution for single ended measurements is twice the value shown.

Full Scale Range	Resolution
± 2.50 volts	333. microvolts
± 0.25 volts	33.3 microvolts
± 25.0 millivolts	3.33 microvolts
± 7.5 millivolts	1.00 microvolts
± 2.5 millivolts	0.33 microvolts

INPUT SAMPLE RATES: The fast or slow A/D conversion uses a 250 us or 16.666 ms signal integration time (16.666 ms is one AC power line cycle). Differential measurements include a second sampling with reversed input polarity to reduce thermal offset and common mode errors. Input sample rates are the time required to measure and convert the result to engineering units. Times do not include the self-calibration measurement which occurs once per instruction.

Fast single ended voltage: 2.4 ms
Fast differential voltage: 3.7 ms
Slow single ended voltage: 18.8 ms
Slow differential voltage: 37.0 ms
Fast dif. thermocouple: 8.3 ms

PUMP NOISE VOLTAGE:

Fast differential — 0.83 microvolts RMS
Slow differential — 0.10 microvolts RMS

COMMON MODE RANGE: ±2.5 volts.

DC COMMON MODE REJECTION: >140 dB.

NORMAL MODE REJECTION: 70 dB (60 Hz with slow differential measurement).

INPUT CURRENT: 3 nanoamps max.

INPUT RESISTANCE: 200 gigaohms.

EXCITATION OUTPUTS

DESCRIPTION: The unit has 3 switched excitations, active only during measurement, with only one output active at any time. The off state is high impedance.

RANGE: ±2.5 volts.

RESOLUTION: 0.67 millivolts.

ACCURACY: Same as voltage input.

OUTPUT CURRENT: 20 mA @ ± 2.5 V, 35 mA @ ± 2.0 V, 50 mA @ ± 1.5 V.

FREQUENCY SWEEP FUNCTION: A swept frequency square wave output between 0 and 2.5 volts is provided for vibrating wire transducers. Timing and frequency range are specified by the instruction.

PERIOD AVERAGING MEASUREMENTS

DEFINITION: The time period for a specified number of cycles of an input frequency is measured, then divided by the number of cycles to obtain the average period of a single cycle.

INPUTS: Any single ended analog channel with configuration defined in the user program. Signal dividing may be required to eliminate interference with measurements on adjacent channels.

INPUT FREQUENCY RANGE:

Range Code	Preamplifier Gain	Input Hysteresis	Maximum Frequency
4	1	10 mV	200 kHz
3	10	1 mV	50 kHz
2	33	300 uV	20 kHz
1	100	100 uV	8 kHz

REFERENCE ACCURACY: ±20 ppm.

RESOLUTION: ±50 nanoseconds divided by the number of cycles measured. Resolution is reduced by signal noise and for signals with a slow transition through the zero voltage threshold.

TIME REQUIRED FOR MEASUREMENT: Signal period times the number of cycles measured plus 1.5 cycles; minimum measurement time is 2 ms.

RESISTANCE AND CONDUCTIVITY MEASUREMENTS

ACCURACY: 0.015% of full scale bridge output, limited by the matching bridge resistors. The excitation voltage should be programmed so the bridge output matches the full scale input voltage range.

MEASUREMENT TYPES: 5 wire and 4 wire full bridge; 4 wire, 3 wire, and 2 wire half bridge. Bridge measurements are ratio-metric and dual polarity to eliminate thermal emfs. AC resistance measurements use a dual polarity 750 us excitation pulse for ionic depolarization, with the signal integration occurring over the last 250 us.

PULSE COUNTERS

NUMBER OF PULSE COUNTER CHANNELS: 2 eight bit or 1 sixteen bit selectable.

MAXIMUM COUNT RATE: 2000 Hz, eight bit counters; 250 kHz, sixteen bit counters. Pulse counter channels scanned at 8 Hz.

MODES: Switch closure, high frequency pulse, and low level AC.

SWITCH CLOSURE MODE

Minimum Switch Closed Time: 5 ms.
Minimum Switch Open Time: 8 ms.
Maximum Bounce Time: 1 ms open with-out count.

HIGH FREQUENCY PULSE MODE

Minimum Pulse Width: 2 us.
Maximum Input Frequency: 250 kHz.
Voltage Threshold: Count upon transition from below 1.5 V to above 1.5 V.
Maximum Input Voltage: ±20 V.

LOW LEVEL AC MODE

Typical of magnetic pulse flow sensors, selected anemometers, etc.)

Min. AC Input Voltage: 5 mV RMS.
Input Hysteresis: 11 mV.
Max. AC Input Voltage: 20 V RMS.

Frequency Range:

AC Input (RMS)	Range
20 millivolts	1 Hz to 100 Hz
50 millivolts	0.5 Hz to 400 Hz
150 millivolts to 20 V	0.3 Hz to 1000 Hz

(Consult factory if higher frequencies are desired.)

DIGITAL I/O PORTS

3 ports, software selectable as binary inputs or control outputs.

OUTPUT VOLTAGES (no load):

high — 5 V ± 0.1 V; low — < 0.1 V.

OUTPUT RESISTANCE: 500 ohms.

INPUT STATE: high — > 3 V; low — < 0.3 V.

INPUT RESISTANCE: 100 kohms.

TRANSIENT PROTECTION

All input and output connections to the IMP-360 module are protected using RC filters or trans-zeros connected to a heavy copper bar between the circuit card and the case. The IMP-360 Wiring Panel includes additional spark gap and transzero protection.

CPU AND INTERFACE

PROCESSOR: Hitachi 6303.

MEMORY: 32k ROM, 16k RAM expandable to 64k.

DISPLAY: 8 digit LCD (0.5" digits).

PERIPHERAL INTERFACE: 9 pin D-type connector for keyboard/display, storage module, cassette, modem, printer, and RS232 adapter. Baud rates selectable at 300, 1200, 9600, and 76,800.

CLOCK ACCURACY: ±1 minute per month.

MAXIMUM PROGRAM EXECUTION RATE:

System tasks initiated in sync with real-time up to 64 Hz. One measurement with tape transfer is possible at this rate without interruption.

SYSTEM POWER REQUIREMENTS

VOLTAGE: 9.6 to 16 volts.

TYPICAL CURRENT DRAIN: 0.5 mA quiescent, 13 mA during processing, and 35 mA during analog measurement.

BATTERIES: 7.5 Ahr alkaline D-cells or 5 Ahr rechargeable lead acid batteries, standard.

PHYSICAL SPECIFICATIONS

SIZE: 7.5" x 3.5" x 1.5"; 9" x 3.5" x 2.9" with IMP-360 Wiring Panel. Input connectors extend length 0.15".

WEIGHT: 2 lbs.

WARRANTY

Two years against defects in materials and workmanship.



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PRECIPITATION GAUGES

- RELIABLE AND ACCURATE
- TIPPING AND WEIGHING BUCKETS
- ENGLISH OR METRIC MEASURE
- OPTIONAL ELECTRIC/PROPANE HEAT

Climatronics offers a variety of precipitation gauges, which are all accurate and durable. Models are available for both AC and DC powered systems, with or without heaters.



Tipping Bucket Gauges are available with screened funnels of 6 or 8-inch diameter. Precipitation is channeled to a triangular bucket which tips for every 0.01 inch of water collected. When the bucket empties it activates a sealed reed switch; which sends an event message to the signal conditioner. Upon tipping, the accumulated water is drained.

Both tipping bucket sensors can be provided with optional electric heaters for AC powered systems. In addition, the 8 inch version can accommodate a propane heater for DC powered systems. The heaters prevent data loss during freezing conditions and melt snow so the water content may be measured by the tipping bucket. Either type of gauge is easy to install; requiring a level piece of ground that is free from obstruction. Signal conditioners are available in modular form with an input range of 0-1 inch (0-2.5 cm) or 0-10 inch (0-25 cm), corresponding standard output ranges of 0-1 or 0-5 Vdc.

A wind shield is available to prevent undue turbulence near the sensor funnel, insuring a representative data capture.

SENSOR SPECIFICATIONS

	<u>*6" Tipping Bucket</u> <u>P/N 100508</u>	<u>**8" Tipping Bucket</u> <u>P/N 100097</u>
ACCURACY	±1% up to 7.5 cm/hr (3 inch/hr.)	±3% for rain rates of 2.54 to 15.24 cm/hr (1 to 6 inch/hr.)
	±5% up to 25 cm/hr (10 inch/hr)	
RESOLUTION (Sensitivity)	0.025 cm (0.01 in.)	0.025 cm (0.01 in.)

ELECTRICAL SPECIFICATIONS

	<u>*6" Tipping Bucket</u> <u>P/N 100508</u>	<u>**8" Tipping Bucket</u> <u>P/N 100097</u>
POWER REQUIREMENTS (Without Heat)	1 None	1 None
OUTPUT	Switch Closure	Switch Closure
CONTACT RATING	2 amps @ 12 Vdc	3 amps @ 50 Vdc

PHYSICAL SPECIFICATIONS

	<u>*6" Tipping Bucket</u> <u>P/N 100508</u>	<u>**8" Tipping Bucket</u> <u>P/N 100097</u>
SIZE	26.0 H x 15.9 cm Dia. (10.25 H x 6.25 in Dia.)	46.3 H x 20.3 cm Dia. (18.25 H x 8 in Dia.)
WEIGHT	1.1 Kg (2.5 lbs)	11.4 Kg (25 lbs)
OPERATING TEMPERATURE (Heated)	-40°C to +60°C (-40°F to +140°F)	-40°C to +60°C (-40°F to +140°F)
USE WITH SIGNAL CONDITIONER	P/N 100747 (MMS) P/N 100840 (RMS)	P/N 100747 (MMS) P/N 100840 (RMS)

- 1 Power supplied by Signal Conditioner
- * Electric Heat Available, 40 watts
- ** Electric and Propane Heat Available
(Electric Heat, 200 watts)



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APPENDIX C

CHRONOLOGY

AMBIENT AIR, SOIL GAS AND WELL PRESSURE SAMPLING EVENTS

CHRONOLOGY - AMBIENT AIR SAMPLING

SAMPLE 2-4A1

- **AUGUST 23, 1993** Started sampler A-1 using pump A and rotameter R1 at 1022 EDT. The nominal flow rate was 0.7 liters per minute (lpm). The sampler was programmed to run 1440 minutes continuously for 24 hours. The sampling location was A1 as shown in Figure 2.1. This location is outside the landfill property, six (6) feet south of the gold course property line and approximately ninety (90) feet from Round Swamp Road. This was an upwind high volume (1,000 liter) sample. The initial ambient VOC concentration was 0.0 ppm, and the initial rotameter reading was 90 units. A leak check was performed before sampling, and no leak was found. A maximum and minimum thermometer was set inside the sampler to record the temperature change.

The operator checked the sampler seven times (1112 EDT, 1238 EDT, 1348 EDT, 1437 EDT, 1730 EDT, 1926 EDT and 2228 EDT) and the rotameter readings were 88, 85, 83.5, 80, 79 and 79 units with the total elapse times of 49, 136, 212, 256, 428, 544 and 725 minutes, respectively.

- **AUGUST 24, 1993** The operator checked the sampler four times (0112 EDT, 0512 EDT, 0807 EDT and 1022 EDT) and the rotameter readings were at 78, 77, 79 and 80 units with the total elapse times of 891, 1130, 1306 and 1440 minutes, respectively. The pump operation was normal during the whole sampling period. No unusual events were noted. The sampler was removed from service at 1022 EDT with the total elapse time of 1440 minutes. The ambient VOC reading was 0.0 ppm. The recorded maximum and minimum temperatures inside the sampling cooler were 66°F and 44°F, respectively. The condensate impinger contained 5.9 ml of condensate that was collected as sample 2-4A1-C.

SAMPLE 2-4A2

- **AUGUST 23, 1993** Sampler A-2 began sampling at 917 EDT. Pump C was used along with R1. The sampling location was A2 which is 180 feet southwest of the air stripper. The nominal flow rate was 0.7 lpm. The initial rotameter reading was 90 units. The pump was programmed to run 24 hours continuously to collect a 1000 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. The leak check was approved before the sampler was started. This was a high volume, downwind ambient sample.

The operator checked the sampler eight times (1055 EDT, 1218 EDT, 1305 EDT, 1420 EDT, 1459 EDT, 1714 EDT, 1850 EDT and 2121 EDT) and the rotameter readings were 89, 85, 86, 86, 85, 85, 85 and 84 units with total elapsed times of 99, 181, 229, 303, 342, 477, 573 and 743 minutes, respectively. No unusual events were noted.

- **AUGUST 24, 1993** The operator checked the sampler four times (0046 EDT, 0447 EDT, 0822 EDT and 917 EDT) and the rotameter readings were 80, 79, 80 and 83 units with total elapsed times of 929, 1170, 1385 and 1440 minutes, respectively. The sampler was removed from service according to the established protocol at 0917 EDT with a total elapse time of 1440 minutes. The recorded maximum and minimum temperatures within the A-2 sampler was 64°F and 44°F, respectively. The condensate impinger in the sampler contained 6.4 ml of condensate that was collected as sample 2-4-A2-C.

SAMPLE 2-4A3

- **AUGUST 23, 1993** The A-3 sampler was started at 0928 EDT with pump D and R2. This was a low volume, downwind sample. The nominal flow rate was 0.070 lpm and the nominal sample volume was 100 liters. The sample location was also southwest of the air stripper, next to Samplers A-2. The inlet line was situated approximately two inches from the A-2 sampler inlet line. The initial ambient VOC concentration was 0.0 ppm. The initial rotameter reading was 50 units. A leak check was performed before the sampler was started and all connections were leak free.

The operator checked the sampler eight times (1100 EDT, 1219 EDT, 1306 EDT, 1421 EDT, 1501 EDT, 1716 EDT, 1852 EDT and 2142 EDT) and the rotameter readings were 50, 48, 48, 50, 46, 48, 49 and 52 units with total elapsed times of 92, 171, 217, 293, 332, 468, 564 and 733 minutes, respectively. No problems were observed.

- **AUGUST 24, 1993** The operator checked the sampler three times (0047 EDT, 0448 EDT and 0456 EDT) and the rotameter readings were 54, 50 units and the third was unavailable with the elapsed times of 918, 1160 and 1178 minutes, respectively. The sampler had stopped at 0456 EDT with a total elapsed time of 1178 minutes. The recorded maximum and minimum temperatures inside the sampler were 66°F and 43°F, respectively. No condensate was recovered.

SAMPLE 2-4A4

- **AUGUST 23, 1993** Sampler A-4 was positioned inside the landfill across from the M9 clusterwell approximately 100 feet west of the air stripper, as shown on Figure 2.1. This was a second upwind highflow sample. It was started at 0956 EDT. Pump E was programmed to run at a nominal flow rate of 0.7 Lpm for 1440 minutes over 24 hours to collect 1000 liters of sample. R1 was utilized. A leak check was performed before the sampler was started and no leakage was observed. Maximum and minimum thermometer was placed inside the sampler. The rotameter reading was 90 units at the beginning of the test. Micro-Tip meter indicated an initial ambient VOC concentration of 0.0 ppm.

The operator checked the sampler seven times (1024 EDT, 1258 EDT, 1412 EDT, 1449 EDT, 1701 EDT, 1905 EDT and 2212 EDT) and the rotameter readings were 91, 90, 93, 92, 92, 88 and 86 units at total elapsed times of 88, 176, 251, 292, 425, 549 and 735 minutes, respectively.

- **AUGUST 24, 1993** The operator checked the sampler four times (0058 EDT, 0458 EDT, 0840 EDT and 0956 EDT) and the rotameter readings were 83, 80, 82 and 82 units at the total elapsed times of 902, 1142, 1364 and 1440 minutes, respectively.

The unit was taken out of service at 956 EDT according to established protocols. The recorded pump total elapse time was 1440 minutes. The final ambient VOC concentration was 0.0 ppm. The recorded maximum and minimum temperatures inside the sampler were 66°F and 45°F, respectively. The condensate impinger inside the sampler contained 5.8 ml of condensate that was collected as Sampler 2-4-A4-C.

TO-14-21

- **AUGUST 23, 1993** Passivated sampling canister #21 was positioned SW of the air stripper next to samplers A2 and A3. This was the first downwind sampler using the TO-14 method. Sampling started at 0923 EDT. The initial ambient VOC concentration was 0.0 ppm. The operator checked the sampler seven times (1057 EDT, 1201 EDT, 1312 EDT, 1420 EDT, 1505 EDT, 1720 EDT and 1854 EDT) and the negative pressure readings were 27, 25, 19.5, 16.5, 15, 9 and 5 inches of Hg at total elapsed times of 94, 158, 279, 297, 342, 477 and 571 minutes, respectively.

TO-14-23

- **AUGUST 24, 1993** Passivated sampling canister #23 was positioned SW of the air stripper next to samplers A2 and A3. This was the second downwind sampler using the TO-14 method. Sampling started at 0045 EDT with an initial negative pressure of 30 inches of Hg. The operator checked the sampler four times (0449 EDT, 0825 EDT, 0935 EDT and 1047 EDT) and the negative pressure readings were 18, 9, 5 and 4.5 inches of Hg at total elapsed times of 244, 460, 530 and 602 minutes, respectively.

CHRONOLOGY - SOIL GAS SAMPLING

AUGUST 23, 1993 OBSERVATIONS

- **SAMPLE 2-4F1** Sample 2-4F1 was collected from well F1 (30"deep) located inside the Firemans' Training Center about eight feet away from a fenced subsurface vault. Pump B and rotameter three (R3) were used with sampling line #1. The nominal flowrate was 1.0 Lpm and the nominal sample volume was 10 liters. The initial ambient VOC concentration was 0.0 ppm. The initial well VOC reading was 0.0 ppm. The well was evacuated for 30 seconds to pull a full well volume of stagnant air prior to sampling. Sampling started at 1041 EDT with an initial rotameter reading of 120 units at the bottom of the ball. A leak check was performed prior to the sampling and all connection lines were fine.

Sampling stopped at 1051 EDT as scheduled. The final rotameter reading was 122 units. The final ambient air and well VOC readings were 0.0 ppm and 0.0 ppm, respectively. The operators observed trucking activity approximately 600 feet away.

- **SAMPLE 2-4M2** Sample 2-4M2 was collected between 1107 EDT and 1117 EDT from well M2 (30"deep). This well was located next to the landfill property along the west side of Winding Road. Pump B, R3 and sampling line #2 were used. The nominal flowrate was 1.0 Lpm and the initial rotameter reading was 110 units. A leak check was performed prior to sampling and all connection lines were fine. Initial ambient air, sample inlet line and well VOC readings were taken and all were found to be 0.0 ppm. The final rotameter reading was 113 units. Both final ambient air and well VOC concentrations were 0.0 ppm. The samplers observed that the well was easily retractable from the ground.

- **SAMPLE 2-4M4** Sample 2-4M4 was collected from the 30" deep soil gas well M4 located along the east side of Winding Road. Pump B, R3 and sampling line #3 were used with a nominal flowrate of 1.0 Lpm to collect 10 liters of sample. A leak check was performed as part of the procedure. Initial VOC concentrations were measured for ambient air, inlet line and well; all readings were 0.0 ppm.

Sampling started at 1155 EDT and lasted for 10 minutes as scheduled. The final ambient air and well VOC concentrations were measured again and the results were 0.0 ppm.

- **SAMPLE 2-4M5** Sample 2-4M5 was collected from well M5, a 30" deep well located west of Winding Road east of the landfill. Pump B and R3 were used. The nominal flowrate was 1.0 Lpm. Initial ambient air, inlet line and well VOC concentrations were taken and all readings were 0.0 ppm. After the leak check, the sampler was started at 1225 EDT.

The sampler was stopped at 1235 EDT. During the sampling period the rotameter reading increased from 110 to 113 units. The final ambient air and well VOC readings were 0.0 ppm. Trucking activities were observed during the sampling.

- **SAMPLE 2-4M6** This sample was taken from soil gas well M6 (30"deep) located on the east side of Winding Road east of the landfill about 60 feet north of M4. Pump B, R3 and sampling line #2 were used. The nominal flowrate was 1.0 Lpm. The initial ambient air VOC concentrations were all 0.0 ppm. The system leak check passed and sampling started at 1252 EDT and lasted for 10 minutes. The initial rotameter reading was 110 units.

The final ambient VOC concentration was 0.0 ppm. The final rotameter reading was 112 units. The final well VOC reading was 0.0 ppm.

- **SAMPLE 2-4M13** This sample was collected from well M13 (30"deep). This well was located east of Winding Road. Pump B and R3 were used. The initial ambient air, inlet line and well VOC readings were all 0.0 ppm. The nominal flowrate and volume were 1.0 Lpm and 10 liters, respectively. A leak check was conducted and all connections were fine. Sampling started at 1528 EDT and the initial rotameter reading was 109 units.

Sampling ended at 1538 EDT. The final rotameter reading was 110 units. The final ambient air and well VOC concentrations were 0.0 ppm. The maximum temperature inside the sampler was 64°F. The operators detected a horse manure odor coming from the stables and a large amount of dust that had risen from the surrounding area.

- **SAMPLE 2-4M16** Sample 2-4M16 was collected between 1552 EDT and 1602 EDT from the 30" deep well M16 located on the west side of Winding Road, east of the landfill. Pump B and R3 were used with 1.0 Lpm nominal flowrate to collect 10 liters of sample. A leak check was performed. Initial ambient, inlet line and well VOC concentrations were all 0.0 ppm. The rotameter initial reading was 110 units.

Final ambient air and well VOC readings were both 0.0 ppm. A new sampling line was used for this test. A new battery had been replaced into the Micro-tip prior to initial detection procedure.

- **SAMPLE 2-4M21** This sample was collected from well M21 (30" deep) located on the west side of the landfill, east of Claremont Road. Pump B and R3 were used. A leak check was performed before sampling. The nominal flowrate was 1.0 Lpm and the nominal sample volume was 10 liters. The initial ambient air and well VOC readings were 0.0 ppm.

The collection started at 1615 EDT and ended at 1625 EDT. During the 10 minute sampling period, the initial and final rotameter readings were 108 and 111, respectively. Final ambient air and well VOC conditions were both measured at 0.0 ppm. The operator observed the air temperature inside the sampler. The maximum temperatures was 60°F.

- **SAMPLE 2-4M9 (10')** This sample was taken from one of the four deep wells located at M9. Sample 2-4M9 was collected from the 10 foot deep well marked with blue color. Pump B and R3 were used. The nominal flowrate and volumes were 1.0 Lpm and 10 liters, respectively. The well was evacuated for 1.5 minutes before sampling to remove one full volume of stagnant air inside the well. The evacuation was done using a spare pump and sampling line. A sampling train leak check was performed. The initial ambient air and well VOC concentrations were measured at 0.0 ppm and 0.0 ppm, respectively. Sampling started at 1358 EDT. Initial rotameter reading was 110 units and remained at that level for the 10 minute sampling period.

The sampler was stopped at 1408 EDT. Final ambient air and well VOC readings were recorded and the results were 0.0 ppm and 0.0 ppm, respectively. The temperature inside the sampler was 64°F.

- **SAMPLE 2-4M9 (20')** This sample was collected from the 20 foot deep well at M9. This well was marked with green color. Pump B and R3 were used. The well was evacuated for three minutes before sampling and a sampling train leak check was performed. Initial ambient air and well VOC

concentrations were recorded; the results were 0.0 ppm and 0.0 ppm, respectively. The sampling started at 1416 EDT and finished at 1426 EDT. The rotameter reading remained at 109 units throughout the sampling. Final ambient VOC concentration was 0.0 ppm and the final well VOC concentration was 0.0 ppm. The temperature inside the sampler was 66°F.

- **SAMPLE 2-4M9 (30')** This sample was collected from the 30 foot deep well located at M9. The well was marked with red color. Pump B and R3 were used. The well was evacuated for 4.5 minutes before sampling started and a sampling train leak check was performed. The nominal flowrate was 1 Lpm, and nominal sample volume was 10 liters. Initial ambient air and well VOC concentrations were both 0.0ppm. Testing started at 1435 EDT with initial rotameter reading of 112 units.

Sampling ceased at 1445 EDT. The final rotameter reading was 112 units and final ambient air and well VOC readings were both 0.0 ppm. The maximum temperature inside the sampler was observed to be 64°F. Condensate that had been accumulating in the impinger from M9 to M21 was collected at a volume of 0.3 ml.

- **SAMPLE 2-4M9 (40')** This sample was collected from the 40 foot well at M9. This well was marked with yellow color. Pump B and R3 were used. The well was evacuated at 1.0 Lpm for 6 minutes prior to sampling to remove one full well volume of stagnant soil gas. Operators observed some condensed water inside the impinger. The pump and lines used for evacuating the well were not used for sampling. The leak check was approved prior to the testing. The nominal sampling volume was 10 liters, the nominal sampling rate was 1.0 Lpm. The initial ambient air, inlet line and well VOC concentrations were all recorded to be 0.0 ppm.

Sampling started at 1453 EDT. The initial rotameter reading was 113 units. The test lasted for 10 minutes and the final ambient air and well concentrations were recorded and the readings were both 0.0 ppm. The final rotameter reading was 113 units and the maximum temperature inside the sampler was 64°F.

AUGUST 24, 1993 OBSERVATIONS

- **SAMPLE 2-4M31** Sample 2-4M31 was collected from well M31 which was a 30" deep well located west of the landfill. Pump B and R3 were used for this sampling with a nominal flowrate and volume of 1.0 Lpm and 10 liters. The well was evacuated for 30 seconds prior to sampling. The initial ambient air and well VOC concentrations were recorded and the readings were 0.0 ppm and 1.1 ppm, respectively. A leak check was performed and all connections were fine.

Sampling started at 1013 EDT with an initial rotameter reading of 117 units. The sampling ended at 1023 EDT, as scheduled. The final rotameter reading was 120 units. Final ambient air concentration was 0.1 ppm, and the final well concentration was 0.0 ppm. A small amount of condensate was detected, and this was poured into the front tenax/charcoal trap.

- **SAMPLE 2-4M28** Sample 2-1M28 was collected from the 30" deep well M28 located north of the recharge basin, just within the western landfill property line. Pump B and R3 were used for sampling. The nominal flowrate and sample volume were 1.0 Lpm and 10 liters. The initial ambient and well VOC concentrations were measured and the reading were both 0.0 ppm. A leak check was performed.

Sampling started at 1234 EDT with an initial rotameter reading of 115 units. The sampling stopped at 1244 EDT, as scheduled. The final rotameter reading was 116 units. The final ambient air and well VOC concentration was measured at 0.0 ppm.

- **SAMPLE 2-4M22** Sample 2-4M22 was collected from a 30" deep well M22 located north of the landfill. Pump D and R3 were used. The well was evacuated for 30 seconds prior to sampling. A leak check was performed to check the line connection. Initial ambient air and well VOC concentrations were measured at 0.0 ppm and 0.5 ppm, respectively.

The sampling started at 1039 EDT and lasted for ten minutes, as scheduled. During sampling the initial and final rotameter reading were 112 and 115 units respectively. The ambient air and well VOC concentrations were recorded again at the end of sampling and readings were both 0.0 ppm. A small amount of condensate was detected and poured into the front tenax/charcoal trap.

- **SAMPLE 2-4M39** Sample 2-4M39 was collected from M39, a 30" deep well located north of the air stripper, next to a telephone pole. Pump B and R3 were used. The nominal flowrate and sample volume were 1.0 Lpm and 10 liters, respectively. The well was evacuated for 30 seconds prior to the sampling and a leak check was performed. The initial ambient air and well concentrations were 0.0 ppm and 2.9 ppm, respectively. The initial rotameter reading was 110 units.

The sampling started at 1320 EDT and finished at 1330 EDT. The final rotameter reading was 112 units. The final ambient air and well VOC concentrations were both 0.0 ppm.

- **SAMPLE 2-4M34** Sample 2-4M34 was collected from M34, a 30" deep well located southwest of the landfill on the west side of the haul road. Pump B and R3 were used. The nominal flowrate was 1.0 Lpm, the nominal sample volume was 10 liters. The ambient air VOC concentration was measured before sampling and the reading was 0.0 ppm. The well was evacuated for 30 seconds prior to sampling. The initial well VOC concentration was 9.8 ppm.

Sampling started at 0952 EDT. The initial rotameter reading was 119 units. Sampling ended at 1002 EDT. The final rotameter reading was 121 units. Final ambient air and well VOC concentrations were 0.0 ppm and 4.1 ppm, respectively. The maximum sampler temperature was 56°F. The operators observed that trucking and grass cutting activities were occurring in the area.

- **SAMPLE 2-4M37** Sample 2-4M37 was collected from M37, a 30" deep well located at the southwest corner of the landfill. The nominal flowrate and sample volume was 1.0 Lpm and 10 liters, respectively. The ambient air and well VOC concentrations were measured before sampling and the reading for both was 0.0 ppm. The well was evacuated for 30 seconds prior to sampling.

Sampling started at 1353 EDT. The initial rotameter reading was 110 units. Sampling ended at 1403 EDT. The final rotameter was 112 units. Final ambient air and well VOC concentrations were both 0.0 ppm.

- **SAMPLE 2-4 M13.2** Sample 2-4M13.2 was collected from the 30" deep well M13 located east of Winding Road. Pump B and R3 were used. The initial ambient air, inlet line and well VOC concentrations were all 0.0 ppm. The nominal flow rate and volume were 1.0 LPM and 10 liters, respectively. A leak check was conducted on all connections and the well was purged of one well

volume. Sampling began at 1104 EDT and the initial rotameter reading was 108 units.

The sampling ended at 1114 EDT. The final rotameter reading was at 109 units. The final ambient air and well VOC concentrations were both 0.0 ppm. The maximum temperature inside the sampler was 56°F.

This sample was a duplicate sample of 2-4M13 and was collected one day later. Again at this sampling site there is an odor of horse manure.

- **SAMPLE 2-4 M16.2** Sample 2-4M16.2 was collected from the 30" deep well M16 located on the west side of Winding Road, east of the landfill. Pump B and R3 were used. The initial ambient air, inlet line and well VOC concentrations are all 0.0 ppm. The nominal flow rate and volume were 1.0 Lpm and 10 liters, respectively. A leak check was performed on all connections and the well was purged of one well volume for 30 seconds. Sampling began at 1130 EDT and the initial rotameter reading was 111 units.

The sampling ended at 1140 EDT. The final rotameter reading was 113 units. The final ambient air and well VOC concentrations were both 0.0 ppm. The maximum sampler temperature was 60°F.

This sample was a duplicate sample of 2-4M16 and was collected one day later.

- **SAMPLE 2-4M21.2** Sample 2-4M21.2 was collected from the 30" deep well M16 located on the west side of the landfill east of Claremont Road. Pump B and rotameter R3 were used. The initial ambient air, inlet air and well VOC concentration were all 0.0 ppm. The nominal flow rate and volume were 1.0 Lpm and 10 liters, respectively. A leak check was performed on all connections and the well was purged of one well volume for 30 seconds. Sampling began at 1201 EDT and an initial rotameter reading of 110 units.

The sampling ended at 1211 EDT. The final rotameter reading was 110 units. The final ambient air and well VOC concentrations were both 0.0 ppm. The maximum sampler temperature was 62°F.

This sample was a duplicate sample of 2-4M21 and was collected one day later.

- **SAMPLE 2-4FB(A)** Sample 2-4FB(A) was one of two field blank samples. It was collected at the soil gas sampling site M-37. The sampling traps were removed from the shipping tubes, trap ends were opened and remained open for about 30 seconds. At the end of sample collection the trap ends were closed, placed back into the shipping tubes and labeled.

- **SAMPLE 2-4FB(B)** Sample 2-4FB(B) was the second field blank sample collected as a backup field sample. It was collected at the same site as 2-4FB(A). The same field sample collection procedure was applied. The traps were opened to the site atmosphere for about 30 seconds.

- **SAMPLE 2-4TB(A)** Sample 2-4TB(A) was prepared at the site M-37. The sampling traps were taken out of the shipping box with the traps remaining inside the shipping tubes. They were then labeled and put back into the box.

CHRONOLOGY - WELL PRESSURE READINGS

AUGUST 24, 1993

- **PW1** PW1 was located northwest of the landfill along the haul road. A Dwyer inclined manometer was used for well pressure measurement. The manometer was leveled, leak checked and zeroed before it was used to measure the well pressure. There were two wells inside PW1. One well was marked with blue color, the other one was marked with green color. Pressure readings from both wells were taken two times to assure the readings were reliable. All readings were noted on the datasheet.

- **PW2** PW2 was located at the southeast corner of the landfill. A Dwyer inclined manometer was used for the pressure measurement. The manometer was leveled, leak checked and zeroed before pressure reading started. There were two wells inside PW2. One well was marked with blue color, the other one was marked with green color. Pressure readings were taken two times and all readings were recorded on the datasheet.

- **F9** F9 was located south of the landfill inside the Firemans' Training Center. It was also east of the soil gas well F1. Again, a Dwyer inclined manometer was used for the well pressure readings. The manometer was leveled, leak checked and zeroed as part of the quality assurance procedure. Two wells were located at PW3 and they were marked with blue and green colors, respectively. Pressure readings were taken two times for both wells and all readings were recorded on the datasheet.

APPENDIX D
ANALYTICAL RESULTS

GRASEBY RTL
4022 Stirrup Creek Drive, Suite 325
Durham, NC 27703
919/544-5775

CHAIN OF CUSTODY

Client: RTP ENV. ASSOC. Date: 8-13-93

Analysis Type/Special Instructions: SO# 93081001 / PO# LKBOBL-RSM

CONTAINER IDENTIFICATION	SAMPLE ID #
2 coolers: desorbed T/C	Lots 919 ABCD + 921 ABCDE
9 boxes of 6 tubes	
(FX-Sat.del. to RSM of RTP)	

Relinquished by: (GRTL) Wayne Jones Date: 8-13-93 Time: 15:00

Received by: _____ Date: _____ Time: _____

Relinquished by: _____ Date: _____ Time: _____

Received by: _____ Date: _____ Time: _____

Relinquished by: _____ Date: _____ Time: _____

Received by: _____ Date: _____ Time: _____

CHAINS OF CUSTODY RECORD

P1 of 1

[illegible]

1 of 1

RTP ENVIRONMENTAL ASSOCIATES, INC.
4408 Post Avenue, Suite 105, Westbury, NY 11590
(516) 333-4526

RTL

(2 boxes)

CHAINS OF CUSTODY RECORD

P1 of 4

Project ID: LKB0BL2-4		Test Type: 2nd Year, 4th Qtr. Ambient Air / Soil Gas Wells		Number of Containers							Remarks	
Samplers: (Signature) KJS, SM, MB, JW, KG		Sample ID	Date	Time	Sampling Location	A	B	C	D	E		
Test ID	2-4A1-F	8/24/93										*
	2-4A1-B											
	2-4A2-F											
	2-4A2-B											
	2-4A3-F											
	2-4A3-B											
	2-4A4-F											
	2-4A4-B											
	2-4FB(A)											
	2-4FB(B)											
	2-4TB(A)											
	2-4F1-F	8/23/93										
	2-4F1-B											
Relinquished By: (Signature) Joe Wang		Date/Time: 8/25/93, 1400 EDT		Received By: (Signature)					Date/Time:			
Relinquished By: (Signature)		Date/Time:		Received By: (Signature)					Date/Time:			
Relinquished By: (Signature)		Date/Time:		Received By: (Signature)					Date/Time:			
Comments:												
* : Please call Scott Mills for lab. instructions!												
RTP ENVIRONMENTAL ASSOCIATES, INC. 408 Post Avenue, Suite 105, Westbury, NY 11590 (516) 333-4526												

CHAINS OF CUSTODY RECORD

Project ID: LK80BL2-4		Test Type: 2nd Yr. 4th Qtr. Ambient Air / Soil Gas Wells											
Samplers: (Signature) KJS, SM, MB, JW, KG		Number of Containers											
Test ID	Sample ID	Date	Time	Sampling Location		A	B	C	D	E	Remarks		
2-4M2-F	2-4M2-B	8/23/93			1						*		
2-4M4-F	2-4M4-B				1								
2-4M5-F	2-4M5-B												
2-4M6-F	2-4M6-B												
2-4M9(F)	2-4M9(B)												
2-4M10(F)	2-4M10(B)												
2-4M11(F)	2-4M11(B)												
2-4M12(F)	2-4M12(B)												
2-4M13(F)	2-4M13(B)												
Relinquished By: (Signature) Joe Dwyer	Date/Time: 8/25/93, 1400 EDT	Received By: (Signature)		Date/Time:									
Relinquished By: (Signature)	Date/Time:	Received By: (Signature)		Date/Time:									
Relinquished By: (Signature)	Date/Time:	Received By: (Signature)		Date/Time:									
Comments:													
*: Please call Scott Mills for lab. instructions!													
RTP ENVIRONMENTAL ASSOCIATES, INC. 400 Post Avenue, Suite 106, Westbury, NY 11590 (516) 333-4626													

CHAINS OF CUSTODY RECORD

P3 of 4

Project ID: LKBOBL 2-4		Test Type: 2nd yr., 4th Oct. Amb. air @ Soil Gas wells									
Samplers: (Signature) KJS, MB, SM, KG, JW											
Test ID	Sample ID	Date	Time	Sampling Location	Number of Containers	A	B	C	D	E	Remarks
	2-4M130-B	8/23/93			1						* -
	2-4M140-F	;									
	2-4M140-B	;									
	2-4M132-F	8/24/93									
	2-4M132-B	;									
	2-4M16-F	8/23/93									
	2-4M16-B	;									
	2-4M162-F	8/24/93									
	2-4M162-B										
	2-4M212-F										
	2-4M212-B										
	2-4M22-F										
	2-4M22-B										
Relinquished By: (Signature) <i>Joe Wang</i>		Date/Time: 8/25/93, 1400 EDT		Received By: (Signature)		Date/Time:					
Relinquished By: (Signature)		Date/Time:		Received By: (Signature)		Date/Time:					
Relinquished By: (Signature)		Date/Time:		Received By: (Signature)		Date/Time:					
Comments: * Please call Scott Mills for lab instructions!											
RTP ENVIRONMENTAL ASSOCIATES, INC. 408 Post Avenue, Suite 10B, Westbury, NY 11590 (516) 333-4828											

pg of 4

RTP ENVIRONMENTAL ASSOCIATES, INC.
408 Post Avenue, Suite 106, Westbury, NY 11590
(616) 333-4826

October 15, 1993

R. Scott Mills
RTP Environmental Associates Inc.
400 Post Avenue
Westbury, NY 11590

RE: 93082652 (Project: LKBOBL2-4/ RSM 9/3/93) VOST Analysis

Dear Mr. Mills:

Enclosed please find the results of analysis for the samples submitted to our laboratory on 8/26/93.

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

Sincerely,

GRASEBY NUTECH-RTL



J. Wayne Jones
Chemist/ Laboratory Manager

JWJ/jwj

Enclosures

VOST GC/MS REPORT

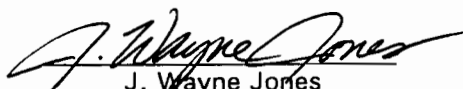
prepared for

RTP ENVIRONMENTAL ASSOCIATES, Inc.

Project: LKBOBL2-4/ RSM (9/3/93) VOST Analysis

by

GRASEBY NUTECH-RTL


J. Wayne Jones
Chemist/ Laboratory Manager

GRTL ID # 93082652

October 15, 1993

INTRODUCTION

Scope:

To analyze (VOST) Tenax/Charcoal cartridges and condensate samples for the custom target compound list (TCL) and tentatively identify Benzaldehyde, 2-Chloroethyl vinyl ether, cis-1,2-Dichloroethane, Freon-13 and the next 5 greatest Non-TCL peaks by Desorb-Purge-Trap-Desorb Gas Chromatography/ Mass Spectrometry (DPTD GC/MS). The condensates will be analyzed by PTD GC/MS. Also the routine mass scanning range is to be altered from 35-260 amu. to 45-260 amu. as requested in prior projects. Reference the Narrative and Sample Results for more details about the tentative identification of the TCL-Ketones due to the increase in the minimum scan range setting.

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. The compounds are desorbed from the analytical trap into the GC/MS system.

The condensate sample is analyzed by purge and trap in the same desorption system. A 5 mL aliquot is measured in a gas-tight syringe and spiked with internal standards. The sample is then transferred to the water purge column and collected as above for 10 minutes.

Calculations:

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

Aqueous samples can be reported as concentration. To convert nanograms per 5 mL sample volume analyzed to micrograms (µg) per mL, multiply the ng result by 0.001 to convert to µg. Next divide the µg value by 5 mL for concentration as "mass per unit volume" (µg/mL). Example: $100 \text{ ng} / 5 \text{ mL} = 100 \text{ ng} (0.001 \text{ µg/ng}) / 5 \text{ mL} = 0.02 \text{ µg/mL}$.

ANALYTICAL CONDITIONS

Equipment:

HP 5970 GC/ MSD with HP DOS Chemstation tuned to BFB criteria

GC Conditions:

Temp 1 : 0 °C
Time 1 : 4.0 minutes
Ramp Rate 1 : 6.0 °C/minute
Temp 2 : 120 °C
Time 2 : 0 minutes
Ramp Rate 2 : 20.0 °C/minute
Temp 3 : 160 °C
Time 3 : 0.5 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

Mass Spectrometer Conditions:

Run Time : 26.5 minutes
Scan Range : 45 - 260 AMU
Scan Delay : 1.25 minutes
Ion Source Temp : 200 °C
Electron Multiplier : 1800 ± 200 EV
Separator Temp : 225 °C

Sample Chronicle:

Client	RTP Environmental Associates Inc.
RTL Project ID	93082652
Analysis Type	VOST Tenax/ charcoal pairs and Condensates
Date of Collection	8/23/93 - 8/24/93
Date Received	8/26/93
Date Authorized	9/3/93
Date Analyzed	10/4/93 - 10/6/93
Date Reported	10/15/93

NARRATIVE

The letter dated September 3, 1993 stated the project scope and any special considerations required by RTP Environmental Associates. The routine custom scope was implemented as to the mass range modification from 35- 260 amu. to 45- 260 amu. to primarily prevent the potential of mass 44 saturation during analysis. Sample splits were also implemented where requested. All internal standards recovered within expected QC limits. However, several notable occurrences were observed and are listed on each respective report and further explained in the Endnotes.

- The scope implemented was to analyze the samples in the requested sequence by RTP Environmental, and call after various steps to confirm overall values and any complications, if observed.
- As stated with prior projects and in most cases, the Ketones will be identified using secondary ion information only due to the lack of data for the primary mass 43. Calibration information will reflect the new quantitation ion response where necessary. The identification of these target compounds is solely based upon the presence of minimal information and retention time similarity only. The laboratory does recognize positive identification cannot be confirmed, and therefore, the hits will be labeled as "Tentatively Identified Target Compounds". See Sample Results page 2 of each respective sample report. RTP has prior information explaining the above identification short comings.
- Due to an inadvertent desorption system problem the sample "2-4 M5-F/B" was not recovered correctly. RTP was notified promptly and confirmed that no duplicate sample cartridge was available for analysis. Reference Endnote "d". No data is available to report.
- Sample "2-4 M39-B" was analyzed with the scan range of 34 - 260 amu. instead of 45 - 260 amu. as stated in the scope of this project. No interference of target compounds was observed, and the recovery of Internal standards were within acceptably limits. See Sample Results.
- During analysis of sample "2-4 F1-F/B", the GC program was not set to the routine operation parameters following a blank analysis to confirm system background. A retention time shift was observed and expected. The results obtained were manually reviewed to confirm all target hits. No difficulty or interferences were observed and the obtained results are reported in the Sample Results.
- Vinyl acetate has been added to GRASEBY RTL's VOST TCL and can be quantitated in future projects utilizing full scan settings of the mass spectrometer. However upon more thorough evaluation of the compound as an available standard, the primary identifying masses are not represented in the modified scan ranged method. The two significant ions for identification are less than mass 45. Therefore, no tentative identification can be made regarding a library search confirmation due to the lack of data. Also the compound represents itself as a low responding polar compound in the desorption system. The low response would usually be hidden in the total ion chromatogram by a larger coeluting compound unless a extremely large amount was present in the sample.

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

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, DC. 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

ENDNOTES

- a: The amount detected is beyond the established calibration range. Linearity should not be assumed for results which greatly exceed the highest limit. When sample splitting is used, the ratio of the split, calculated using the average of the three internal standards, is the factor for the new extended calibration range, i.e., 20 - 1,000 ng range and a split of 1:10 becomes 200 - 10,000 ng. See each sample report for the applicable calibration range.
- b: Vinyl acetate can not be detected (ND) due to the lack of scan data to observe the primary masses for identification. See Narrative for more information concerning the project scope and RTL's new available standards for quantitation.
- c: Detector saturation was observed during the elution of this compound. The amount present on the sample cartridge was actually greater than reported.
- d: A desorption system malfunction was observed during the recovery of the VOST sample. A valve did not completely move into proper position to transfer the sample from phase to the next step. All attempts were made by the chemist to reconcile the problem. The system was carefully reviewed after the run to reduce the possibility of reoccurrence. The numbers of malfunctions are considered very low but are sometimes unavoidable. A sample duplicate is the only sure way to insure complete data recovery of such mechanical problems.

S A M P L E R E S U L T S

Sample Identification Cross-Reference Information

Date	File Name	Sample Name	Sample Name
10/4/93	S100405.D	2-4 TB (A) / 93082652-7	2-4 TB (A) / 93082652-7
10/4/93	S100406.D	2-4 FB (A)/(B) / 93082652-8/9	2-4 FB (A)/(B) / 93082652-8/9
10/4/93	S100407.D	2-4 TB (A)-C / 93082652-1	2-4 TB (A)-C / 93082652-1
10/4/93	S100408.D	2-4 FB -C / 93082652-2	2-4 FB -C / 93082652-2
10/4/93	S100409.D	2-4 A1-C / 93082652-3	2-4 A1-C / 93082652-3
10/4/93	S100410.D	2-4 A2-C / 93082652-4	2-4 A2-C / 93082652-4
10/4/93	S100411.D	2-4 A4-C / 93082652-5	2-4 A4-C / 93082652-5
10/4/93	S100412.D	2-4 M9-M21 -C / 93082652-6	2-4 M9-M21 -C / 93082652-6
10/4/93	S100413.D	2-4 M39-B / 93082652-32B	2-4 M39-B / 93082652-32B
10/4/93	S100414.D	2-4 A2-B / 93082652-11B	2-4 A2-B / 93082652-11B
10/4/93	S100415.D	2-4 M39-F / 93082652-32F	2-4 M39-F / 93082652-32F
10/4/93	S100416.D	2-4 M2-F/B / 93082652-15	2-4 M2-F/B / 93082652-15
10/4/93	S100417.D	2-4 M4-F/B / 93082652-16	2-4 M4-F/B / 93082652-16
10/4/93	S100418.D	2-4 M5-F/B / 93082652-17	2-4 M5-F/B / 93082652-17
10/5/93	S100512.D	2-4 M6-F/B / 93082652-18	2-4 M6-F/B / 93082652-18
10/5/93	S100513.D	2-4 M9(10')-F/B / 93082652-19	2-4 M9(10')-F/B / 93082652-19
10/5/93	S100514.D	2-4 M9 (20')-F/B / 93082652-20	2-4 M9 (20')-F/B / 93082652-20
10/5/93	S100515.D	2-4 M9 (30')-F/B / 93082652-21	2-4 M9 (30')-F/B / 93082652-21
10/5/93	S100516.D	2-4 M9 (40')-F/B / 93082652-22	2-4 M9 (40')-F/B / 93082652-22
10/5/93	S100518.D	2-4 M13.2 -F/B / 93082652-23	2-4 M13.2 -F/B / 93082652-23
10/5/93	S100519.D	2-4 M16 -F/B / 93082652-24	2-4 M16 -F/B / 93082652-24
10/5/93	S100520.D	2-4 M16.2 -F/B / 93082652-25	2-4 M16.2 -F/B / 93082652-25
10/5/93	S100520.D	2-4 M16.2 -F/B / 93082652-25	2-4 M16.2 -F/B / 93082652-25
10/5/93	S100521.D	2-4 M21.2 -F/B / 93082652-26	2-4 M21.2 -F/B / 93082652-26
10/5/93	S100522.D	2-4 M22 -F/B / 93082652-27	2-4 M22 -F/B / 93082652-27
10/5/93	S100523.D	2-4 M28 -F/B / 93082652-28	2-4 M28 -F/B / 93082652-28
10/5/93	S100524.D	2-4 M31 / 93082652-29	2-4 M31 / 93082652-29
10/6/93	S100606.D	2-4 M34 / 93082652-30	2-4 M34 / 93082652-30
10/6/93	S100607.D	2-4 M37 -F/B / 93082652-31	2-4 M37 -F/B / 93082652-31
10/6/93	S100608.D	2-4 A3 -F/B / 93082652-12	2-4 A3 -F/B / 93082652-12
10/6/93	S100609.D	2-4 A1 -F/B / 93082652-10	2-4 A1 -F/B / 93082652-10
10/6/93	S100610.D	2-4 A4 -F/B / 93082652-13	2-4 A4 -F/B / 93082652-13
10/6/93	S100611.D	2-4 A2 -F / 93082652-11	2-4 A2 -F / 93082652-11
10/6/93	S100613.D	2-4 F1 -F/B / 93082652-14	2-4 F1 -F/B / 93082652-14

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 TB (A) / 93082652-7
 Lab File: D:\100493\100405.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/4/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C only
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	99
Toluene-d8	104
4-Bromofluorobenzene	91

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 TB (A) / 93082652-7
 Lab File: D:\100493\S100405.D

Date Analyzed: 10/4/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C only
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 TB (A) / 93082652-7
Lab File: D:\100493\S100405.D

Date Analyzed: 10/4/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C only
Split Factor: 1

No.	RT. (minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags

None detected

RT: Retention time	ND: Not detected or available	Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 10/4/93

Sample ID: 2-4 TB (A)-C / 93082652-1

GC/MS Method: VOS RTP1

Lab File: D:\100493\100407.D

Sample Matrix: 5 mL: Condensate

Quant. Range: 20 to 1000 ng

Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	109
Toluene-d8	104
4-Bromofluorobenzene	93

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 TB (A)-C / 93082652-1
 Lab File: D:\100493\S100407.D

Date Analyzed: 10/4/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: 5 mL: Condensate
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 TB (A)-C / 93082652-1
Lab File: D:\100493\S100407.D

Date Analyzed: 10/4/93
GC/MS Method: VOS_RTP1
Sample Matrix: 5 mL: Condensate
Split Factor: 1

No.	RT. (minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags

None detected

RT: Retention time	ND: Not detected or available	Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 FB (A)/(B) / 93082652-8/9
 Lab File: D:\100493\S100406.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/4/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	105
Toluene-d8	104
4-Bromofluorobenzene	87

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 FB (A)/(B) / 93082652-8/9
 Lab File: D:\100493\S100406.D

Date Analyzed: 10/4/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 FB (A)/(B) / 93082652-8/9
Lab File: D:\100493\S100406.D

Date Analyzed: 10/4/93
GC/MS Method: VOS RTP1
Sample Matrix: T/C:T/C pair
Split Factor: 1

No.	RT. (minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags

None detected

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 FB -C / 93082652-2
 Lab File: D:\100493\S100408.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/4/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: 5 mL: Condensate
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	116
Toluene-d8	111
4-Bromofluorobenzene	88

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 FB -C / 93082652-2
 Lab File: D:\100493\S100408.D

Date Analyzed: 10/4/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: 5 mL: Condensate
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	92	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 FB -C / 93082652-2
Lab File: D:\100493\S100408.D

Date Analyzed: 10/4/93
GC/MS Method: VOS_RTP1
Sample Matrix: 5 mL: Condensate
Split Factor: 1

No.	RT. (minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags

None detected

RT: Retention time	ND: Not detected or available	Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 A1 -F/B / 93082652-10
 Lab File: D:\100693\100609.D
 Quant. Range: 100 to 5000 ng

Date Analyzed: 10/6/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C:T/C pair/ Split
 Split Factor: 5

Percent Surrogate Recovery

1,2-Dichloroethane-d4	105
Toluene-d8	111
4-Bromofluorobenzene	89

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	310	
56-23-5	Carbon tetrachloride	200	
71-43-2	Benzene	220	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	1,500	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	580	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	1,000	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	440	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 A1 -F/B / 93082652-10
 Lab File: D:\100693\S100609.D

Date Analyzed: 10/6/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair/ Split
 Split Factor: 5

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 24 A1 -F/B / 93082652-10
Lab File: D:\100693\S100609.D

Date Analyzed: 10/6/93
GC/MS Method: VOS RTP1
Sample Matrix: T/C:T/C pair/ Split
Split Factor: 5

RT.		Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
No.	(minutes)				
1	1.77	Unknown hydrocarbon	ND	11,000	
2	3.92	Unknown freon	ND	350	
3	21.55	1,2,3-Trimethylbenzene	526-73-8	310	
4	23.14	Unknown alkane	ND	270	
5	23.70	Unknown alkene	ND	160	

RT: Retention time ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 A1-C / 93082652-3
 Lab File: D:\100493\100409.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/4/93
 GC/MS Method: VOS RTP1
 Sample Matrix: 5 mL: Condensate
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	113
Toluene-d8	112
4-Bromofluorobenzene	96

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 A1-C / 93082652-3
 Lab File: D:\100493\S100409.D

Date Analyzed: 10/4/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: 5 mL: Condensate
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	90	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 A1-C / 93082652-3
Lab File: D:\100493\S100409.D

Date Analyzed: 10/4/93
GC/MS Method: VOS_RTP1
Sample Matrix: 5 mL: Condensate
Split Factor: 1

RT.				
No.	(minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng) Flags
None detected				

RT: Retention time	ND: Not detected or available	Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 A2 -F / 93082652-11
 Lab File: D:\100693\SI00611.D
 Quant. Range: 120 to 6000 ng

Date Analyzed: 10/6/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C: only/ Split
 Split Factor: 6

Percent Surrogate Recovery

1,2-Dichloroethane-d4	105
Toluene-d8	106
4-Bromofluorobenzene	94

CAS No.	Target Compounds	Amount (ng)	Flags
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	590	
75-35-4	1,1-Dichloroethene	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	330	
56-23-5	Carbon tetrachloride	170	
71-43-2	Benzene	270	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	2,000	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	720	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	140	
1330-20-7	Total Xylenes	1,600	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	720	
611-14-3	1-Ethyl-2-methylbenzene	120	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	130	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 A2 -F / 93082652-11
 Lab File: D:\100693\S100611.D

Date Analyzed: 10/6/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C: only/ Split
 Split Factor: 6

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 A2 -F / 93082652-11
Lab File: D:\100693\S100611.D

Date Analyzed: 10/6/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C: only/ Split
Split Factor: 6

RT.					
No.	(minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
1	1.80	Unknown hydrocarbon	ND	10,000	
2	3.88	Unknown freon	ND	320	
3	21.55	1,2,3-Trimethylbenzene	526-73-8	750	
4	23.13	Unknown alkane	ND	1,000	
5	24.08	Unknown alkane	ND	1,400	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 A2-B / 93082652-11B
 Lab File: D:\100493\100414.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/4/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C only
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	116
Toluene-d8	112
4-Bromofluorobenzene	105

CAS No.	Target Compounds	Amount (ng)	Flags
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	750	
75-35-4	1,1-Dichloroethene	BQL	
75-15-0	Carbon disulfide	140	
75-09-2	Methylene chloride	71	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	50	
56-23-5	Carbon tetrachloride	37	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 A2-B / 93082652-11B
 Lab File: D:\100493\S100414.D

Date Analyzed: 10/4/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C only
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: **2-4 A2-B / 93082652-11B**
Lab File: D:\100493\SI00414.D

Date Analyzed: 10/4/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C only
Split Factor: 1

RT.				
No.	(minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng)
1	1.86	Dichlorodifluoromethane	75-71-8	770
2	4.04	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	190
3	20.38	2-Ethylhexanal	123-05-7	57
4	24.10	Unknown alkane	ND	420
5	25.52	Unknown hydrocarbon	ND	54

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 10/4/93

Sample ID: 2-4 A2-C / 93082652-4

GC/MS Method: VOS RTP1

Lab File: D:\100493\S100410.D

Sample Matrix: 5 mL: Condensate

Quant. Range: 20 to 1000 ng

Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	118
Toluene-d8	111
4-Bromofluorobenzene	93

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 A2-C / 93082652-4
 Lab File: D:\100493\S100410.D

Date Analyzed: 10/4/93
 GC/MS Method: VOS RTP1
 Sample Matrix: 5 mL: Condensate
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	94	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 A2-C / 93082652-4
Lab File: D:\100493\S100410.D

Date Analyzed: 10/4/93
GC/MS Method: VOS_RTP1
Sample Matrix: 5 mL: Condensate
Split Factor: 1

No.	RT. (minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags

None detected

RT: Retention time	ND: Not detected or available	Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 A3 -F/B / 93082652-12
 Lab File: D:\100693\100608.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/6/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	99
Toluene-d8	96
4-Bromofluorobenzene	85

CAS No.	Target Compounds	Amount (ng)	Flags
74-87-3	Chloromethane	170	
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	37	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	94	
56-23-5	Carbon tetrachloride	55	
71-43-2	Benzene	99	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	190	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	68	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	130	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	62	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 A3 -F/B / 93082652-12
Lab File: D:\100693\S100608.D

Date Analyzed: 10/6/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C:T/C pair
Split Factor: 1

No.	RT.		CAS No.	Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds			
1	1.88	Xenon and Unknown freon coeluting	7440-63-3/ ND	760	
2	4.08	Unknown freon	ND	77	
3	23.14	Unknown alkane	ND	89	
4	23.72	Unknown hydrocarbon	ND	210	
5	24.07	Unknown alkane	ND	250	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 A4 -F/B / 93082652-13
 Lab File: D:\100693\S100610.D
 Quant. Range: 120 to 6000 ng

Date Analyzed: 10/6/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair/ Split
 Split Factor: 6

Percent Surrogate Recovery

1,2-Dichloroethane-d4	96
Toluene-d8	111
4-Bromofluorobenzene	94

CAS No.	Target Compounds	Amount (ng)	Flags
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	510	
75-35-4	1,1-Dichloroethene	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	310	
56-23-5	Carbon tetrachloride	180	
71-43-2	Benzene	290	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	2,400	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	750	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	130	
1330-20-7	Total Xylenes	1,500	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	730	
611-14-3	1-Ethyl-2-methylbenzene	120	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 A4 -F/B / 93082652-13
 Lab File: D:\100693\100610.D

Date Analyzed: 10/6/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair/ Split
 Split Factor: 6

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 A4 -F/B / 93082652-13
Lab File: D:\100693\100610.D

Date Analyzed: 10/6/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C:T/C pair/ Split
Split Factor: 6

RT.		Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
No.	(minutes)				
1	1.73	Unknown hydrocarbon	ND	7,100	
2	20.29	Unknown alkane	ND	480	
3	21.56	1,2,3-Trimethylbenzene	526-73-8	820	
4	23.15	Unknown alkane	ND	1,000	
5	23.57	Unknown	ND	540	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 A4-C / 93082652-5
 Lab File: D:\100493\S100411.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/4/93
 GC/MS Method: VOST93
 Sample Matrix: 5 mL: Condensate
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	119
Toluene-d8	105
4-Bromofluorobenzene	96

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 A4-C / 93082652-5
 Lab File: D:\100493\S100411.D

Date Analyzed: 10/4/93
 GC/MS Method: VOST93
 Sample Matrix: 5 mL: Condensate
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	78	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 A4-C / 93082652-5
Lab File: D:\100493\S100411.D

Date Analyzed: 10/4/93
GC/MS Method: VOST93
Sample Matrix: 5 mL: Condensate
Split Factor: 1

No.	RT.		CAS No.	Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds			
1	1.76	Carbon dioxide	ND	34	c

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 F1 -F/B / 93082652-14
Lab File: D:\100693\S100613.D
Quant. Range: 80 to 4000 ng

Date Analyzed: 10/6/93
GC/MS Method: VOS RTP1
Sample Matrix: T/C:T/C pair/ Split
Split Factor: 4

Percent Surrogate Recovery

1,2-Dichloroethane-d4	102
Toluene-d8	100
4-Bromofluorobenzene	92

CAS No.	Target Compounds	Amount (ng)	Flags
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	620	
75-35-4	1,1-Dichloroethene	BQL	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	200	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 F1 -F/B / 93082652-14
 Lab File: D:\100693\S100613.D

Date Analyzed: 10/6/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C:T/C pair/ Split
 Split Factor: 4

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 F1 -F/B / 93082652-14
Lab File: D:\100693\100613.D

Date Analyzed: 10/6/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C:T/C pair/ Split
Split Factor: 4

RT.		Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
No.	(minutes)				
1	10.84	Unknown hydrocarbon	ND	79	
2	12.12	Unknown hydrocarbon	ND	91	
3	12.55	Unknown hydrocarbon	ND	150	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M2-F/B / 93082652-15
 Lab File: D:\100493\S100416.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/4/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	111
Toluene-d8	111
4-Bromofluorobenzene	106

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	21	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	39	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M2-F/B / 93082652-15
 Lab File: D:\100493\S100416.D

Date Analyzed: 10/4/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	490	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 M2-F/B / 93082652-15
Lab File: D:\100493\100416.D

Date Analyzed: 10/4/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C:T/C pair
Split Factor: 1

RT.		Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
No.	(minutes)				
1	2.00	Xenon	7440-63-3	420	
2	23.57	Unknown silane	ND	50	
3	24.09	1,2-Dibromo 1,1,2,2-tetrachloroethane an	630-25-1		
		Hexachloroethane coelution	67-72-1	96	
4	26.15	Unknown pentanol	ND	26	
5	26.52	Unknown alkane	ND	220	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M4-F/B / 93082652-16
 Lab File: D:\100493\100417.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/4/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	110
Toluene-d8	107
4-Bromofluorobenzene	95

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	44	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	110	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M4-F/B / 93082652-16
 Lab File: D:\100493\S100417.D

Date Analyzed: 10/4/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 M4-F/B / 93082652-16
Lab File: D:\100493\S100417.D

Date Analyzed: 10/4/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C:T/C pair
Split Factor: 1

RT.		Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
No.	(minutes)				
1	2.00	Unknown hydrocarbon	ND	220	
2	24.07	1,2-Dibromo-1,1,2,2-tetrachloroethane	630-25-1	30	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M5-FJB / 93082652-17 d
 Lab File: D:\100493\100418.D d
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/4/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	d
Toluene-d8	d
4-Bromofluorobenzene	d

CAS No.	Target Compounds	Amount (ng)	Flags
74-87-3	Chloromethane		d
75-01-4	Vinyl chloride		d
74-83-9	Bromomethane		d
75-00-3	Chloroethane		d
75-69-4	Trichlorofluoromethane		d
75-35-4	1,1-Dichloroethene		d
75-15-0	Carbon disulfide		d
75-09-2	Methylene chloride		d
156-60-5	trans-1,2-Dichloroethene		d
75-34-3	1,1-Dichloroethane		d
67-66-3	Chloroform		d
71-55-6	1,1,1-Trichloroethane		d
56-23-5	Carbon tetrachloride		d
71-43-2	Benzene		d
107-06-2	1,2-Dichloroethane		d
79-01-6	Trichloroethene		d
78-87-5	1,2-Dichloropropane		d
75-27-4	Bromodichloromethane		d
10061-01-5	cis-1,3-Dichloropropene		d
108-88-3	Toluene		d
10061-02-6	trans-1,3-Dichloropropene		d
79-00-5	1,1,2-Trichloroethane		d
127-18-4	Tetrachloroethene		d
124-48-1	Dibromochloromethane		d
108-90-7	Chlorobenzene		d
100-41-4	Ethylbenzene		d
1330-20-7	Total Xylenes		d
100-42-5	Styrene		d
75-25-2	Bromoform		d
79-34-5	1,1,2,2-Tetrachloroethane		d
622-96-8	1-Ethyl-4-methylbenzene		d
611-14-3	1-Ethyl-2-methylbenzene		d
541-73-1	1,3-Dichlorobenzene		d
106-46-7	1,4-Dichlorobenzene		d
95-50-1	1,2-Dichlorobenzene		d

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M5-F/B / 93082652-17 d
 Lab File: D:\100493\S100418.D d

Date Analyzed: 10/4/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone		d
7.45	108-05-4	Vinyl acetate		d
8.72	78-93-3	2-Butanone		d
13.49	108-10-1	4-Methyl-2-pentanone		d
15.33	591-78-6	2-Hexanone		d

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde		d
ND	110-75-8	2-Chloroethyl vinyl ether		d
ND	75-72-9	Chlorotrifluoromethane or Freon-13		d
ND	156-59-2	cis-1,2-Dichloroethene		d

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 M5-F/B / 93082652-17
Lab File: D:\100493\100418.D

Date Analyzed: 10/4/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C:T/C pair
Split Factor: 1

RT.				
No.	(minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng)
None detected				
d				

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M6-F/B / 93082652-18
 Lab File: D:\100593\100512.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/5/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	88
Toluene-d8	98
4-Bromofluorobenzene	79

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M8-F/B / 93082652-18
 Lab File: D:\100593\100512.D

Date Analyzed: 10/5/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 M6-F/B / 93082652-18
Lab File: D:\100593\S100512.D

Date Analyzed: 10/5/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C:T/C pair
Split Factor: 1

RT.		Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
No.	(minutes)				
1	1.98	Xenon	7440-63-3	350	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M9(10')-F/B / 93082652-19
 Lab File: D:\100593\100513.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/5/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	90
Toluene-d8	103
4-Bromofluorobenzene	80

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	96	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M9(10')-F/B / 93082652-19
 Lab File: D:\100593\S100513.D

Date Analyzed: 10/5/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 M9(10')-F/B / 93082652-19
Lab File: D:\100593\S100513.D

Date Analyzed: 10/5/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C:T/C pair
Split Factor: 1

RT.					
No.	(minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
1	1.86	Xenon and an Unknown Freon coelution	7440-63-3/ ND	280	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M9 (20')-F/B / 93082652-20
 Lab File: D:\100593\S100514.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/5/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	87
Toluene-d8	97
4-Bromofluorobenzene	80

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	81	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M9 (20')-F/B / 93082652-20
 Lab File: D:\100593\S100514.D

Date Analyzed: 10/5/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 M9 (20')-F/B / 93082652-20
Lab File: D:\100593\S100514.D

Date Analyzed: 10/5/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C:T/C pair
Split Factor: 1

RT.		Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
No.	(minutes)				
1	1.88	Xenon and an Unknown Freon coelution	7440-63-3 / ND	630	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M9 (30')-F/B / 93082652-21
 Lab File: D:\100593\SI00515.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/5/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	92
Toluene-d8	112
4-Bromofluorobenzene	105

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	22	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	36	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	820	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M9 (30") F/B / 93082652-21
 Lab File: D:\100593\S100515.D

Date Analyzed: 10/5/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 M9 (30')-F/B / 93082652-21
Lab File: D:\100593\S100515.D

Date Analyzed: 10/5/93
GC/MS Method: VOS RTP1
Sample Matrix: T/C:T/C pair
Split Factor: 1

RT.		Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
No.	(minutes)				
1	1.86	Xenon and an Unknown Freon coelution	7440-63-3 / ND	800	
2	4.05	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	130	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M9 (40')-F/B / 93082652-22
 Lab File: D:\100593\100516.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/5/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	93
Toluene-d8	102
4-Bromofluorobenzene	82

CAS No.	Target Compounds	Amount (ng)	Flags
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	45	
75-35-4	1,1-Dichloroethene	BQL	
75-15-0	Carbon disulfide	22	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	32	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	110	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	21	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	1,900	a
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M9 (40")-F/B / 93082652-22
 Lab File: D:\100593\100516.D

Date Analyzed: 10/5/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 M9 (40')-F/B / 93082652-22
Lab File: D:\100593\S100516.D

Date Analyzed: 10/5/93
GC/MS Method: VOS RTP1
Sample Matrix: T/C:T/C pair
Split Factor: 1

No.	RT.		CAS No.	Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds			
1	1.86	Xenon and Dichlorodifluoromethane coelution	7440-63-3 75-71-8	1,600	
2	4.05	1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	470	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M16 -F/B / 93082652-24
 Lab File: D:\100593\100519.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/5/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	93
Toluene-d8	106
4-Bromofluorobenzene	81

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	42	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	56	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M16 -F/B / 93082652-24
 Lab File: D:\100593\S100519.D

Date Analyzed: 10/5/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 M16 -F/B / 93082652-24
Lab File: D:\100593\S100519.D

Date Analyzed: 10/5/93
GC/MS Method: VOS RTP1
Sample Matrix: T/C:T/C pair
Split Factor: 1

No.	RT.		Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
	(minutes)					
1	1.99		Xenon	7440-63-3	490	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M9-M21 -C / 93082652-6
 Lab File: D:\100493\S100412.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/4/93
 GC/MS Method: VOST93
 Sample Matrix: 5 mL: Condensate
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	119
Toluene-d8	111
4-Bromofluorobenzene	93

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	21	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	67	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M9-M21 -C / 93082652-6
 Lab File: D:\100493\S100412.D

Date Analyzed: 10/4/93
 GC/MS Method: VOST93
 Sample Matrix: 5 mL: Condensate
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 M39-B / 93082652-32B
Lab File: D:\100493\S100413.D

Date Analyzed: 10/4/93
GC/MS Method: VOST93
Sample Matrix: T/C only
Split Factor: 1

RT.					
No.	(minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
1	1.76	Carbon dioxide	ND	> 5800	c

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 10/4/93

Sample ID: 2-4 M9-M21 -C / 93082652-6

GC/MS Method: VOST93

Lab File: D:\100493\S100412.D

Sample Matrix: 5 mL: Condensate

Split Factor: 1

No.	RT. (minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags

None detected

RT: Retention time	ND: Not detected or available	Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M22 -F/B / 93082652-27
 Lab File: D:\100593\S100522.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/5/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	101
Toluene-d8	107
4-Bromofluorobenzene	85

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M22 -F/B / 93082652-27
 Lab File: D:\100593\S100522.D

Date Analyzed: 10/5/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 10/5/93

Sample ID: 2-4 M22 -F/B / 93082652-27

GC/MS Method: VOS_RTP1

Lab File: D:\100593\SI00522.D

Sample Matrix: T/C:T/C pair

Split Factor: 1

RT.					
No.	(minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
1	2.02	Xenon	7440-63-3	470	
2	19.01	alpha- Pinene	80-56-8	190	
3	20.63	Unknown alkene	ND	66	
4	24.75	Unknown hydrocarbon	ND	58	
5	25.64	Unknown hydrocarbon	ND	130	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M28 -F/B / 93082652-28
 Lab File: D:\100593\S100523.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/5/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	96
Toluene-d8	104
4-Bromofluorobenzene	74

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	67	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	100	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	190	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M28 -F/B / 93082652-28
 Lab File: D:\100593\S100523.D

Date Analyzed: 10/5/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 M28 -F/B / 93082652-28
Lab File: D:\100593\S100523.D

Date Analyzed: 10/5/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C:T/C pair
Split Factor: 1

RT.					
No.	(minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
1	1.83	Unknown hydrocarbon and freon coelutio	ND/ ND	94	
2	2.02	Xenon	7440-63-3	100	
3	24.11	Unknown alkene	ND	98	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M31 / 93082652-29
 Lab File: D:\100593\S100524.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/5/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C only
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	97
Toluene-d8	112
4-Bromofluorobenzene	81

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	51	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	120	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M31 / 93082652-29
 Lab File: D:\100593\S100524.D

Date Analyzed: 10/5/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C only
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 M31 / 93082652-29
Lab File: D:\100593\100524.D

Date Analyzed: 10/5/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C only
Split Factor: 1

No.	RT.		CAS No.	Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds			
1	1.75	Unknown hydrocarbon and freon coelutio	ND/ ND	66	
2	24.12	Unknown alkene	ND	72	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M34 / 93082652-30
 Lab File: D:\100693\S100606.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/6/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C only
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	100
Toluene-d8	98
4-Bromofluorobenzene	90

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	38	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	49	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Sample ID: 2-4 M34 / 93082652-30

Lab File: D:\100693\S100606.D

Date Analyzed: 10/6/93

GC/MS Method: VOS_RTP1

Sample Matrix: T/C only

Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.

Date Analyzed: 10/6/93

Sample ID: 2-4 M34 / 93082652-30

GC/MS Method: VOS_RTP1

Lab File: D:\100693\S100606.D

Sample Matrix: T/C only

Split Factor: 1

No.	RT.		CAS No.	Amount (ng)	Flags
	(minutes)	Tentatively Identified Compounds			
1	1.84	Unknown freon	ND	38	
2	2.02	Xenon	7440-63-3	32	
3	2.72	Unknown	ND	160	
4	3.08	Unknown	ND	41	
5	24.08	Unknown alkane	ND	34	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M37 -F/B / 93082652-31
 Lab File: D:\100693\S100607.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/6/93
 GC/MS Method: VQS_RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	99
Toluene-d8	108
4-Bromofluorobenzene	123

CAS No.	Target Compounds	Amount (ng)	Flags
74-87-3	Chloromethane	620	
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	45	
71-55-6	1,1,1-Trichloroethane	28	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	23	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	63	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M37 -F/B / 93082652-31
 Lab File: D:\100693\100607.D

Date Analyzed: 10/6/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	120	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 M37 -F/B / 93082652-31
Lab File: D:\100693\S100607.D

Date Analyzed: 10/6/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C:T/C pair
Split Factor: 1

RT.		Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
No.	(minutes)				
1	1.88	Unknown freon	ND	380	
2	21.42	Unknown alkene	ND	130	
3	22.37	Methylmethylethylbenzene isomer	99-87-6/ 535-77-3	69	
4	24.07	Unknown alkane	ND	120	

RT: Retention time ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M39-F / 93082652-32F
 Lab File: D:\100493\100415.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/4/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C only
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	114
Toluene-d8	113
4-Bromofluorobenzene	109

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	350	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M39-F / 93082652-32F
 Lab File: D:\100493\S100415.D

Date Analyzed: 10/4/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C only
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 M39-F / 93082652-32F
Lab File: D:\100493\S100415.D

Date Analyzed: 10/4/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C only
Split Factor: 1

RT.					
No.	(minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
1	1.78	Unknown hydrocarbon	ND	29	
2	25.75	Unknown hydrocarbon	ND	64	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M39-B / 93082652-32B
 Lab File: D:\100493\S100413.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/4/93
 GC/MS Method: VOST93
 Sample Matrix: T/C only
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	115
Toluene-d8	102
4-Bromofluorobenzene	88

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	21	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	BQL	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M39-B / 93082652-32B
 Lab File: D:\100493\S100413.D

Date Analyzed: 10/4/93
 GC/MS Method: VOST93
 Sample Matrix: T/C only
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M13.2 F/B / 93082652-23
 Lab File: D:\100593\SI00518.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/5/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	94
Toluene-d8	101
4-Bromofluorobenzene	86

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	110	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	BQL	
79-01-6	Trichloroethene	25	
78-87-5	1,2-Dichloropropane	BQL	
75-27-4	Bromodichloromethane	BQL	
10061-01-5	cis-1,3-Dichloropropene	BQL	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	200	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M13.2 -F/B / 93082652-23
 Lab File: D:\100593\S100518.D

Date Analyzed: 10/5/93
 GC/MS Method: VOS RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 24 M13.2 -F/B / 93082652-23
Lab File: D:\100593\100518.D

Date Analyzed: 10/5/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C:T/C pair
Split Factor: 1

RT.					
No.	(minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
1	1.98	Xenon	7440-63-3	500	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M16.2 -F/B / 93082652-25
 Lab File: D:\100593\100520.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/5/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	97
Toluene-d8	110
4-Bromofluorobenzene	84

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	45	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M16.2 -F/B / 93082652-25
 Lab File: D:\100593\100520.D

Date Analyzed: 10/5/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 M16.2 -F/B / 93082652-25
Lab File: D:\100593\S100520.D

Date Analyzed: 10/5/93
GC/MS Method: VOS_RTP1
Sample Matrix: T/C:T/C pair
Split Factor: 1

RT.					
No.	(minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
1	1.99	Xenon and Unknown	7440-63-3/ ND	340	
2	2.03	Unknown	ND	120	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M21.2 -F/B / 93082652-26
 Lab File: D:\100593\S100521.D
 Quant. Range: 20 to 1000 ng

Date Analyzed: 10/5/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Percent Surrogate Recovery

1,2-Dichloroethane-d4	99
Toluene-d8	117
4-Bromofluorobenzene	93

CAS No.	Target Compounds	Amount (ng)	Flags
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	
75-15-0	Carbon disulfide	BQL	
75-09-2	Methylene chloride	BQL	
156-60-5	trans-1,2-Dichloroethene	BQL	
75-34-3	1,1-Dichloroethane	BQL	
67-66-3	Chloroform	BQL	
71-55-6	1,1,1-Trichloroethane	BQL	
56-23-5	Carbon tetrachloride	BQL	
71-43-2	Benzene	BQL	
107-06-2	1,2-Dichloroethane	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	
108-88-3	Toluene	BQL	
10061-02-6	trans-1,3-Dichloropropene	BQL	
79-00-5	1,1,2-Trichloroethane	BQL	
127-18-4	Tetrachloroethene	60	
124-48-1	Dibromochloromethane	BQL	
108-90-7	Chlorobenzene	BQL	
100-41-4	Ethylbenzene	BQL	
1330-20-7	Total Xylenes	BQL	
100-42-5	Styrene	BQL	
75-25-2	Bromoform	BQL	
79-34-5	1,1,2,2-Tetrachloroethane	BQL	
622-96-8	1-Ethyl-4-methylbenzene	BQL	
611-14-3	1-Ethyl-2-methylbenzene	BQL	
541-73-1	1,3-Dichlorobenzene	BQL	
106-46-7	1,4-Dichlorobenzene	BQL	
95-50-1	1,2-Dichlorobenzene	BQL	

Flags: See Endnotes if applicable.

BQL: Below Quantitation Limit

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
 Sample ID: 2-4 M21.2 -F/B / 93082652-26
 Lab File: D:\100593\100521.D

Date Analyzed: 10/5/93
 GC/MS Method: VOS_RTP1
 Sample Matrix: T/C:T/C pair
 Split Factor: 1

Expected RT. (minutes)	CAS No.	Tentatively Identified Target Compounds	Amount (ng)	Flags
4.55	67-64-1	Acetone	BQL	
7.45	108-05-4	Vinyl acetate	BQL	b
8.72	78-93-3	2-Butanone	BQL	
13.49	108-10-1	4-Methyl-2-pentanone	BQL	
15.33	591-78-6	2-Hexanone	BQL	

RT. (minutes)	CAS No.	Specific Tentatively Identified Compounds	Amount (ng)	Flags
ND	100-52-7	Benzaldehyde	ND	
ND	110-75-8	2-Chloroethyl vinyl ether	ND	
ND	75-72-9	Chlorotrifluoromethane or Freon-13	ND	
ND	156-59-2	cis-1,2-Dichloroethene	ND	

RT: Retention time

ND: Not detected or available

Flags: See Endnotes if applicable.

GRASEBY NUTECH-RTL

Client: RTP Environmental Associates Inc.
Sample ID: 2-4 M21.2 F/B / 93082652-26
Lab File: D:\100593\S100521.D

Date Analyzed: 10/5/93
GC/MS Method: VOS RTP1
Sample Matrix: T/C:T/C pair
Split Factor: 1

RT.					
No.	(minutes)	Tentatively Identified Compounds	CAS No.	Amount (ng)	Flags
1	1.78	Xenon and Unknown coeluting	7440-63-3/ ND	600	
2	19.66	Unknown siloxane	ND	130	

RT: Retention time ND: Not detected or available Flags: See Endnotes if applicable.

September 27, 1993

Mr. Scott Mills
RTP Environmental Associates
400 Post Avenue
Westbury, NY 11590

RE: 93082651; (Project ID # LKBOBL2-4/RSM 9/3/93)

Dear Mr. Mills:

Enclosed you will find the results of analysis for the samples submitted to our laboratory on 8/26/93.

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

Sincerely,

GRASEBY NUTECH RTL

Wendy L. Ballard

Wendy L. Ballard
Chemist

WLB/wlb

Enclosures

TO-14 GC/MS REPORT

prepared for

RTP Environmental Associates
(Project ID # LKBOBL2-4/RSM 9/3/93)

by

GRASEBY NUTECH-RTL

Wendy L. Ballard

Wendy L. Ballard
Chemist

J. Wayne Jones

J. Wayne Jones
GC/MS Supervisor

RTL ID # 93082651

September 27, 1993

INTRODUCTION

Scope:

To analyze the Summa® canister samples for TO-14 target compound list (TCL) by Gas Chromatography/Mass Spectrometry (GC/MS) using SIM.

Method Summary:

The samples were analyzed by TO-14 protocol. We used a Nutech 3550A Cryogenic Concentrator equipped with a Nafion dryer to selectively remove water from the sample stream. In addition, the sample was cryofocussed before injection into the GC with a Nutech Model 354A cryofocussing accessory. Gas chromatography was followed by MS analysis using a Hewlett-Packard 5971 MSD with accompanying Hewlett-Packard Vectra 486s/20 computer. The daily GC/MS performance test required for this method is described in the EPA Draft Statement of Work for volatiles analysis in ambient air. The key abundance criteria for 4-Bromofluorobenzene (BFB) must be met before any samples are analyzed. A blank of less than 0.2 ppbv must be obtained to verify system status for sample analysis.

Calculations:

All target compounds that coincide with the target compound list (TCL) are calculated using an internal standard comparison to response factors from a continuing calibration (see below).

$$x = \frac{a_x}{a_{is}} \cdot \frac{is}{rrf}$$

Where:

x = concentration of target compound (ppbv)
is = concentration of internal standard (ppbv)
a_x = response of target compound (area)
a_{is} = response of internal standard (area)
rrf = relative response factor

ANALYTICAL CONDITIONS

Equipment:

A Nutech 3550A Cryogenic Concentrator with a Nutech VOC Autosampler and 354A Cryofocusing accessory. A Hewlett-Packard 5890 Gas chromatograph with electronic pressure programming, a 5971 Mass selective detector with a jet separator, and a DOS Chemstation.

GC Conditions:

Temperature 1	0 °C
Time 1	4 minutes
Ramp Rate 1	5 °C per minute
Temperature 2	80 °C
Time 2	0 minutes
Ramp rate 2	8 °C per minute
Temperature 3	129°C
Time 3	0 minutes
Ramp rate 3	11 °C per minute
Temperature 4	180 °C
Time 4	0 minute

Column:

0.53 mm x 60 m fused silica capillary column (J&W Scientific-DB-1 with 1.5 µm film)

Mass Spectrometer Conditions:

Run Time	31 minutes
Scan Range	34 - 260 AMU(SIM)
Scan Delay	2.25 minutes
Ion Source Temperature	170 °C
Electron Multiplier	1700 ± 200 EV

Sample Chronicle:

Client	RTP Environmental Associates
RTL Project ID	93082651
Analysis Type	TO-14 SIM
Date of Collection	not supplied
Date Received	8/26/93
Date Authorized	9/3/93
Date Analyzed	9/17/93
Date Reported	9/27/93

Narrative:

Two canisters were received on 8/26/93, and initial pressures were checked and documented. The samples were analyzed using a 300ml sample volume and a calibration range of 0.20 - 10.0ppbv. We remain available to assist with questions concerning this report or analytical procedures.

Flags:

#1 This compound exceeds our calibration range which may not be linear at this concentration.

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

Compendium Method TO-14, Quality Assurance Division, Environmental Monitoring Systems Laboratory, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711

Volatile Organics Analysis of Ambient Air in Canisters, Draft of US EPA Contract Laboratory Program, Rev. VCAA01.0, December, 1991.

SAMPLE RESULTS

Graseby Nutech-RTL

Client : RTP Environmental Associates
 Sample ID : 93082851-1
 File ID : C:\HPCHEM\1\DATA\091793B\0801002.D
 Analyzed : 17-Sep-93

Client ID : 2-4can1:can 21
 Sampling volume : 300 ml
 Description : TO-14 Sim
 Calibration range : 0.2 - 10.0 ppbv

#	Compound name	Result	CAS Number	Flags
2	Dichlorodifluoromethane	0.28 ppbv	75-71-8	
3	Chloromethane	0.35 ppbv	74-87-3	
4	1,2-Dichloro-1,1,2,2-tetrafluoroethane	Bql	76-14-2	
5	Vinyl chloride	Bql	75-01-4	
6	Bromomethane	Bql	74-83-9	
7	Chloroethane	Bql	75-00-3	
8	Trichlorofluoromethane	0.23 ppbv	75-69-4	
9	1,1-Dichloroethene	Bql	75-35-4	
10	Methylene chloride	0.37 ppbv	75-09-2	
11	3-Chloropropene	Bql	107-06-1	
12	1,1,2-Trichloro-1,2,2-trifluoroethane	Bql	76-13-1	
13	1,1-Dichloroethane	Bql	75-34-3	
14	cis-1,2-Dichloroethene	Bql	156-59-2	
15	Chloroform	Bql	67-66-3	
16	1,2-Dichloroethane	Bql	107-06-2	
17	1,1,1-Trichloroethane	0.21 ppbv	71-55-6	
19	Benzene	0.35 ppbv	71-43-2	
20	Carbon tetrachloride	Bql	56-23-5	
21	1,2-Dichloropropane	Bql	78-87-5	
22	Trichloroethene	Bql	79-01-6	
23	cis-1,3-Dichloropropene	Bql	10061-01-5	
24	trans-1,3-Dichloropropene	Bql	10061-02-6	
25	1,1,2-Trichloroethane	Bql	79-00-5	
26	Toluene	0.67 ppbv	108-88-3	
28	1,2-Dibromoethane	Bql	106-93-4	
29	Tetrachloroethene	Bql	127-18-4	
30	Chlorobenzene	Bql	108-90-7	
31	Ethylbenzene	Bql	100-41-4	
32	m,p-Xylene (isomer coelution: min. 0.4ppbv)	Bql	1330-20-7	
33	Styrene	Bql	100-42-5	
34	o-Xylene	Bql	95-47-6	
35	1,1,2,2-Tetrachloroethane	Bql	79-34-5	
36	4-Ethyltoluene	Bql	622-96-8	
37	1,3,5-Trimethylbenzene	Bql	108-67-8	
38	1,2,4-Trimethylbenzene	Bql	95-63-6	
39	1,3-Dichlorobenzene	Bql	541-73-1	
40	Benzyl chloride	Bql	100-44-7	
41	1,4-Dichlorobenzene	Bql	106-46-7	
42	1,2-Dichlorobenzene	Bql	95-50-1	
43	1,2,4-Trichlorobenzene	Bql	120-82-1	
44	Hexachlorobutadiene	Bql	87-68-3	

Bql = below quantifiable limit

Dilution factor = 1

Quantitation Report

Data File : C:\HPCHEM\1\DATA\091793B\0801002.D

Acq Time : 17 Sep 93 7:50 pm

Sample : 93082651-1

Misc : 2-4can2;can 21

Quant Time: Sep 20 11:34 1993

Operator: wlb

Inst : 5971

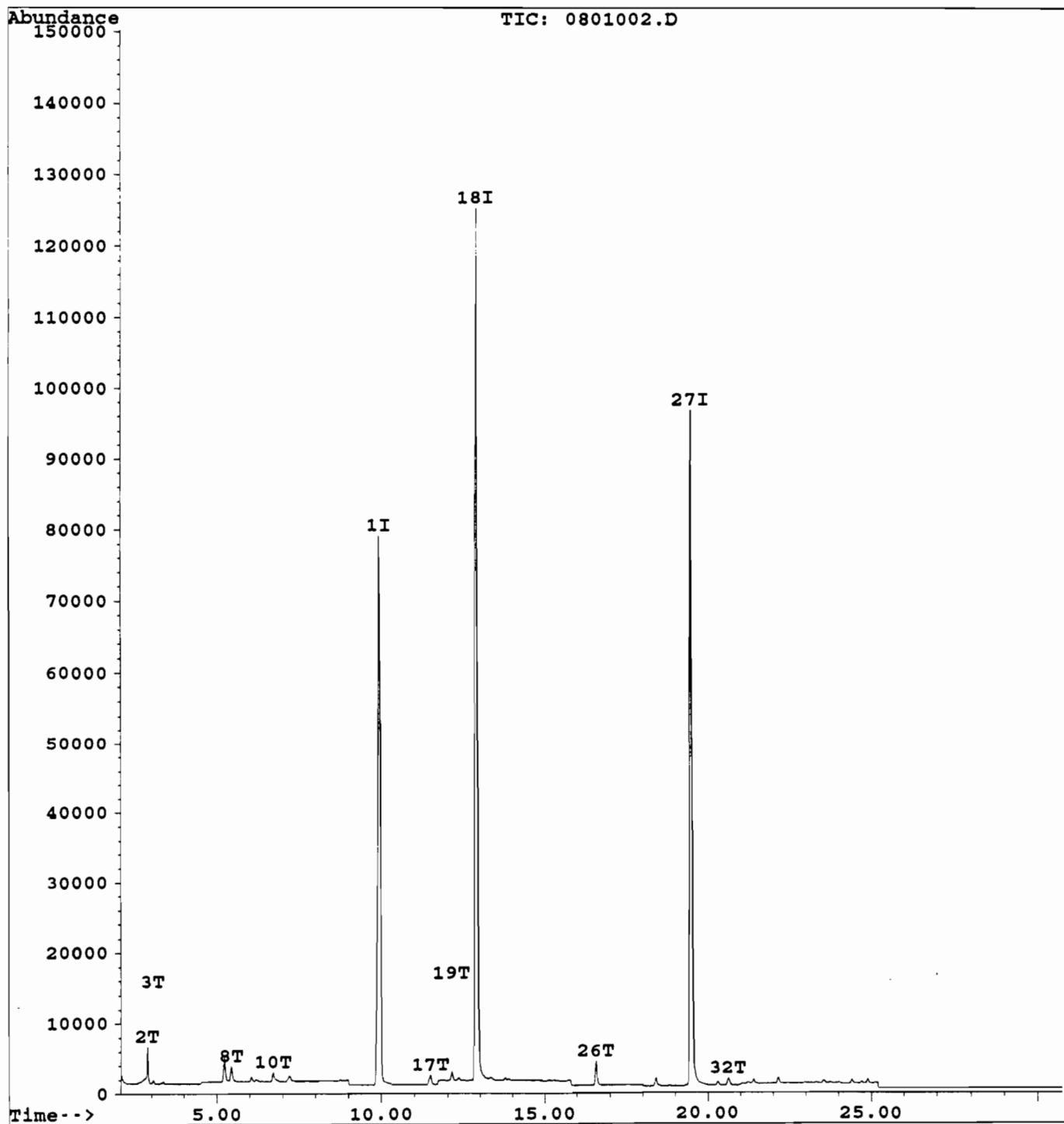
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\LOWSIM.M

Title : TO-14 sim calibration

Last Update : Mon Sep 20 12:46:03 1993

Response via : Single Level Calibration



3550A 'QA/QC REPORT

Sample Information

Sample Name: 93082651-1

Inlet Position : 8

Injection Number: 1

Run Information

Inject Time : 19:59:10

Date : 09-17-93

Analysis Information

Method Name : to14_lci.mth

Int. Std. : Yes

Sample Type : Sample

Cryofocus : Yes

Analysis Type : Low Level

Target Sample Volume: 300

True Sample Volume : 300

ERRORS: None

Graseby Nutech-RTL

Client : RTP Environmental Associates
 Sample ID : 93082651-2
 File ID : C:\HPCHEM\1\DATA\091793B\0901003.D
 Analyzed : 17-Sep-93

Client ID : 2-4can2:can 23
 Sampling volume : 300 ml
 Description : TO-14 Sim
 Calibration range : 0.2 - 10.0 ppbv

#	Compound name	Result	CAS Number	Flags
2	Dichlorodifluoromethane	0.33 ppbv	75-71-8	
3	Chloromethane	0.34 ppbv	74-87-3	
4	1,2-Dichloro-1,1,2,2-tetrafluoroethane	Bql	76-14-2	
5	Vinyl chloride	Bql	75-01-4	
6	Bromomethane	Bql	74-83-9	
7	Chloroethane	Bql	75-00-3	
8	Trichlorofluoromethane	0.21 ppbv	75-69-4	
9	1,1-Dichloroethene	Bql	75-35-4	
10	Methylene chloride	Bql	75-09-2	
11	3-Chloropropene	Bql	107-05-1	
12	1,1,2-Trichloro-1,2,2-trifluoroethane	Bql	76-13-1	
13	1,1-Dichloroethane	Bql	75-34-3	
14	cis-1,2-Dichloroethene	Bql	156-59-2	
15	Chloroform	Bql	67-68-3	
16	1,2-Dichloroethane	Bql	107-06-2	
17	1,1,1-Trichloroethane	Bql	71-55-6	
19	Benzene	Bql	71-43-2	
20	Carbon tetrachloride	Bql	56-23-5	
21	1,2-Dichloropropane	Bql	78-87-5	
22	Trichloroethene	Bql	79-01-6	
23	cis-1,3-Dichloropropene	Bql	10061-01-5	
24	trans-1,3-Dichloropropene	Bql	10061-02-6	
25	1,1,2-Trichloroethane	Bql	79-00-5	
26	Toluene	Bql	108-88-3	
28	1,2-Dibromoethane	Bql	106-93-4	
29	Tetrachloroethene	Bql	127-18-4	
30	Chlorobenzene	Bql	108-90-7	
31	Ethylbenzene	Bql	100-41-4	
32	m,p-Xylene (isomer coelution: min. 0.4ppbv)	Bql	1330-20-7	
33	Styrene	Bql	100-42-5	
34	o-Xylene	Bql	95-47-8	
35	1,1,2,2-Tetrachloroethane	Bql	79-34-5	
36	4-Ethyltoluene	Bql	622-96-8	
37	1,3,5-Trimethylbenzene	Bql	108-67-8	
38	1,2,4-Trimethylbenzene	Bql	95-63-6	
39	1,3-Dichlorobenzene	Bql	541-73-1	
40	Benzyl chloride	Bql	100-44-7	
41	1,4-Dichlorobenzene	Bql	106-46-7	
42	1,2-Dichlorobenzene	Bql	95-50-1	
43	1,2,4-Trichlorobenzene	Bql	120-82-1	
44	Hexachlorobutadiene	Bql	87-68-3	

Bql = below quantifiable limit

Dilution factor = 1

Quantitation Report

Data File : C:\HPCHEM\1\DATA\091793B\0901003.D

Acq Time : 17 Sep 93 8:40 pm

Operator: wlb

Sample : 93082651-2

Inst : 5971

Misc : 2-4can2;can 23

Multiplr: 1.00

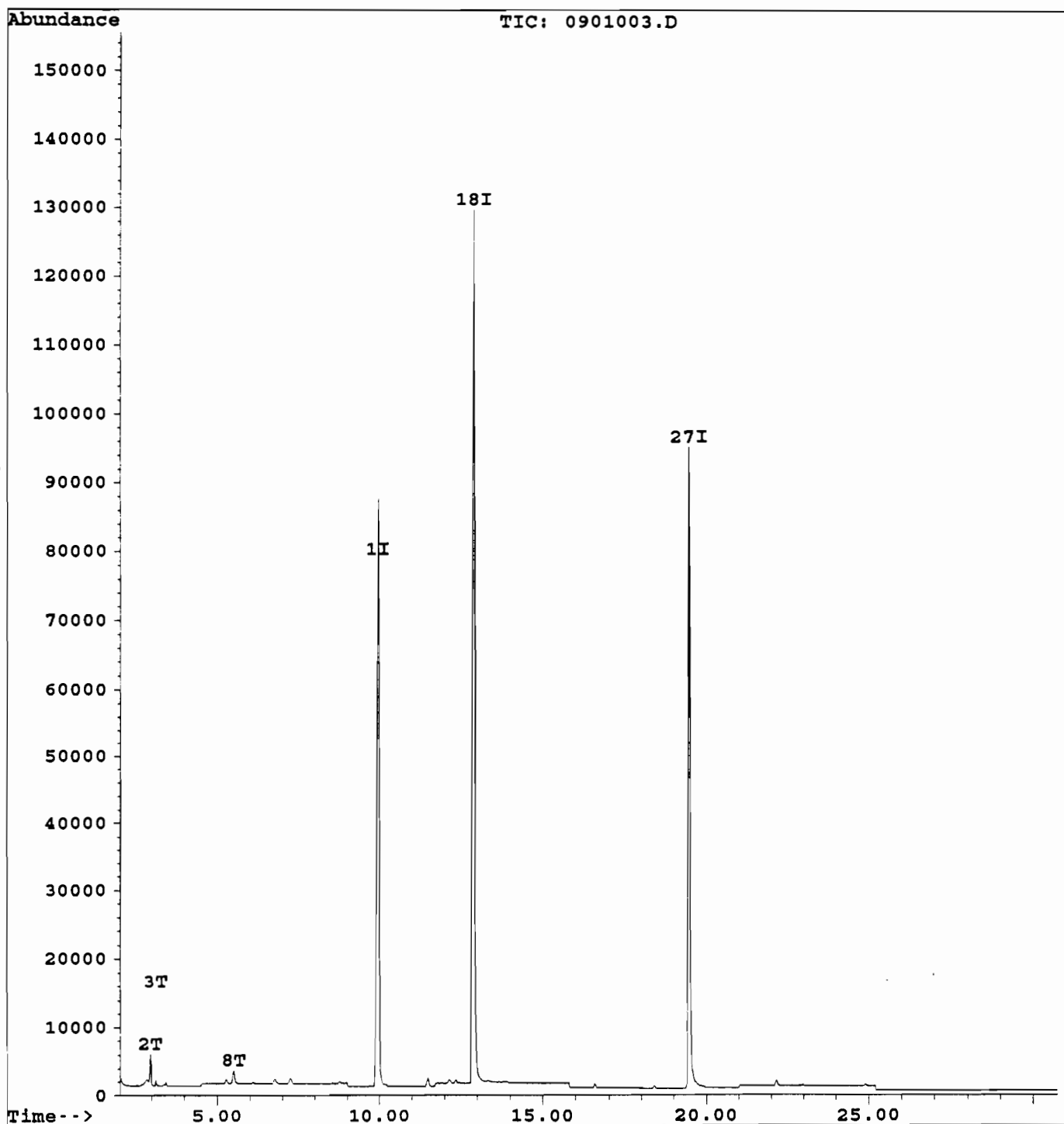
Quant Time: Sep 20 13:02 1993

Method : C:\HPCHEM\1\METHODS\LOWSIM.M

Title : TO-14 sim calibration

Last Update : Mon Sep 20 12:46:03 1993

Response via : Single Level Calibration



3550A QA/QC REPORT

Sample Information

Sample Name: 93082651-2

Inlet Position : 9

Injection Number: 1

Run Information

Inject Time : 20:49:53

Date : 09-17-93

Analysis Information

Method Name : to14_lci.mth

Int. Std. : Yes

Sample Type : Sample

Cryofocus : Yes

Analysis Type : Low Level

Target Sample Volume: 300

True Sample Volume : 300

ERRORS: None

CHAINS OF CUSTODY RECORD

P1 of 4

Project ID: LK808L2-4		Test Type: 2nd Year, 4th Qt. Ambient Air / Soil Gas wells	
Samplers: (Signature) KJS, SM, MB, JW, KG			
Test ID	Sample ID	Date	Time
2-4A1-F	8/24/93		
2-4A1-B			
2-4A2-F			
2-4A2-B			
2-4A3-F			
2-4A3-B			
2-4A4-F			
2-4A4-B			
2-4FB(A)			
2-4FB(B)			
2-4TB(A)			
2-4F1-F	8/23/93		
2-4F1-B			

Relinquished By: (Signature) Jie Wang	Date/Time: 8/25/93, 1400 EDT
Relinquished By: (Signature)	Date/Time:
Relinquished By: (Signature)	Date/Time:

Received By: (Signature) [Signature]	Date/Time: 8/26/93 11:00
Received By: (Signature)	Date/Time:
Received By: (Signature)	Date/Time:

Comments:
* : Please call Scott Mills for lab. instructions!

RTP ENVIRONMENTAL ASSOCIATES, INC.
408 Post Avenue, Suite 105, Westbury, NY 11590
(516) 333-4828

p4 of 4

RTP ENVIRONMENTAL ASSOCIATES, INC.
408 Post Avenue, Suite 108, Westbury, NY 11590
5161 333-4576

P: of 1

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4765 Calle Quetzal, Camarillo, California 93012(805) 389-1353
FAX (805) 389-1438CLIENT: Scott Mills
RTP Environmental Associates, Inc.
400 Post Avenue, Suite 105
Westbury, NY 11590

Lab Number : CJ-3866-1

Project : LKB0BL2-4

Analyzed : 08/27/93

Analyzed by: YL

Method : EPA 5040

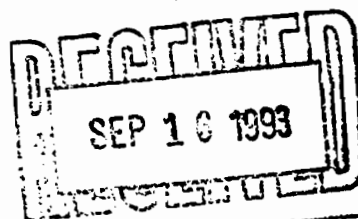
REPORT OF ANALYTICAL RESULTS

Page 1 of 2

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED		
2-4ML3-F,B	Tenax tube	KJS,MB,SM,KG,JW	08/23/93	08/27/93	
CONSTITUENT	(CAS RN)	*PQL Total ng	RESULT Total ng	NOTE	
HSL Volatile Organics					
Acetone	(67641)	50.	220		
Benzene	(71432)	10.	ND		
Bromodichloromethane	(75274)	20.	ND		
Bromomethane (Methyl Bromide)	(74839)	20.	ND		
Bromoform	(75252)	20.	ND		
2-Butanone (MEK)	(78933)	20.	ND		
Carbon Disulfide	(75150)	100.	ND		
Carbon Tetrachloride	(56235)	20.	ND		
Chlorobenzene	(108907)	10.	ND		
Chloroethane (Ethyl Chloride)	(75003)	10.	ND		
Chloroform	(67663)	60.	ND		
Chloromethane (Methyl Chloride)	(74873)	10.	ND		
Dibromochloromethane	(124381)	20.	ND		
1,1-Dichloroethane	(75343)	10.	ND		
1,2-Dichloroethane (EDC)	(107062)	20.	ND		
1,1-Dichloroethene	(75354)	20.	ND		
cis-1,2-Dichloroethene	(156694)	20.	ND		
trans-1,2-Dichloroethene	(156605)	20.	ND		
Dichloromethane	(75092)	100.	ND		

Lab Certifications: CAELAP #1598 & #1783; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD
#10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

08/30/93
MS1/1M18J
LRH/ge
JH27MS1

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4765 Calle Quetzal, Camarillo, California 93012(805) 389-1353
FAX (805) 389-1438CLIENT: Scott Mills
RTP Environmental Associates, Inc.
400 Post Avenue, Suite 105
Westbury, NY 11590Lab Number : CJ-3866-1
Project : LKB0BL2-4
Analyzed : 08/27/93
Analyzed by: YL
Method : EPA 5040

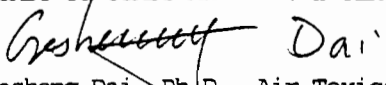
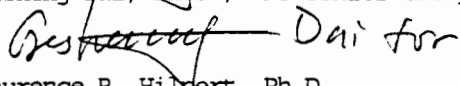
REPORT OF ANALYTICAL RESULTS

Page 2 of 2

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED	
2-4ML3-F,B	Tenax tube	KJS,MB,SM,KG,JW	08/23/93	08/27/93
CONSTITUENT	(CAS RN)	*PQL	RESULT	NOTE
		Total ng	Total ng	
1,2-Dichloropropane	(78875)	10.	ND	
cis-1,3-Dichloropropene	(10061015)	10.	ND	
trans-1,3-Dichloropropene	(10061026)	10.	ND	
Ethylbenzene	(100411)	20.	ND	
2-Hexanone	(591786)	10.	ND	
4-Methyl-2-Pentanone (MIBK)	(108101)	10.	ND	
Styrene	(100425)	20.	ND	
1,1,2,2-Tetrachloroethane	(79345)	20.	ND	
Tetrachloroethene (PCE)	(127184)	20.	160.	
Toluene	(108883)	20.	ND	
1,1,1-Trichloroethane (TCA)	(71556)	20.	24.	
1,1,2-Trichloroethane	(79005)	20.	ND	
Trichloroethene (TCE)	(79016)	10.	ND	
Vinyl Acetate	(108054)	40.	ND	
Vinyl Chloride	(75104)	10.	ND	
Xylenes	(1330207)	20.	ND	
Percent Surrogate Recovery			102.	

Lab Certifications: CAELAP #1598 & #1783; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

08/30/93
MS1/1M18J
LRH/ge
JH27MS1Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.
Gesheng Dai, Ph.D., Air Toxics Group Leader
Laurence R. Hilgert, Ph.D.
Vice President

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SoCal Division (Camarillo Laboratory)
4765 Calle Quetzal, Camarillo, California 93012

(805) 389-1353
FAX (805) 389-1438

CLIENT: Scott Mills
RTP Environmental Associates, Inc.
400 Post Avenue, Suite 105
Westbury, NY 11590

Lab Number : CJ-3866-2
Project : LKB0BL2-4
Analyzed : 08/27/93
Analyzed by: YL
Method : EPA 5040

REPORT OF ANALYTICAL RESULTS

Page 1 of 2

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED		
2-4M21-F,B	Tenax tube	KJS,MB,SM,KG,JW	08/23/93	08/27/93	
CONSTITUENT	(CAS RN)	*PQL	RESULT	NOTE	
		Total ng	Total ng		
HSL Volatile Organics					
Acetone	(67641)	50.	110		
Benzene	(71432)	10.	ND		
Bromodichloromethane	(75274)	20.	ND		
Bromomethane (Methyl Bromide)	(74839)	20.	ND		
Bromoform	(75252)	20.	ND		
2-Butanone (MEK)	(78933)	20.	ND		
Carbon Disulfide	(75150)	100.	ND		
Carbon Tetrachloride	(56235)	20.	ND		
Chlorobenzene	(108907)	10.	ND		
Chloroethane (Ethyl Chloride)	(75003)	10.	ND		
Chloroform	(67663)	60.	ND		
Chloromethane (Methyl Chloride)	(74873)	10.	ND		
Dibromochloromethane	(124381)	20.	ND		
1,1-Dichloroethane	(75343)	10.	ND		
1,2-Dichloroethane (EDC)	(107062)	20.	ND		
1,1-Dichloroethene	(75354)	20.	ND		
cis-1,2-Dichloroethene	(156694)	20.	ND		
trans-1,2-Dichloroethene	(156605)	20.	ND		
Dichloromethane	(75092)	100.	ND		

Lab Certifications: CAELAP #1598 & #1783; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

08/30/93
MS1/1M19J
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JH27MS1

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4765 Calle Quetzal, Camarillo, California 93012

(805) 389-1353
FAX (805) 389-1438

CLIENT: Scott Mills
RTP Environmental Associates, Inc.
400 Post Avenue, Suite 105
Westbury, NY 11590

Lab Number : CJ-3866-2
Project : LKBOBL2-4
Analyzed : 08/27/93
Analyzed by: YL
Method : EPA 5040

REPORT OF ANALYTICAL RESULTS

Page 2 of 2

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED		
2-4M21-F,B	Tenax tube	KJS,MB,SM,KG,JW	08/23/93	08/27/93	
CONSTITUENT	(CAS RN)	*PQL Total ng	RESULT Total ng	NOTE	
1,2-Dichloropropane	(78875)	10.	ND		
cis-1,3-Dichloropropene	(10061015)	10.	ND		
trans-1,3-Dichloropropene	(10061026)	10.	ND		
Ethylbenzene	(100411)	20.	ND		
2-Hexanone	(591786)	10.	ND		
4-Methyl-2-Pentanone (MIBK)	(108101)	10.	ND		
Styrene	(100425)	20.	ND		
1,1,2,2-Tetrachloroethane	(79345)	20.	ND		
Tetrachloroethene (PCE)	(127184)	20.	47.		
Toluene	(108883)	20.	ND		
1,1,1-Trichloroethane (TCA)	(71556)	20.	ND		
1,1,2-Trichloroethane	(79005)	20.	ND		
Trichloroethene (TCE)	(79016)	10.	ND		
Vinyl Acetate	(108054)	40.	ND		
Vinyl Chloride	(75104)	10.	ND		
Xylenes	(1330207)	20.	ND		
Percent Surrogate Recovery			103.		

Lab Certifications: CAELAP #1598 & #1783; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

08/30/93
MS1/1M19J
LRH/ge
JH27MS1

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai, Ph.D., Air Toxics Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

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4765 Calle Quetzal, Camarillo, California 93012

(805) 389-1353
FAX (805) 389-1438

CLIENT: Scott Mills
RTP Environmental Associates, Inc.
400 Post Avenue, Suite 105
Westbury, NY 11590

Lab Number : CJ-3866-3
Project : LKB0BL2-4
Analyzed : 09/03/93
Analyzed by: JK
Method : EPA 8260

REPORT OF ANALYTICAL RESULTS

Page 1 of 3

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED		
2-4TB(B) -C	Aqueous	KJS, MB, SM, KG, JW	08/24/93	08/27/93	
CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE	
VOLATILE ORGANIC COMPOUNDS BY GC/MS					1
Benzene	(71432)	0.5	ND		
Bromobenzene	(108861)	0.5	ND		
Bromochloromethane	(74975)	0.5	ND		
Bromodichloromethane	(75274)	0.5	ND		
Bromoform	(75252)	0.5	ND		
Bromomethane (Methyl bromide)	(74839)	1.	ND		
n-Butylbenzene	(104518)	0.5	ND		
sec-Butylbenzene	(135988)	0.5	ND		
tert-Butylbenzene	(98066)	0.5	ND		
Carbon tetrachloride	(56235)	0.5	ND		
Chlorobenzene	(108907)	0.5	ND		
Chloroethane (Ethyl chloride)	(75003)	1.	ND		
Chloroform	(67663)	0.5	ND		
Chloromethane (Methyl chloride)	(74873)	1.	ND		
2-Chlorotoluene	(95498)	0.5	ND		
4-Chlorotoluene	(106434)	0.5	ND		
Dibromochloromethane	(124481)	0.5	ND		
1,2-Dibromo-3-chloropropane	(96128)	0.5	ND		

Lab Certifications: CAELAP #1598 & #1783; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) EXTRACTED by EPA 5030 (purge-and-trap)

09/09/93
DVL/03SEP08
MH/nz
CJ38674245V

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4765 Calle Quetzal, Camarillo, California 93012

(805) 389-1353
FAX (805) 389-1438

CLIENT: Scott Mills
RTP Environmental Associates, Inc.
400 Post Avenue, Suite 105
Westbury, NY 11590

Lab Number : CJ-3866-3
Project : LKB0BL2-4
Analyzed : 09/03/93
Analyzed by: JK
Method : EPA 8260

REPORT OF ANALYTICAL RESULTS

Page 2 of 3

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED		
2-4TB (B) -C	Aqueous	KJS, MB, SM, KG, JW	08/24/93	08/27/93	
CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE	
1,2-Dibromoethane (EDB)	(106934)	0.5	ND		
Dibromomethane	(74953)	0.5	ND		
1,2-Dichlorobenzene	(95501)	0.5	ND		
1,3-Dichlorobenzene	(541731)	0.5	ND		
1,4-Dichlorobenzene	(106467)	0.5	ND		
Dichlorodifluoromethane (Freon 12)	(75718)	1.	ND		
1,1-Dichloroethane	(75343)	0.5	ND		
1,2-Dichloroethane (EDC)	(107062)	0.5	ND		
1,1-Dichloroethene	(75354)	0.5	ND		
cis-1,2-Dichloroethene	(156592)	0.5	ND		
trans-1,2-Dichloroethene	(156605)	0.5	ND		
1,2-Dichloropropane	(78875)	0.5	ND		
1,3-Dichloropropane	(142289)	0.5	ND		
2,2-Dichloropropane	(594207)	0.5	ND		
1,1-Dichloropropene	(563586)	0.5	ND		
Ethylbenzene	(100414)	0.5	ND		
Hexachlorobutadiene	(87683)	1.	ND		
Isopropylbenzene	(98828)	0.5	ND		
4-Isopropyltoluene	(99876)	0.5	ND		
Methylene chloride	(75092)	1.	3.9		

Lab Certifications: CAELAP #1598 & #1783; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

09/09/93
DV1/03SEP08
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CJ38674245V

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4765 Calle Quetzal, Camarillo, California 93012(805) 389-1353
FAX (805) 389-1438CLIENT: Scott Mills
RTP Environmental Associates, Inc.
400 Post Avenue, Suite 105
Westbury, NY 11590Lab Number : CJ-3866-3
Project : LKB0BL2-4
Analyzed : 09/03/93
Analyzed by: JK
Method : EPA 8260

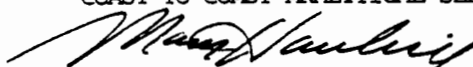
REPORT OF ANALYTICAL RESULTS

Page 3 of 3

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED		
2-4TB(B) -C	Aqueous	KJS, MB, SM, KG, JW	08/24/93	08/27/93	
CONSTITUENT	(CAS RN)	*PQL µg/L	RESULT µg/L	NOTE	
Naphthalene	(91203)	0.5	ND		
n-Propylbenzene	(103651)	0.5	ND		
Styrene	(100425)	0.5	ND		
1,1,1,2-Tetrachloroethane	(630206)	0.5	ND		
1,1,2,2-Tetrachloroethane	(79345)	0.5	ND		
Tetrachloroethene (PCE)	(127184)	0.5	ND		
Toluene	(108883)	0.5	ND		
1,2,3-Trichlorobenzene	(87616)	0.5	ND		
1,2,4-Trichlorobenzene	(120821)	0.5	ND		
1,1,1-Trichloroethane (TCA)	(71556)	0.5	ND		
1,1,2-Trichloroethane	(79005)	0.5	ND		
Trichloroethene (TCE)	(79016)	0.5	ND		
Trichlorofluoromethane (Freon 11)	(75694)	1.	ND		
1,2,3-Trichloropropane	(96184)	0.5	ND		
1,2,4-Trimethylbenzene	(95636)	0.5	ND		
1,3,5-Trimethylbenzene	(108678)	0.5	ND		
Vinyl chloride	(75014)	1.	ND		
Xylenes	(1330207)	0.5	ND		
Toluene-d8 (Surrogate Percent Recovery)			94.		
p-Bromofluorobenzene (Surrogate Percent Recovery)			111.		

Lab Certifications: CAELAP #1598 & #1783; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #10187

*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

09/09/93
DV1/03SEP08
MH/nz
CJ38674245VRespectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.Mary Havlicek, Ph.D.
President

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4765 Calle Quetzal, Camarillo, California 93012(805) 389-1353
FAX (805) 389-1438

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 08/27/93
Analyzed by: GD
Method : EPA TO-14INSTRUMENT BLANK
REPORT OF ANALYTICAL RESULTS

Page 1 of 2

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED		
INSTRUMENT BLANK	Air				
CONSTITUENT	(CAS RN)	*PQL µg/cu M	RESULT µg/cu M	NOTE	
VOLATILE ORGANICS BY EPA TO-14					1
Acetone	(67641)	3.	ND		
Benzene	(71432)	0.5	ND		
Bromodichloromethane	(75274)	1.	ND		
Bromomethane (Methyl Bromide)	(74839)	1.	ND		
Bromoform	(75252)	1.	ND		
1,3-Butadiene	(106990)	1.	ND		
2-Butanone (MEK)	(78933)	1.	ND		
Carbon Disulfide	(75150)	5.	ND		
Carbon Tetrachloride	(56235)	1.	ND		
Chlorobenzene	(108907)	0.5	ND		
Chloroethane (Ethyl Chloride)	(75003)	0.5	ND		
2-Chloroethyl Vinyl Ether	(110758)	5.	ND		
Chloroform	(67663)	3.	ND		
Chloromethane (Methyl Chloride)	(74873)	0.5	ND		
Dibromochloromethane	(124381)	1.	ND		
1,2-Dibromoethane (EDB)	(106934)	2.	ND		
1,2-Dichlorobenzene	(95501)	1.	ND		
1,3-Dichlorobenzene	(541731)	1.	ND		
1,4-Dichlorobenzene	(106467)	1.	ND		
1,1-Dichloroethane	(75343)	0.5	ND		
1,2-Dichloroethane (EDC)	(107062)	1.	ND		

Lab Certifications: CAELAP #1598 & #1783; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #10187
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)
(1) Concentrations in ug/cu M reported at 760 mm Hg pressure and 298 deg. K.08/30/93
MS1/1M03J
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Analyzed : 08/27/93
Analyzed by: GD
Method : EPA TO-14

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REPORT OF ANALYTICAL RESULTS

Page 2 of 2

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED		
INSTRUMENT BLANK	Air				
CONSTITUENT	(CAS RN)	*PQL µg/cu M	RESULT µg/cu M	NOTE	
1,1-Dichloroethene	(75354)	1.	ND		
cis-1,2-Dichloroethene	(156694)	1.0	ND		
trans-1,2-Dichloroethene	(156605)	1.	ND		
Dichloromethane	(75092)	5.	ND		
1,2-Dichloropropane	(78875)	0.5	ND		
cis-1,3-Dichloropropene	(10061015)	0.5	ND		
trans-1,3-Dichloropropene	(10061026)	0.5	ND		
Ethylbenzene	(100411)	1.	ND		
2-Hexanone	(591786)	0.5	ND		
4-Methyl-2-Pentanone (MIBK)	(108101)	0.5	ND		
Styrene	(100425)	1.	ND		
1,1,2,2-Tetrachloroethane	(79345)	1.	ND		
Tetrachloroethene (PCE)	(127184)	1.	ND		
Toluene	(108883)	1	ND		
1,1,1-Trichloroethane (TCA)	(71556)	1.	ND		
1,1,2-Trichloroethane	(79005)	1.	ND		
Trichloroethene (TCE)	(79016)	0.5	ND		
Trichlorofluoromethane (F-11)	(75694)	1.	ND		
Trichlorotrifluoroethane (F-113)	(76131)	2.	ND		
Vinyl Acetate	(108054)	2.	ND		
Vinyl Chloride	(75104)	0.5	ND		
Xylenes	(1330207)	1.	ND		

Lab Certifications: CAELAP #1598 & #1783; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #10187
*RESULTS listed as 'ND' were not detected at or above the listed PQL (Practical Quantitation Limit)

08/30/93
MS1/LM03J
LRH/ge
CJ9308-27

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai, Ph.D., Air Toxics Group Leader

Laurence R. Hilpert, Ph.D.
Vice President



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FAX (805) 389-1438

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 08/27/93
Analyzed by: YL
Method : EPA TO-14

QC SPIKE
REPORT OF ANALYTICAL RESULTS

Page 1 of 2

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED		
QC SPIKE	Air				
CONSTITUENT	*PQL µg/cu M	SPIKE AMOUNT	RESULT µg/cu M	%REC	NOTE
VOLATILE ORGANICS BY EPA TO-14					1,2
Acetone	3.		NS		
Benzene	0.5	16.	17.	106.	
Bromodichloromethane	1.		NS		
Bromomethane (Methyl Bromide)	1.	21.	15.	71.	
Bromoform	1.		NS		
1,3-Butadiene	1.	10.	8.2	82.	
2-Butanone (MEK)	1.		NS		
Carbon Disulfide	5.		NS		
Carbon Tetrachloride	1.	31.	30.	97.	
Chlorobenzene	0.5	23.	22.	96.	
Chloroethane (Ethyl Chloride)	0.5		NS		
2-Chloroethyl Vinyl Ether	5.		16.	NS	
Chloroform	3.	25.	26.	104.	
Chloromethane (Methyl Chloride)	0.5		3.3	NS	
Dibromochloromethane	1.		NS		
1,2-Dibromoethane (EDB)	2.	10.	8.4	84.	
1,2-Dichlorobenzene	1.		NS		
1,3-Dichlorobenzene	1.		NS		
1,4-Dichlorobenzene	1.		NS		
1,1-Dichloroethane	0.5		NS		

Lab Certifications: CAELAP #1598 & #1783; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #1013

* RESULTS listed as 'NS' were not spiked. PQL = Practical Quantitation Limit

(1) Concentrations in ug/cu M reported at 760 mm Hg pressure and 298 deg. K.

(2) Zero Air spiked with NIST SRM 1804, Cylinder # ALM-000881.

08/30/93
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LRH/ge
CJ9308-27



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FAX (805) 389-1438

CLIENT: Coast-to-Coast Analytical Services, Inc.

Analyzed : 08/27/93
Analyzed by: YL
Method : EPA TO-14

QC SPIKE
REPORT OF ANALYTICAL RESULTS

Page 2 of 2

SAMPLE DESCRIPTION	MATRIX	SAMPLED BY	SAMPLED DATE RECEIVED		
QC SPIKE	Air				
CONSTITUENT	*PQL µg/cu M	SPIKE AMOUNT	RESULT µg/cu M	%REC	NOTE
1,2-Dichloroethane (EDC)	1.	20.	20.	100.	
1,1-Dichloroethene	1.		NS		
cis-1,2-Dichloroethene	1.0		2.1	NS	
trans-1,2-Dichloroethene	1.		NS		
Dichloromethane	5.	17.	19.	112.	
1,2-Dichloropropane	0.5	23.	23.	100.	
cis-1,3-Dichloropropene	0.5		NS		
trans-1,3-Dichloropropene	0.5		NS		
Ethylbenzene	1.	15.	14.	93.	
2-Hexanone	0.5		NS		
4-Methyl-2-Pentanone (MIBK)	0.5		NS		
Styrene	1.		NS		
1,1,2,2-Tetrachloroethane	1.		NS		
Tetrachloroethene (PCE)	1.	34.	29.	85.	
Toluene	1	18.	18.	100.	
1,1,1-Trichloroethane (TCA)	1.	28.	28.	100.	
1,1,2-Trichloroethane	1.		NS		
Trichloroethene (TCE)	0.5	27.	26.	96.	
Trichlorofluoromethane (F-11)	1.	29.	22.	76.	
Trichlorotrifluoroethane (F-113)	2.		NS		
Vinyl Acetate	2.		NS		
Vinyl Chloride	0.5	14.	12.	86.	
Xylenes	1.	15.	14.	93.	

Lab Certifications: CAELAP #1598 & #1783; UTELAP #E-142; AZELAP #AZ0162; A2LA #0136-01; L.A.Co.CSD #10187
* RESULTS listed as 'NS' were not spiked. PQL = Practical Quantitation Limit

08/30/93
MS1/1M20J
LRH/ge
CJ9308-27

Respectfully submitted,
COAST-TO-COAST ANALYTICAL SERVICES, INC.

Gesheng Dai, Ph.D., Air Toxics Group Leader

Laurence R. Hilpert, Ph.D.
Vice President

[illegible]

500 AL

APPENDIX E
FIELD DATA FORMS

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LK30BL2-4 LOCATION Cyster Bay Landfill DATE Aug. 23, 93INVESTIGATORS JW, KJG, RSMGENERAL WEATHER CONDITIONS Sunny, 77°FSAMPLE ID 2-4 F1 Front - 924 D
Back - 921 ESAMPLER ID Soil gas samplerPUMP ID B #15 R3SAMPLE LOCATION Fireman's Training CenterWELL ID F1WELL DEPTH 30"NOMINAL FLOW RATE 1 lpmNOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT
VOC READING 0.0 ppmINITIAL WELL
VOC READING 0.0 ppmINITIAL INLET LINE
VOC READING ppmSAMPLE START TIME 10:41 AM EDTINITIAL ROTAMETER READING 120 (Bot. SS Ball) (READ FROM B)122 @ 10:43FINAL AMBIENT
VOC READING 0.0 ppmFINAL WELL
VOC READING 0.0 ppmSAMPLE STOP TIME EDTDURATION 10 (min)FINAL ROTAMETER READING 122 (READ FROM B)

COMMENTS: Pre Leak Check - O.K. ; TRUCKING ACTIVITY ~ 200 YDS. AWAY.
Post Leak Check - O.K. Line 1 is used

Leak Check OK (pre)

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LK30BL2-4 LOCATION Cyster Bay Landfill DATE Aug. 23, 93INVESTIGATORS SM KGGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-4 M2Front - 921C
Back - 921BSAMPLER ID Soil gas samplerPUMP ID B #5, R3SAMPLE LOCATION M2 1 W. of
from winding RdWELL ID M2WELL DEPTH 30"NOMINAL FLOW RATE 1 lpmNOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT
VOC READING 0.0 ppmINITIAL WELL
VOC READING 0.0 ppmINITIAL INLET LINE
VOC READING 0.0 ppmSAMPLE START TIME 1107 EDTINITIAL ROTAMETER READING 120 (READ FROM 120 B)FINAL AMBIENT
VOC READING 0.0 ppmFINAL WELL
VOC READING 0.0 ppmSAMPLE STOP TIME 1117 EDTDURATION 10 (Min)FINAL ROTAMETER READING 113 (READ FROM 113 B)

COMMENTS: flow fault occurred 30" after start, change Rotameter
reading to 110 B of SS. Rotameter reading was up to 112 at 11:11 EDT.
M2 is loose, you can pull it out easily. Line 2 is used

Leak check o.k. (pre)

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LK30BL2-4 LOCATION Cyster Bay landfill DATE Aug. 23, 93INVESTIGATORS RJS SM KG JlwGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-4M4 Front - 921C
Back - 921A SAMPLER ID Soil gas samplerPUMP ID B #5 / R3 SAMPLE LOCATION E of W. road, by the fenceWELL ID M4 WELL DEPTH 30"NOMINAL FLOW RATE 1 lpm NOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING 0.0 ppm INITIAL WELL VOC READING 0.0 ppmINITIAL INLET LINE VOC READING 0.0 ppm SAMPLE START TIME 11:55 EDTINITIAL ROTAMETER READING 109 ~~114~~ SS (READ FROM 114 B)FINAL AMBIENT VOC READING 0.0 ppm FINAL WELL VOC READING 0.0SAMPLE STOP TIME 11:43 1205 EDT DURATION 10 (Min)FINAL ROTAMETER READING 111 ~~114~~ SS (READ FROM 114 B)COMMENTS: Leak check OK (pre) & (post) Line 3 used

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LK30BL2-4 LOCATION Cyster Bay Landfill DATE Aug. 23, 93INVESTIGATORS KG JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-4M5 Front - 921C
Back - 921B SAMPLER ID Soil gas samplerPUMP ID B #5/R3 SAMPLE LOCATION W of W1 RoadWELL ID M5 WELL DEPTH 30"NOMINAL FLOW RATE 1 lpm NOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING 0.0 ppm INITIAL WELL VOC READING 0.0 ppmINITIAL INLET LINE VOC READING 0.0 ppm SAMPLE START TIME 1225 EDTINITIAL ROTAMETER READING 110 B of SS (READ FROM 110 B)FINAL AMBIENT VOC READING 0.0 ppm FINAL WELL VOC READING 0.0 ppmSAMPLE STOP TIME 1235 EDT DURATION 10 (Min)FINAL ROTAMETER READING 113 (READ FROM 110 B)COMMENTS: Truck activities on winding road
Leak check OK (pre) & (post)
new line (#2) is used

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LK30BL2-4 LOCATION Cyster Bay landfill DATE Aug. 23, 93INVESTIGATORS KG JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-4 M6 Front - 921C
Back - 921B SAMPLER ID soil gas samplerPUMP ID B #5/R3 SAMPLE LOCATION E of W roadWELL ID M6 WELL DEPTH 30"NOMINAL FLOW RATE 1 lpm NOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING 0.0 ppm INITIAL WELL VOC READING 0.0 ppmINITIAL INLET LINE VOC READING 0.0 ppm SAMPLE START TIME 1252 EDTINITIAL ROTAMETER READING 110 B of SS (READ FROM 110 B)
112 @ 1258 EDTFINAL AMBIENT VOC READING 0.0 ppm FINAL WELL VOC READING 0.0SAMPLE STOP TIME 1302 EDT DURATION 10 (Min.)FINAL ROTAMETER READING 112 (READ FROM 110 B)COMMENTS: line 2 used. max/min Temp. =leak check OK (pre & post)

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB0BL2-4 LOCATION Cyster Bay landfill DATE Aug. 23, 93INVESTIGATORS KG JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-4M9(10') Front - 921A
Back - 921B SAMPLER ID Soil gas samplerPUMP ID B #5/R3 SAMPLE LOCATION E of road mainWELL ID M9(10') WELL DEPTH 10' (blue)NOMINAL FLOW RATE 1 lpm NOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING 0.0 ppm INITIAL WELL VOC READING 0.0 ppmINITIAL INLET LINE VOC READING 0.0 ppm SAMPLE START TIME 1358 EDTINITIAL ROTAMETER READING 110 B of SS (READ FROM 120 B)FINAL AMBIENT VOC READING 0.0 ppm FINAL WELL VOC READING 0.0SAMPLE STOP TIME 1408 EDT DURATION 10 (Min)FINAL ROTAMETER READING 115 B of SS (READ FROM 120 B)COMMENTS: Max 64°F. leak check ok (pre)

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LK30BL2-4 LOCATION Cyster Bay landfill DATE Aug. 23, 93INVESTIGATORS KG JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-4M9(20') Front - 921B
Back - 921A SAMPLER ID Soil gas samplerPUMP ID B #5 / R3 SAMPLE LOCATION E of W. rd. ~~main~~WELL ID M9(20') Green WELL DEPTH 20' GreenNOMINAL FLOW RATE 1 lpm NOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING 0.0 ppm INITIAL WELL VOC READING 0.0 ppmINITIAL INLET LINE VOC READING 0.0 ppm SAMPLE START TIME 1416 EDTINITIAL ROTAMETER READING 109 R of SS (READ FROM ~~100~~ B)FINAL AMBIENT VOC READING 0.0 ppm FINAL WELL VOC READING 0.0 ppmSAMPLE STOP TIME 1426 EDT DURATION (Min)FINAL ROTAMETER READING 109 R of S.S. (READ FROM ~~100~~ B)COMMENTS: Leak check (pre) OK, 66°F max inside cooler

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LK30BL2-4 LOCATION Cyster Bay Landfill DATE Aug. 23, 93INVESTIGATORS KG JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-4 M9 (30') Front - 921 A
Back - 921 B SAMPLER ID Soil gas samplerPUMP ID B #5 / R3 SAMPLE LOCATION E of W. roadWELL ID M9 (30') WELL DEPTH 30' (red)NOMINAL FLOW RATE 1 lpm NOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING 0.0 ppm INITIAL WELL VOC READING 0.0 ppmINITIAL INLET LINE VOC READING 0.0 ppm SAMPLE START TIME 1435 EDTINITIAL ROTAMETER READING 112 (READ FROM 112 B)
112 @ 1440 EDTFINAL AMBIENT VOC READING 0.0 ppm FINAL WELL VOC READING 0.0 ppmSAMPLE STOP TIME 1445 EDT DURATION 10 (Min.)FINAL ROTAMETER READING 112 (READ FROM 112 B)COMMENTS: Leak check OK, max Temp. = 64°F

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB08L2-4 LOCATION Cyster Bay landfill DATE Aug. 23, '93INVESTIGATORS KG JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-4 M9 (40') Front - 921A
Back - 921A SAMPLER ID Soil gas samplerPUMP ID #5 B / K3 SAMPLE LOCATION E of w. rd. mainWELL ID M9 (40') WELL DEPTH 40' (yellow)NOMINAL FLOW RATE 1 lpm NOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING 0.0 ppm INITIAL WELL VOC READING 0.0 ppmINITIAL INLET LINE VOC READING 0.0 ppm SAMPLE START TIME 1453 EDTINITIAL ROTAMETER READING 110 B of S.S. (READ FROM ~~100~~ B)FINAL AMBIENT VOC READING 0.0 ppm FINAL WELL VOC READING 0.0 ppmSAMPLE STOP TIME 1503 EDT DURATION 10 (Min)FINAL ROTAMETER READING 113 (READ FROM ~~100~~ B)COMMENTS: Leak check OK (pre). Max Temp = 64°Fnoticeable condensate inside impinger

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LK30BL2-4 LOCATION Cyster Bay landfill DATE Aug. 23, '93INVESTIGATORS KG JLVGENERAL WEATHER CONDITIONS Sunny ~82°FSAMPLE ID 2-4MB Front - 921 A
Back - 921 B SAMPLER ID Soil gas samplerPUMP ID #5B R3 SAMPLE LOCATION West of 5th AveWELL ID M13 WELL DEPTH 30"NOMINAL FLOW RATE 1 lpm NOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING 0.0 ppm INITIAL WELL VOC READING 0.0 ppmINITIAL INLET LINE VOC READING 0.0 ppm SAMPLE START TIME 1528 EDTINITIAL ROTAMETER READING 109 (S.S.) (READ FROM 100 B)FINAL AMBIENT VOC READING 0.0 ppm FINAL WELL VOC READING 0SAMPLE STOP TIME 1538 EDT DURATION 10 (Min)FINAL ROTAMETER READING 110 (READ FROM 100 B)64°F insideCOMMENTS: Line 4. f Hose MANUVER ERROR, Leak Check OK.
Micro Tip battery Changed.; ATOP of DRY SOIL {DUST}

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB08L2-4 LOCATION Cyster Bay Landfill DATE Aug 23, 93INVESTIGATORS KG, JWGENERAL WEATHER CONDITIONS Sunny, Lr. BreezeSAMPLE ID 2-4 16 Front - 921 B
Back - 921 ASAMPLER ID Soil gas samplerPUMP ID 5BR3SAMPLE LOCATION Winning Rd. mainWELL ID M-16WELL DEPTH 30"NOMINAL FLOW RATE 1 lpmNOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT
VOC READING 0.0 ppmINITIAL WELL
VOC READING 0.0 ppmINITIAL INLET LINE
VOC READING 0.0 ppmSAMPLE START TIME 1552 EDTINITIAL ROTAMETER READING 110 (READ FROM ~~110~~ B)FINAL AMBIENT
VOC READING 0.0 ppmFINAL WELL
VOC READING 0.0 ppmSAMPLE STOP TIME 1602 EDTDURATION 10 (Min)FINAL ROTAMETER READING 111 (READ FROM ~~110~~ B)

Temp = 62°F

COMMENTS: Leak Check. (O.K.), Line 4, well purged! (✓)

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB08L2-4 LOCATION Oyster Bay Landfill DATE Aug. 23, 93INVESTIGATORS JW, KGGENERAL WEATHER CONDITIONS Sunny, 80°FSAMPLE ID 2-4 M21 Front - 921 D
Back - 921 B SAMPLER ID Soil gas samplerPUMP ID 58 R3 SAMPLE LOCATION Clement T. H.WELL ID M21 WELL DEPTH 30"NOMINAL FLOW RATE 1 lpm NOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING 0.0 ppm INITIAL WELL VOC READING 0.0 ppmINITIAL INLET LINE VOC READING 0.0 ppm SAMPLE START TIME 1615 EDTINITIAL ROTAMETER READING 108 (READ FROM 100 B)FINAL AMBIENT VOC READING 0.0 ppm FINAL WELL VOC READING 0.0SAMPLE STOP TIME 1625 EDT DURATION 10 (Min)FINAL ROTAMETER READING 111 (READ FROM 100 B)T = 60°FCOMMENTS: Purged ✓ Cell Check (OK.)Condensate collected @ M21 → first observed at Cluster well
M9 (10' - 40'). ∴ ⇒ M9 - M21 condensate collected → 0.3 ml

SOIL GAS WELL SAMPLING DATA SHEET

* Use Spare Impinger * → see comments ✓

PROJECT ID LKBOBL2-4 LOCATION Oyster Bay Landfill DATE Aug. 24, 93INVESTIGATORS SW, KGGENERAL WEATHER CONDITIONS OVERCAST, ~73°F

* FRONT TRAP ONLY. Front - 921 B

SAMPLE ID 2-4 M34 BackSAMPLER ID Soil gas samplerPUMP ID #5B R3SAMPLE LOCATION TIPPLE CROSSINGS AT LANDFILLWELL ID M-34WELL DEPTH 30"NOMINAL FLOW RATE 1 lpmNOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING 0.0 ppmINITIAL WELL VOC READING 9.8 ppmINITIAL INLET LINE VOC READING 0 ppmSAMPLE START TIME 0952 EDTINITIAL ROTAMETER READING 119 (READ FROM 119 B)FINAL AMBIENT VOC READING 0.0 ppmFINAL WELL VOC READING 4.1 ppmSAMPLE STOP TIME 1002 EDTDURATION 10 (Min)FINAL ROTAMETER READING 121 (READ FROM 121 B)

Cooler Temperature = 56°F

COMMENTS: Purged (✓), LEAK Check (✓), High TRUCKING ACTIVITY.1st sample of today, RINSED impinger w/ distilled water,NEW SAMPLING ROD, NEW INLET LINE, * ONE TRAP USED.THERMOMETER WAS RESET IN COOLER; COOLER DUMPED FROM 8/23 USEAGEAND CLEANED w/ distilled water, Grass Cutting Activity 100' away w/ gas pumpLoose well into ground

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LK30BL2-4 LOCATION Cyster Bay landfill DATE Aug. 24, 93INVESTIGATORS SW, KGGENERAL WEATHER CONDITIONS overcast

SAMPLE ID 2-4 M-31 Front - 921 E
~~Back~~
PUMP ID #5B 123 SAMPLER ID Soil gas sampler
WELL ID M-31 SAMPLE LOCATION SW of LF
NOMINAL FLOW RATE 1 lpm WELL DEPTH 30"
NOMINAL SAMPLE VOLUME 10 liters

INITIAL AMBIENT
VOC READING 0.0 ppmINITIAL WELL
VOC READING 1.1 ppmINITIAL INLET LINE
VOC READING _____ ppmSAMPLE START TIME 1013 EDTINITIAL ROTAMETER READING 117 (READ FROM ~~120~~ B)FINAL AMBIENT
VOC READING 0.0 → 0.1 → 0.0 ppmFINAL WELL
VOC READING 0.0SAMPLE STOP TIME 1023 EDTDURATION 10 (Min)FINAL ROTAMETER READING 120 (READ FROM ~~120~~ B)

Cooler Temp: = 54°F

COMMENTS: Purges ✓, LEAK CHECK (O.K.), New inlet line is #5
Front Trap only. Collect ~~start~~ a little bit of condensate
in tenax trap

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LK30BL2-4 LOCATION Cyster Bay landfill DATE Aug. 24, 93INVESTIGATORS JW KGGENERAL WEATHER CONDITIONS OVERCAST ~ 78°F
↳ sunnySAMPLE ID 2-4 M22 Front - 921D
Back - 921ESAMPLER ID Soil gas samplerPUMP ID AB R3SAMPLE LOCATION South of GateWELL ID M-22WELL DEPTH 30"NOMINAL FLOW RATE 1 lpmNOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT
VOC READING 0.0 ppmINITIAL WELL
VOC READING 0.5 ppmINITIAL INLET LINE
VOC READING ppmSAMPLE START TIME 1039 EDTINITIAL ROTAMETER READING 112 (READ FROM 100 B)FINAL AMBIENT
VOC READING 0.0 ppmFINAL WELL
VOC READING 0.0 ppmSAMPLE STOP TIME 1049 EDTDURATION 10 (Min)FINAL ROTAMETER READING 115 (READ FROM 100 B)T = 54°F in coolerCOMMENTS: Purge & Leak Check (✓), collect slight condensate
in trap tenex section.

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB0BL2-4 LOCATION Cyster Bay landfill DATE Aug. 24, 93INVESTIGATORS KG JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-4M13.2 Front - 921A
Back - 919D SAMPLER ID Soil gas samplerPUMP ID B #5/R3 SAMPLE LOCATION E. of W. RdWELL ID M13 WELL DEPTH 30'NOMINAL FLOW RATE 1 lpm NOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING 0.0 ppm INITIAL WELL VOC READING 0.0 ppmINITIAL INLET LINE VOC READING 0.0 ppm SAMPLE START TIME 1104 EDTINITIAL ROTAMETER READING 108 (READ FROM B)FINAL AMBIENT VOC READING 0.0 ppm FINAL WELL VOC READING 0.0 ppmSAMPLE STOP TIME 1114 EDT DURATION 10 (Min)FINAL ROTAMETER READING 109 (READ FROM B)COMMENTS: Leak Check (pre) OK. Max temp. inside cooler = 56(1) This is a duplicate sample of 2-4M13. This sample is collected ~~the~~ 1 day later than 2-4M13.(2) Both Front & Back traps are used.(3) Smell house odor during sampling.(4) Note for 8/24, so far, all wells are purge before sampling.

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LK30BL2-4 LOCATION Cyster Bay landfill DATE Aug. 24, 93INVESTIGATORS KG JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-4 M16.2 Front - 919B
Back - 921A SAMPLER ID Soil gas samplerPUMP ID B #5 / R3 SAMPLE LOCATION W. of W. Road ~~near~~WELL ID M16 WELL DEPTH 30"NOMINAL FLOW RATE 1 lpm NOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING 0.0 ppm INITIAL WELL VOC READING 0.0 ppmINITIAL INLET LINE VOC READING 0.0 ppm SAMPLE START TIME 1130 EDTINITIAL ROTAMETER READING 111 (READ FROM ~~112~~ B)FINAL AMBIENT VOC READING 0.0 ppm FINAL WELL VOC READING 0.0SAMPLE STOP TIME 1140 EDT DURATION 10 (min)FINAL ROTAMETER READING 113 (READ FROM ~~112~~ B)COMMENTS: Duplicate of 2-4 M16 (done on 8/23/93). Max temp inside = 60°F
Leak check OK (pre)

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LK30BL2-4 LOCATION Cyster Bay landfill DATE Aug. 24, 93INVESTIGATORS KG JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-4 M21.2 Front - 919C
Back - 919A SAMPLER ID Soil gas samplerPUMP ID B #5/R3 SAMPLE LOCATION E. of damont mainWELL ID M21 WELL DEPTH 30"NOMINAL FLOW RATE 1 lpm NOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING 0.0 ppm INITIAL WELL VOC READING 0.0 ppmINITIAL INLET LINE VOC READING 0.0 ppm SAMPLE START TIME 1201 EDTINITIAL ROTAMETER READING 110 B of SS (READ FROM 110 B)FINAL AMBIENT VOC READING 0.0 ppm FINAL WELL VOC READING 0.0 ppmSAMPLE STOP TIME 1211 EDT DURATION 10 (Min)FINAL ROTAMETER READING 110 B of SS (READ FROM 110 B)COMMENTS: line 5 was used for this sample and for all
samples collected today to this point.
Leak check (pre) OK
Max interior temp. = 62°F

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LK30BL2-4 LOCATION Cyster Bay landfill DATE Aug. 24, 93INVESTIGATORS KGGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-4 M28 Front - 921C
Back - 921E SAMPLER ID Soil gas samplerPUMP ID B #5 / R3 Field Blank SAMPLE LOCATION next to camp groundWELL ID M28 WELL DEPTH 30"NOMINAL FLOW RATE 1 lpm NOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING 0.0 ppm INITIAL WELL VOC READING 0.0 ppmINITIAL INLET LINE VOC READING 0.0 ppm SAMPLE START TIME 1234 EDTINITIAL ROTAMETER READING 115 B of S.S. (READ FROM 1234 B)FINAL AMBIENT VOC READING 0.0 ppm FINAL WELL VOC READING 0.0 ppmSAMPLE STOP TIME 1244 EDT DURATION 10 (Min)FINAL ROTAMETER READING 116 (READ FROM 1234 B)COMMENTS: Leak check OK (pre).Max interior temp = 64°FLine 6 (new) is used.

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LK30BL2-4 LOCATION Cyster Bay landfill DATE Aug. 24, 93INVESTIGATORS KG JW SMGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-4M39 Front - 921C
Back - 921D SAMPLER ID Soil gas samplerPUMP ID #5B / R3 SAMPLE LOCATION By a phone pile, near A.S. BLDG.WELL ID M39 WELL DEPTH 30"NOMINAL FLOW RATE 1 lpm NOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING 0.0 ppm INITIAL WELL VOC READING 2.9 ppmINITIAL INLET LINE VOC READING 0.0 ppm SAMPLE START TIME 1320 EDTINITIAL ROTAMETER READING 110 B of S.S. (READ FROM 110 B)FINAL AMBIENT VOC READING 0.0 ppm FINAL WELL VOC READING 0.0 ppmSAMPLE STOP TIME 1330 EDT DURATION 10 (Min)FINAL ROTAMETER READING 112 B of S.S. (READ FROM 110 B)COMMENTS: line 6 is used. Leak check (pre)Max Temp. = 62°F

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB08L2-4 LOCATION Cyster Bay landfill DATE Aug. 24, 93INVESTIGATORS SM KG JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-4 FB (A) Front - 921C ~~Back~~ SAMPLER ID Soil gas samplerPUMP ID 1 SAMPLE LOCATION minWELL ID 1 WELL DEPTH 10NOMINAL FLOW RATE 1 lpm NOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING ppm INITIAL WELL VOC READING ppmINITIAL INLET LINE VOC READING ppm SAMPLE START TIME EDTINITIAL ROTAMETER READING (READ FROM ~~15~~ B)FINAL AMBIENT VOC READING ppm FINAL WELL VOC READING ppmSAMPLE STOP TIME EDT DURATION (Min)FINAL ROTAMETER READING (READ FROM ~~15~~ B)COMMENTS: Shipping tube broken when received, replace w/
in house shipping tube.30 sec in air @ m39, both ends of the
trap opened.

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LKB08L2-4 LOCATION Cyster Bay landfill DATE Aug. 24, 93INVESTIGATORS SM KG JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-4 TB(A) Front - 921C
BackSAMPLER ID Soil gas samplerPUMP ID /SAMPLE LOCATION M39 (labeled at)
backWELL ID /WELL DEPTH /NOMINAL FLOW RATE 1 lpmNOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT
VOC READING / ppmINITIAL WELL
VOC READING / ppmINITIAL INLET LINE
VOC READING / ppmSAMPLE START TIME / EDTINITIAL ROTAMETER READING / (READ FROM 1000 B)FINAL AMBIENT
VOC READING / ppmFINAL WELL
VOC READING /SAMPLE STOP TIME / EDTDURATION / (Min)FINAL ROTAMETER READING / (READ FROM 1000 B)COMMENTS: One trip blank is collected/labelled

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LK90BL2-4 LOCATION Cyster Bay Landfill DATE Aug. 24, 93INVESTIGATORS JW, ICG, RSM

GENERAL WEATHER CONDITIONS _____

SAMPLE ID 2-4 M-37 Front - 921 E
Back - 921 E SAMPLER ID Soil gas samplerPUMP ID #5B R3 SAMPLE LOCATION SW Landfill
Leachate DischargeWELL ID M-37 WELL DEPTH 30"NOMINAL FLOW RATE 1 lpm NOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING 0 ppm INITIAL WELL VOC READING 0 ppmINITIAL INLET LINE VOC READING 0 ppm SAMPLE START TIME 1353 EDTINITIAL ROTAMETER READING 110 (READ FROM 110 B)FINAL AMBIENT VOC READING 0 ppm FINAL WELL VOC READING 0SAMPLE STOP TIME 1403 EDT DURATION 10 (Min)FINAL ROTAMETER READING 112 (READ FROM 110 B)

T = 64°

COMMENTS: Leak Check (✓), Purged ✓

SOIL GAS WELL SAMPLING DATA SHEET

PROJECT ID LK30BL2-4 LOCATION Cyster Bay landfill DATE Aug. 24, 93INVESTIGATORS KG Sm JWGENERAL WEATHER CONDITIONS SunnySAMPLE ID 2-4 FBLB Front - 921C ~~Back~~ SAMPLER ID soil gas samplerPUMP ID / SAMPLE LOCATION @ M37 ~~main~~WELL ID / WELL DEPTH /NOMINAL FLOW RATE 1 lpm NOMINAL SAMPLE VOLUME 10 litersINITIAL AMBIENT VOC READING / ppm INITIAL WELL VOC READING / ppmINITIAL INLET LINE VOC READING / ppm SAMPLE START TIME EDTINITIAL ROTAMETER READING / (READ FROM 1000 B)FINAL AMBIENT VOC READING / ppm FINAL WELL VOC READING /SAMPLE STOP TIME EDT DURATION / (Min)FINAL ROTAMETER READING / (READ FROM 1000 B)COMMENTS: 30 sec. in air. both ends open.
1 trap.

PRESSURE WELL READING DATA SHEET

Project ID: LK60BL -

Project Site: OYSTER BAY LANDFILL.

Date: 8-23-93.

General Weather Condition: CLEAR/P.C. WIND S. 5-10.

Equipment ID: DWYER INC. HAND

Operators: KES. RSU.

TIME

Well ID	Pressure Well Location	Color Code	Reading
F9	FIRE HALL'S TRAIN CNTR.	GREEN	-0.44
		BLUE	-0.37
		GREEN	-0.44
		BLUE	-0.36
Well ID	Pressure Well Location	Color Code	Reading
PW1	Perimeter Rd.	GREEN	+0.06
		BLUE	+0.01
		GREEN	+0.06
		BLUE	+0.00
Well ID	Pressure Well Location	Color Code	Reading
PW2	Corner FTE/Landfill	GREEN	-0.12
		BLUE	0.0
		GREEN	-0.12
		BLUE	0.0

11:36

11:36

11:38

11:38

12:25

12:33

12:34

12:36

12:51

12:52

12:52

12:54

Comments: _____

Photovac MicroTIP Statistical Monitoring Report

Averaging Interval: 1 Readings
15 Seconds

Date	Time	Min	Avg	Max	Event	Status	Notes
23.93	08:21	21.7	23.6	26.6	075	Ready	
		19.7	20.7	21.9		Alarm	
		20.5	24.9	27.6		Alarm	
		26.1	26.9	27.4		Alarm	
	08:22	24.8	46.1	126		Alarm	
		126	127	128		Alarm	
		6.4	55.3	128		Alarm	
		0.0	1.6	6.4		Cal	
	08:23	0.0	0.0	0.0		Cal	
		0.0	64.0	100		Alarm	
		0.0	2.0	26.2		Alarm	
		0.0	46.4	552		Alarm	
	08:24	0.0	0.0	0.0		Cal	
		0.0	0.1	4.3		Cal	
		0.0	6562	6999		Over	
		101	6563	9999		Over	
	08:25	102	102	103		Over	
		0.0	69.8	102		Alarm	
		0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
	08:26	0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
	08:28	0.0	0.0	0.0	076	Ready	
		0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
	08:29	0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
	09:56	0.0	0.1	1.3	077	Ready	
		0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
	09:57	0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
	09:58	0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
	09:59	0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
	10:00	0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	
	10:01	0.0	0.0	0.0		Ready	
		0.0	0.0	0.0		Ready	

	Time	Lat	Long	Alt	Status	Remarks
	10:51	0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
	0.0	0.0	0.0		Ready	
		0.0	0.0	0.0	Ready	
	10:52	0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
	0.0	0.0	0.0		Ready	
		0.0	0.0	0.0	Ready	
	10:53	0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
	11:02	0.0	0.0	0.0	080 Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
	11:03	0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
	11:16	0.0	0.0	0.0	081 Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
	11:19	0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.7	4.8	Ready	
	11:26	0.0	2.4	8.5	082 Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
	11:28	0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
	11:30	0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
	11:37	0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
	12:16	0.0	0.0	0.0	084 Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
	12:17	0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
	12:18	0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
	12:19	0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
		0.0	0.0	0.0	Ready	
	12:25	0.0	0.0	0.0	085 Ready	

Time	0.0	0.0	0.0	Status
12:36	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
12:37	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
12:46	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
12:47	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
12:48	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
13:04	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
13:05	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
13:12	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
13:13	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
13:14	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
13:15	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
13:45	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
13:46	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
13:47	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
13:48	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
13:49	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
13:50	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
13:54	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready
	0.0	0.0	0.0	Ready

Time	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	
14:11	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	
14:28	0.0	0.0	0.0	083 Ready	
	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	
14:30	0.0	0.0	0.0	Ready	
14:46	0.0	0.0	0.0	084 Ready	
	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	
14:47	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	
15:04	0.0	0.0	0.0	085 Ready	
	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	
15:08	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	LoBat	
15:26	0.0	0.0	0.0	086 LoBat	
	0.0	0.0	0.0	LoBat	
	0.0	0.0	0.0	LoBat	
15:19	0.0	0.0	0.0	LoBat	
	0.0	0.0	0.0	LoBat	
	0.0	0.0	0.0	LoBat	
15:20	0.0	0.0	0.0	LoBat	
	0.0	0.0	0.0	LoBat	
	0.0	0.0	0.0	LoBat	
15:28	0.0	0.0	0.0	087 LoBat	
	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	
15:36	0.0	0.0	0.0	088 Ready	
	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	
15:47	0.0	0.0	0.0	089 Ready	
	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	
15:48	0.0	0.0	0.0	Ready	
16:00	0.0	0.0	0.0	100 Ready	
	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	
16:01	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	
16:04	0.0	0.0	0.0	101 Ready	
	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	
16:23	0.0	0.0	0.0	102 Ready	
	0.0	0.0	0.0	Ready	
	0.0	0.0	0.0	Ready	

AMBIENT AIR SAMPLING DATA SHEET

Project: LKB 03L 2-4 Date: Aug 23 93
 Project Site: Oyster Bay Landfill Operators: LS JW
 General Weather Conditions: Sunny Southeasterly wind 77°F (Setup)

Sample ID: 2-4A1 Front-921D Back-921E Sample Location: Upwind of landfill, next to west state *
 Pump ID: A - R1 Nominal Flow Rate: 0.7 lpm
 Sampler ID: High volume, A1, upwind Nominal Sample Volume: _____

Initial Ambient VOC Conc. (ppm): 0.0
 Leak Check: OK
 Sample Start Time: 1020 1022
 Initial Rotameter Reading, (Bottom of the Ball): 90

Max 66°F Min 44°F

Rotameter Reading	Total Elapse Time	Local Time
88	0049	1112
85	0136	1238
83	0212	1348
83.5	0256	1437
80.	428	1730
79	544	1926
79	725	2228

Rotameter Reading	Total Elapse Time	Local Time
78	891	0112
77	1130	0512
77	1306	0807
80	1440	1022

Sample Stop Time: 1022
 Final Rotameter Reading: 80
 Total Elapse Time: 1440
 Final Ambient VOC Conc. (ppm): _____

Comments: TOT CONDENSATE 5.9ML
2-4A1-C

*: Inside the golf course, outside landfill PL. S. of the road swamp road.
 6' south of property line to golf course - 90' from Round Swamp Road.

AMBIENT AIR SAMPLING DATA SHEET

H1 FLO

Project: LKBOBL

Date: 23 AUG 93

Project Site: _____

Operators: MILLS, BUTLER

General Weather Conditions: PARTLY CLDY

Sample ID: 2-4A2

Sample Location: SW AIR STRIPPER

Pump ID: C

Nominal Flow Rate: 7

Sampler ID: 921B, 921B

Nominal Sample Volume: _____

ROTAMETER R1

Initial Ambient VOC Conc. (ppm): 0.0

Leak Check: OK

Sample Start Time: 0917E

Initial Rotameter Reading, (Bottom of the Ball): 90

SS

MAX 64°F 44°F MIN

Rotameter Reading	Total Elapse Time	Local Time
89	099	1055
85	181	1218
86	229	1205
86	303	1420
85	342	1459
85	477	1714
85	573	1850

Rotameter Reading	Total Elapse Time	Local Time
84	743	2121
80	929	0046
79	1170	0447
80	1385	0822
83	1440	0917

OFF

TO-14 CANNISTER 21

TO-14 CANNISTER 23 FL. 5T-12

ST-10 FIRST

SECOND

START 7-30 0923

1ST CK -27 1057

2ND CK -25 1201

OFF FOR 5 MINUTES

1312-19.5

1420-16.5

1505-15.0

1720-9.0

1854-8.0

0923-1054

0923-1054

0923-1054

0923-1054

0923-1054

0923-1054

0923-1054

0923-1054

0923-1054

0923-1054

0923-1054

Sample Stop Time: _____

Final Rotameter Reading: _____

Total Elapse Time: _____

Final Ambient VOC Conc. (ppm): _____

3

START 0045

7-30

1047
45

-18-0449

-9-0825

-5-0935

-4.5-1047

10hrs
2min

CONDENSATE VOLUME 6.4 mL 2-4-A2-C

AMBIENT AIR SAMPLING DATA SHEET

Low Flow

Project: LK BOWL AMB

Date: 23 AUG 93

Project Site: _____

Operators: MILLS, BUTLER

General Weather Conditions: PARTLY CLOUDY

Sample ID: 24 A3

Sample Location: SW AIRSTRIPPER

Pump ID: DATA (R2)

Nominal Flow Rate: .07 lpm

Sampler ID: 35421D 921E

Nominal Sample Volume: 100.8

Initial Ambient VOC Conc. (ppm): 0.0

Leak Check: OK

Sample Start Time: 0928

Initial Rotameter Reading, (Bottom of the Ball): 50

66 MAX T

43 MIN T

Rotameter Reading	Total Elapse Time	Local Time
50	0092	1100
48	171	1219
48	217	1306
50	293	1421
46	332	1501
48	468	1716
49	564	1852

Rotameter Reading	Total Elapse Time	Local Time
52	733	2142
51	918	0047
50	1160	1160 0448
STOPPED AT	1178	

Sample Stop Time: _____

Final Rotameter Reading: _____

Total Elapse Time: 2078

Final Ambient VOC Conc. (ppm): _____

Comments: N

High Flow

AMBIENT AIR SAMPLING DATA SHEET

Project: LKBERX

Date: 23 AUG 93

Project Site: _____

Operators: MILLS, BUTLER

General Weather Conditions: PARTLY CLOUDY MID 70'S

Sample ID: 24A4

Sample Location: GREEN WELL 10
BRIDGE 100 WEST AG

Pump ID: E

Nominal Flow Rate: .7

Sampler ID: 921E 921E

Nominal Sample Volume: _____

ROTORMETER R1

Initial Ambient VOC Conc. (ppm): 0.0

Leak Check: OK

Sample Start Time: 0956

Initial Rotameter Reading, (Bottom of the Ball): 90

55

MAX T 66° F

MIN 45° F

Rotameter Reading	Total Elapse Time	Local Time
91	0088	1024
90	176	1258
93	251	1412
92	292	1449
92	425	1701
88	549	1905
86	735	2212

Rotameter Reading	Total Elapse Time	Local Time
83	902	0058
80	1142	0458
82	1364	0840
82	1440	0956

Sample Stop Time: 0956 TUES 24 AUG

Final Rotameter Reading: 82

Total Elapse Time: 1440

Final Ambient VOC Conc. (ppm): _____

Comments:

5.8 ML CONDENSATE 2-4 A4-C

APPENDIX F
EQUIPMENT CALIBRATIONS

(PRE)

Date: 8/11/93

Time: 1344 EDT

Pump ID: R1 (H:Vol)

Barometric Pressure, (Pb): 30.21 (in-Hg)

Temperature, (T): 22.2°C 72°F (F)

Operator: KEVIN GOOHS

SS

Remarks:

Remarks:

Calibrated with full ambient VOST train.

PUMP CALIBRATION SHEET

Project: LKBOBL 2-4 (Post)

Date: 8/25/93

Time: ~~1405~~ 1515 EDT

Pump ID: R

Effort Range 77-93

Barometric Pressure, (Pb): 30.10 (in-Hg)

Temperature, (T): 74 (F)

Operator: KJG

LEAK CHECK ✓

(55)

Rotameter Reading (Bottom of the Ball)					
70	80	90	100		
Sampling Medium					
2 T/C, SG, Ia →					
Actual Liters Per Minutes, ALPM					
0.578	0.674	0.764	0.844		
0.580	0.675	0.764	0.846		
0.587	0.673	0.764	0.848		
0.584	0.673	0.766	0.847		
0.583	0.676	0.763	0.855		
0.576	0.672	0.764	0.838		
0.579	0.671	0.769	0.849		
0.578	0.677	0.764	0.846		
0.578	0.672	0.763	0.846		
0.577	0.674	0.764	0.850		
Avg(ALPM)					
0.58	0.6737	0.764	0.847		
Average Standard Liters Per Minute, Avg(SLPM)					

$$\text{SLPM} = \text{ALPM} \times \left(\frac{[(P_b - P_v)/29.92] \times [293/(273 + T)]}{C} \right)$$

$$C = (5/9) \times (F - 32)$$

(°C)	(In-Hg)
15	0.50
16	0.54
17	0.57
18	0.61
19	0.65
20	0.69
21	0.73
22	0.78
23	0.83
24	0.88
25	0.94
26	0.99
27	1.06
28	1.12
29	1.18
30	1.25
31	1.33
32	1.40

Remarks:

Remarks:

PUMP CALIBRATION SHEET

Project: LKB OBL 2-4 (PRE)

Date: 8/11/93

Time: 1412 EDT

Pump ID: R2 (Low-Vol)

Barometric Pressure, (Pb): 30.20 (in-Hg)

Temperature, (T): 22°C 72°F (F)

Operator: KEVIN GOOHS

Black

Rotameter Reading (Bottom of the Ball)					
55	50	45			
Sampling Medium					
ZTC	W/SO	→			
Actual Liters Per Minutes, ALPM (ml/min)					
80.4	69.6	59.9			
80.6	69.6	59.9			
80.6	69.6	59.5			
80.4	69.3	59.9			
80.6	69.5	59.8			
81.0	69.5	60.4			
80.6	68.8	60.0			
80.6	69.4	60.0			
80.5	69.5	60.0			
80.7	69.3	59.7			
Avg(ALPM) (ml/min)					
80.6	69.41	59.91			
Average Standard Liters Per Minute, Avg(SLPM)					
$SLPM = ALPM \times \left[\left(\frac{P_b - P_v}{29.92} \right) \times \left(\frac{293}{273 + T} \right) \right]$ $C = (5/9) \times (F - 32)$					

(C)	(In-Hg)
15	0.50
16	0.54
17	0.57
18	0.61
19	0.65
20	0.69
21	0.73
22	0.78
23	0.83
24	0.88
25	0.94
26	0.99
27	1.06
28	1.12
29	1.18
30	1.25
31	1.33
32	1.40

Remarks:

Remarks:

Remarks: Calibrated with full ambient VOST trans.
" units are in milliliters per minute.

PUMP CALIBRATION SHEET

Project: LKB OBL 2-4 (POST)

Date: 8/25/93

Time: 1435 EDT

Pump ID: R 2 (low Vol)

BFF. Range 46-52

Barometric Pressure, (Pb): **30.10** (in-Hg)

Temperature, (T): 74° (F)

Operator: K 3 G

LEAK CHECK ✓

Black

[illegible]

(C)	(In-Hg)
15	0.50
16	0.54
17	0.57
18	0.61
19	0.65
20	0.69
21	0.73
22	0.78
23	0.83
24	0.88
25	0.94
26	0.99
27	1.06
28	1.12
29	1.18
30	1.25
31	1.33
32	1.40

Remarks:

Remarks:

PUMP CALIBRATION SHEET

Project: LABOR-4 (Pre)

Date: 8/11/93

Time: 1300 EDT

Pump ID: R3 (H: vol)

Barometric Pressure, (Pb): 30.21 (in-Hg)

Temperature, (T): 22.2°C 72°F (F)

Operator: KEVIN BOOHS.

Rotameter Reading (Bottom of the Ball)					
80	90	100	110	120	
Sampling Medium					
2-T/c w/\$G					
Actual Liters Per Minutes, ALPM					
0.690	0.779	0.865	0.960	1.05	
0.689	0.775	0.866	0.957	1.05	
0.687	0.775	0.867	0.957	1.05	
0.689	0.777	0.868	0.960	1.05	
0.689	0.775	0.867	0.964	1.06	
0.688	0.776	0.870	0.964	1.05	
0.689	0.777	0.871	0.965	1.06	
0.689	0.776	0.869	0.961	1.06	
0.690	0.777	0.869	0.961	1.06	
0.690	0.776	0.868	0.963	1.06	
Avg(ALPM)					
0.689	0.776	0.868	0.961	1.055	
Average Standard Liters Per Minute, Avg(SLPM)					
$SLPM = ALPM \times \left(\left[\frac{Pb - Pv}{29.92} \right] \times \left[\frac{293}{(273 + T)} \right] \right)$ $C = (5/9) \times (F - 32)$					

(C)	(In-Hg)
15	0.50
16	0.54
17	0.57
18	0.61
19	0.65
20	0.69
21	0.73
22	0.78
23	0.83
24	0.88
25	0.94
26	0.99
27	1.06
28	1.12
29	1.18
30	1.25
31	1.33
32	1.40

Remarks:

Remarks:

Calibrated with full ambient VOST train.

PUMP CALIBRATION SHEET

Project: LKBOBL 2-4 (POST)

Date: 8/25/93

Time: 1600 EDT

Pump ID: R3

Effort Range 108-122

Barometric Pressure, (Pb): 30.10 (in-Hg)

Temperature, (T): 74 (F) = 23.3

Operator: LSG

°C

LEAK CHECK ✓

Rotameter Reading (Bottom of the Ball)				
100	110	120		
Sampling Medium				
ZTK, SG, Inp. P.S. →				
Actual Liters Per Minutes, ALPM				
0.871	1.974	1.07		
0.874	1.970	1.09		
0.871	1.972	1.06		
0.871	1.973	1.06		
0.872	1.969	1.06		
0.873	1.969	1.06		
0.871	1.970	1.06		
0.877	1.972	1.06		
0.875	0.973	1.05		
0.875	1.960	1.04		
Avg(ALPM)				
0.873	0.970	1.06		
Average Standard Liters Per Minute, Avg(SLPM)				
$SLPM = ALPM \times \{[(Pb - Pv) / 29.92] \times [293 / (273 + T)]\}$ $C = (5/9) \times (F - 32)$				

(°C)	(In. Hg)
15	0.50
16	0.54
17	0.57
18	0.61
19	0.65
20	0.69
21	0.73
22	0.78
23	0.83
24	0.88
25	0.94
26	0.99
27	1.06
28	1.12
29	1.18
30	1.25
31	1.33
32	1.40

Remarks:

Remarks:

APPENDIX G
METEOROLOGICAL MONITORING DATA

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Fourth Quarter

SUMMARY OF METEOROLOGICAL DATA AT UPWIND LOCATION

EDT (HH:MM)	MWS (MPH)	MWVD (Degrees)	SDWD (Degrees)	P (in. Hg)
1100	2.9	203	84	30.05
1200	5.3	201	23	30.06
1300	4.7	210	31	30.06
1400	7.3	201	20	30.05
1500	7.8	193	21	30.05
1600	7.5	196	21	30.04
1700	7.0	192	24	30.03
1800	7.1	201	20	30.02
1900	7.2	200	19	30.01
2000	6.1	201	19	29.99
2100	4.5	200	18	29.98
2200	4.4	197	18	29.97
2300	4.5	200	18	29.96
2400	4.3	204	17	29.96
0100	3.6	207	17	29.97
0200	2.2	209	22	29.98
0300	1.9	207	26	29.99
0400	2.9	209	18	29.99
0500	1.5	222	36	30.00
0600	1.4	211	15	29.99
0700	1.9	202	17	30.00
0800	3.7	202	18	30.01
0900	4.9	206	19	30.02
1000	5.8	198	18	30.03
1100	6.6	200	21	30.05

EDT: Eastern Daylight Time

MWS: Mean Wind Speed, miles per hour

MWVD: Mean Wind Vector Direction

SDWD: Standard Deviation of Wind Direction

P: Atmospheric Pressure

Note: 360 degrees is due North.

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Fourth Quarter

**SUMMARY OF METEOROLOGICAL DATA
ATOP LANDFILL AT DOWNWIND LOCATION**

EDT (HH:MM)	MWS (MPH)	MWVD (Degrees)	SDWD (Degrees)	P (in. Hg)
1000	7.3	288	25	29.85
1100	7.1	285	27	29.85
1200	8.8	251	31	29.86
1300	9.1	245	20	29.85
1400	11.1	223	21	29.85
1500	12.1	214	19	29.85
1600	11.6	204	19	29.84
1700	12.1	204	20	29.83
1800	12.4	209	18	29.83
1900	11.9	219	13	29.82
2000	10.6	220	11	29.80
2100	9.3	221	11	29.79
2200	8.7	215	12	29.79
2300	8.8	220	11	29.78
2400	9.5	230	12	29.78
0100	8.0	235	11	29.79
0200	6.6	244	11	29.80
0300	7.1	247	10	29.81
0400	8.4	240	11	29.82
0500	6.1	239	10	29.82
0600	6.9	226	8	29.82
0700	7.0	237	9	29.83
0800	8.0	236	10	29.84
0900	8.9	233	12	29.85
1000	10.8	227	12	29.85

EDT: Eastern Daylight Time
MWS: Mean Wind Speed, miles per hour.
MWVD: Mean Wind Vector Direction
SDWD: Standard Deviation of Wind Direction
P: Atmospheric Pressure

Note: 360 degrees is due North.

METEOROLOGICAL EQUIPMENT SITING DATA SHEET

Project: LKB OBL 2-4

Aug. 23, 93

Project Site: Oyster Bay landfill

Operators: KJS / JW

Instrument No. 1 (old)
Location: County Golf ~~field~~ field S. of the landfill Cont side landfill PL. cross the st. of Round Swamp road?
Initial Battery Voltage: 12.8
Wind Dir. Reference: Measured N = True N.
True WD = Measured WD +/- () =
Date & Julian Day to Set Up: 235 (8/23/93)
Start Time (Local): 10 AM start.
Date & Julian Day to Take Down: 236 8/24/94
Stop Time (Local): 1130 AM STOP
Remarks: 6' from property line (fence) 90' from Round Swamp Road. 90' from intersection of winding Rd & Round Swamp.

Instrument No.2 (new)
Location: Atop the landfill
Initial Battery Voltage: 13.3
Wind Dir. Reference: Scale house (same as before) L as measured north.
True WD = Measured WD +/- () =
Date & Julian Day to Set Up: 235 (Aug. 23, 93)
Start Time (Local): 8:35 AM (start)
Date & Julian Day to Take Down: 236 (8/24/93)
Stop Time (Local): 1430 EDT
Remarks: final voltage 12.8 (1430 EDT, 2.33)

New Met.

Date to take down
8/24/93(236):

@ 1430 EDT

Final Voltage = 12.8

1993 ANNUAL REPORT

APPENDIX D

**EVALUATION OF AMBIENT VOLATILE ORGANIC
COMPOUNDS IN AIR & SOILS AND SOIL GAS
PRESSURE READINGS FOR 1992 – 1993,
SECOND YEAR OF MONITORING, ANNUAL SUMMARY**

MAY 1994

**OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
EVALUATION OF AMBIENT
VOLATILE ORGANIC COMPOUNDS IN AIR AND SOILS
AND SOIL GAS PRESSURE READINGS FOR
1992-1993**

Second Year of Monitoring

Annual Summary

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 1994

**OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
EVALUATION OF AMBIENT VOLATILE ORGANIC COMPOUNDS IN AIR AND SOILS
AND SOIL GAS PRESSURE READINGS FOR 1992-1993**

Second Year Of Monitoring
Annual Summary

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**OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
EVALUATION OF AMBIENT VOLATILE ORGANIC COMPOUNDS IN AIR AND SOILS
AND SOIL GAS PRESSURE READINGS FOR 1992-1993**

1.0 INTRODUCTION

The Town of Oyster Bay is monitoring volatile organic compounds (VOCs) at the Oyster Bay Solid Waste Disposal Complex (OBSWDC) on a quarterly basis. The monitoring program was designed to comply with all of the requirements stipulated in the Consent Decree (83CIV5357) RAP Attachment 2. The details of the specific monitoring methods used, laboratory analysis performed and the results for all program phases including volatile organic compounds monitoring, have been presented in quarterly reports. The reports have been forwarded to the appropriate regulatory agencies, as they were completed.

This evaluation has been prepared to review the volatile organic compounds data that was collected during the second full year of monitoring. The purpose of the review is to determine if there is sufficient evidence to request relief from the quarterly monitoring schedule stated in the Consent Decree.

The OBSWDC is located in the Town of Oyster Bay, New York and is bounded on the north by Bethpage Sweethollow Road, on the west by Round Swamp Road and on the east by Winding Road. A concrete plant and the Nassau County Fireman's Training Center (NCFTC) are located along the southern border of the site. A large industrial park adjoins the northeastern border of the landfill and other significant industrial areas exist nearby to the north and west. These other industrial areas do not have common boundary with the landfill. However, they are sources of air pollutants that impact the area immediately surrounding the landfill. Therefore, several other potential sources contributing volatile organic compounds in the immediate and general vicinity of the landfill influence the concentrations being monitored by the Oyster Bay program.

To control landfill emissions, the OBSWDC has undergone significant changes over the past several years. The installation of a gas collection system along the perimeter of the landfill began in 1981 and a capping program was initiated in 1983. The capping program involved placing an impervious clay cap over the landfill. This program was completed in January, 1993. The gas collection system is scheduled for additional expansion in 1994. A thermal oxidizer was installed to combust the landfill gas collected

by the perimeter collection system. Also, a contractor is currently mining combustible gas from the landfill for energy production. All of these activities have and will continue to restrict the release of landfill gas from the OBSWDC and thereby reduce the level of air pollutant emissions related to the landfill.

As stipulated in the Consent Decree, soil gas pressure readings are performed on a quarterly basis at selected points around the OBSWDC. These values have been reported to the NYSDOL. The air emissions from the thermal oxidizer have also been tested on a quarterly and annual basis and these test results have been reported to the NYSDOL. The results have indicated that the thermal oxidizer emissions are all below the applicable ambient guideline concentrations as stipulated by the New York State Department of Environmental Conservation (NYSDEC).

2.0 ANALYSIS OF DATA

The established target compound list (TCL) for this study was based on the ability of the Volatile Organic Sampling Train (VOST) method developed by the United States Environmental Protection Agency (USEPA) to quantify various volatile organic compounds. The sampling train was modified slightly to make the unit portable for in-field use at the landfill. The sampling train and the sampling and analysis protocols along with all the details on data collection, analysis and other documentation are provided in the quarterly reports.

The sampling events were scheduled to observe concentrations during various seasons of the year with adjustments for weather conditions. As a conservative step, the sampling events took place during periods of falling atmospheric pressure. These periods would coincide with the greatest potential for releases of volatile organic compounds from the landfill. Sampling for each quarterly test occurred over a consecutive 24-hour period. Ambient monitoring during the first year of monitoring took place in July and October of 1990, February and May of 1991, and monitoring for the second year took place in October of 1992 and March, May and August of 1993.

The program target compound list is provided in Table 2.1 along with toxicity and guideline concentration values. The target compound list has been modified during the course of the monitoring effort because of changing state requirements, analytical capabilities, and continuing data review as related to the

TABLE 2.1

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Annual Summary

PROGRAM TARGET COMPOUND LIST WITH
NYSDEC AMBIENT AIR GUIDELINES

VOC COMPOUND NAME	TOXICITY	CURRENT SGC (ug/m3)		CURRENT AGC (ug/m3)		FORMER AGC (ug/m3)
Benzene	H	30	(p)	0.12	(E,U)	100
Bromodichloromethane	H			0.02	(D)	0.03*
Bromoform	M	1,200	(t)	12	(T)	11.9*
Bromomethane						
Carbon Disulfide	M	710	(r)	7	(D)	100
Carbon Tetrachloride	H	1,300	(r)	0.07	(E,U)	100
Chlorobenzene	M	11,000	(p)	20	(E)	1,170
Chloroethane	L	630,000	(t)	63,000	(T)	52,000
Chloroform	M	980	(r)	23	(R)	167
Chloromethane	M	22,000	(d)	770	(D)	2,100
Dibromochloromethane	M			0.1	(D)	0.03*
Dibromomethane						
1,2-Dichlorobenzene (o)	M	30,000	(t)	200	(E)	1,000
1,3-Dichlorobenzene (m)	M	30,000	(a)	200	(A)	714*
1,4-Dichlorobenzene (p)	M*	110,000*		700*		
Dichlorodifluoromethane						
1,1-Dichloroethane	L	190,000	(t)	500	(E)	9,524*
1,2-Dichloroethane	M	950	(r)	0.039	(E,U)	0.2
1,1-Dichloroethene	H	2,000	(t)	0.02	(E,U)	66.7
trans-1,2-Dichloroethene	M			360	(D)	360*
1,2-Dichloropropane	M	83,000	(t)	0.15	(D)	833*
cis-1,3-Dichloropropene						
trans-1,3-Dichloropropene						
Ethylbenzene	M	100,000	(t)	1,000	(T)	1,450
Iodomethane						
Methylene Chloride	M	41,000	(t)	27	(D,U)	1,170
Styrene	M	51,000	(t)	510	(T)	716
1,1,2,2-Tetrachloroethane	M	1,600	(t)	0.02	(E,U)	23.2
Tetrachloroethene	M	81,000	(t)	1.2**	(D,U)	1,120
Toluene	L	89,000	(r)	2,000	(I)	7,500
1,1,1-Trichloroethane	L	450,000	(t)	1,000	(E)	38,000
1,1,2-Trichloroethane	M	13,000	(t)	0.06	(E,U)	150
Trichloroethene	M	33,000	(r)	0.45	(D,U)	900
Trichlorofluoromethane	L	560,000	(t)	700	(E)	
Vinyl Chloride	H	1,300	(t)	0.02	(E,U)	0.4
Xylenes (Total)	M	100,000	(t)	300	(I)	1,450***

TABLE 2.1
Continued

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Annual Summary

PROGRAM TARGET COMPOUND LIST WITH
NYSDEC AMBIENT AIR GUIDELINES

TENTATIVELY IDENTIFIED COMPOUNDS****	TOXICITY	CURRENT SGC (ug/m3)		CURRENT AGC (ug/m3)		FORMER AGC (ug/m3)
Acetone	L	140,000	(r)	14,000	(R)	35,600
Benzaldehyde						
2-Butanone	M	140,000	(t)	300	(E)	1967
2-Chloroethyl Vinyl Ether						
cis-1,2-Dichloroethene	M	190,000	(a)	1,900	(A)	1,880*
Freon 13	L	43,000	(a)	530	(A)	133,333*
2-Hexanone						
4-Methyl-2-Pentanone	M	48,000	(r)	480	(R)	683

FOOTNOTES:

SGC - Short-term guideline concentration (current as of June 1991).

AGC - Annual guideline concentration (current as of June 1991, former as of 1986, 9/89 Edition).

*Proposed Value.

**Tetrachloroethene AGC current as of November 22, 1991.

***1450 total for ortho and para xylenes and 1450 total for meta xylene.

****Tentatively Identified Compound (TIC) using EPA SW846 Method 8240. Six additional non-target compound GC/MS peaks with the largest analytical response were also targeted per VOST analysis.

Toxicity - H for High; M for moderate; and L for low by NYSDEC.

(a) - SGC based on NYSDEC structure-activity analogy.

(d) - SGC derived by NYSDEC, Division of Air Resources, Bureau of Air Toxics, Toxics Assessment Section.

(p) - SGC derived from proposed ACGIH TLV-TWA (1990-1991).

(r) - SGC derived from NIOSH REL-TWA (1988).

(t) - SGC derived from ACGIH TLV-TWA (1990-1991).

(A) - AGC based on NYSDEC structure-activity analogy.

(D) - AGC derived from NYSDEC, Division of Air Resources, Bureau of Air Toxics, Toxics Assessment Section.

(E) - AGC based on derivation by USEPA.

(I) - AGC based on RFC developed by USEPA - Integrated Risk Information System (IRIS), input pending.

(R) - AGC derived from NIOSH REL-TWA (1988).

(T) - AGC derived from ACGIH TLV-TWA (1990-1991).

(U) - AGC is the ambient air concentration which corresponds to an excess cancer risk of one in one million after lifetime exposure.

tentatively identified compounds being detected. The latest modification occurred during the analysis of the August 1993 sample runs. In general, the list continues to expand as more compounds are added to the standard method analyses list.

The monitoring program incorporates repositioning of sampling equipment to best define the contributions associated with the OBSWDC. Therefore, locations upwind of the complex can be compared directly to locations downwind of the complex to determine the impact of the OBSWDC on ambient concentrations.

Ambient air quality levels were monitored for a 24-hour period, at three locations downwind of the complex for the second year 1992 and 1993 sampling events. The downwind samplers have been identified by location as A2, A3 and A4. The three locations are relative positions. The samples labeled A2 and A3 are located at the same position. Sampler A2 is a high volume sampler versus sampler A3 which is a low volume sampler. High sampling rates in this program are used to improve minimum detection limits. Low sample volumes assure high concentration constituents do not invalidate an analysis. Sampler A4 is positioned along the side slope of the landfill, relative to the mean wind direction.

Table 2.2 provides data for the second year of monitoring at the A-2 sampling location. These data represent the total ambient air concentrations downwind of the landfill. The samples were collected over a 24-hour period using high sampling rates. The four independent 24-hour samples were averaged to provide an estimated annual average concentration for a location downwind of the complex. As shown, four compounds exceed current annual guideline concentrations (AGCs) specified by the NYSDEC.

Table 2.3 presents the 24-hour monitoring data for ambient air concentrations at the A1 sampler location that is positioned upwind of the complex during the second year, four quarters of testing. These values are combined to provide an average annual background concentration upwind of the landfill. These averages can be compared to the annual guideline concentrations provided by NYSDEC. As shown in Table 2.3, there are four compounds that exceed the current NYSDEC annual guideline concentrations.

A rough approximation of impact of the complex for an identified target compound can be estimated by subtracting the background concentration data presented in Table 2.3 from the value presented in Table

TABLE 2.2

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Annual Summary

LANDFILL AFFECTED AMBIENT AIR VOST SAMPLE RESULTS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				ANNUAL AVERAGE	CURRENT	FORMER
SAMPLE IDENTIFICATION*	1A2	2A2	3A2	4A2	A2	AGC	AGC
VOC COMPOUND NAME							
Benzene	1.68	1.38	0.823	0.298	1.68	0.12	100
Bromodichloromethane						0.02	0.03**
Bromoform						12	11.9**
Bromomethane							
Carbon Disulfide				0.269	0.269	7	100
Carbon Tetrachloride	0.422	0.388	0.191	0.218	0.297	0.07	100
Chlorobenzene						20	1,170
Chloroethane						63,000	52,000
Chloroform						23	167
Chloromethane	0.0745	1.22			0.647	770	2,100
Dibromochloromethane						0.1	0.03**
1,2-Dichlorobenzene (o)				0.163	0.163	200	1,000
1,3-Dichlorobenzene (m)	0.147				0.147	200	714**
1,4-Dichlorobenzene (p)		0.284	0.271		0.278	700**	
1,1-Dichloroethane						500	9,524**
1,2-Dichloroethane						0.039	0.2
1,1-Dichloroethene						0.02	66.7
trans-1,2-Dichloroethene						360	360**
1,2-Dichloropropane	0.0500				0.0500	0.15	833**
cis-1,3-Dichloropropene							
trans-1,3-Dichloropropene							
Ethylbenzene	1.18	1.52	0.824	0.173	0.924	1,000	1,450
Methylene Chloride	0.461	1.83	0.432	0.203	0.732	27	1,170
Styrene						510	716
1,1,2,2-Tetrachloroethane						0.02	23.2
Tetrachloroethene	1.37	3.38	1.11	0.731	1.64	1.2	1,120
Toluene	0.843	9.41	6.05	1.96	4.57	2,000	7,500
1,1,1-Trichloroethane	1.26	1.93	0.553	0.385	1.03	1,000	38,000
1,1,2-Trichloroethane						0.06	150
Trichloroethene	0.206	1.52	0.111		0.612	0.45	900
Trichlorofluoromethane	1.04	1.62	1.16	1.31	1.28	700	
Vinyl Chloride						0.02	0.4
Xylenes (Total)	1.27	8.22	4.12	1.58	3.80	300	1,450

Notes:

Concentrations are in micrograms per cubic meter.

Shaded areas indicate concentrations that exceed the absolute value of the standard.

For further clarification see footnotes in Appendix A.

* Sample identification format: 1A2=first quarter sample at sampler A2.

** Proposed value.

TABLE 2.3

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Annual Summary

BACKGROUND AMBIENT AIR VOST SAMPLE RESULTS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				ANNUAL AVERAGE	CURRENT	FORMER
SAMPLE IDENTIFICATION*	1A1	2A1	3A1	4A1	A1	AGC	AGC
VOC COMPOUND NAME							
Benzene	1.52	3.12	0.557	0.242	1.38	0.12	100
Bromodichloromethane						0.02	0.03**
Bromoform						12	11.9**
Bromomethane							
Carbon Disulfide		0.0302			0.0302	7	100
Carbon Tetrachloride	0.41	0.402	0.219	0.222	0.313	0.07	100
Chlorobenzene						20	1,170
Chloroethane						63,000	52,000
Chloroform						23	167
Chloromethane	0.0686	2.21			1.14	770	2,100
Dibromochloromethane						0.1	0.03**
1,2-Dichlorobenzene (o)						200	1,000
1,3-Dichlorobenzene (m)	0.238				0.238	200	714**
1,4-Dichlorobenzene (p)		0.402	0.305		0.354	700**	
1,1-Dichloroethane						500	9,524**
1,2-Dichloroethane						0.039	0.2
1,1-Dichloroethene						0.02	66.7
trans-1,2-Dichloroethene						360	360**
1,2-Dichloropropane	0.0476				0.0476	0.15	833**
cis-1,3-Dichloropropene							
trans-1,3-Dichloropropene							
Ethylbenzene	0.790	1.51	0.952		1.08	1,000	1,450
Methylene Chloride	0.305	2.21	0.619		0.462	27	1,170
Styrene						510	716
1,1,2,2-Tetrachloroethane						0.02	23.2
Tetrachloroethene	1.71	3.82	1.96	0.605	2.01	1.2	1,120
Toluene	0.781	1.71	6.57	1.53	2.65	2,000	7,500
1,1,1-Trichloroethane	1.24	2.21	0.686	0.333	1.12	1,000	38,000
1,1,2-Trichloroethane						0.06	150
Trichloroethene	0.229	2.01	0.114		0.784	0.45	900
Trichlorofluoromethane	0.819	1.91	1.05	0.787	1.14	700	
Vinyl Chloride						0.02	0.4
Xylenes (Total)	2.57	4.02	4.95	1.03	3.14	300	1,450

Notes:

Concentrations are in micrograms per cubic meter.

Shaded areas indicate concentrations that exceed the absolute value of the standard.

For further clarification, see footnotes in Appendix A.

* Sample identification format: 1A1= first quarter at sampler A1.

** Proposed value.

2.2. The results for benzene indicate that the complex impact is 0.21 micrograms per cubic meter or approximately two times the annual guideline concentration. The other constituents do not have significant differential impacts and downwind values are lower than their respective upwind values. Values generally decrease as the distance from the respective source of the detected compounds increase. The rate of the diffusion cannot be approximated until the other specific sources of these compounds are defined.

Table 2.4 presents the non-target (tentatively identified) compounds identified at Sampler A-2. Table 2.5 identifies non-target compounds at sampler A-1. These tables also provide annual average concentrations for identified non-target compounds. As shown, the concentrations downwind of the complex for ethylmethylbenzene are well in excess of current annual guideline concentrations even after the background values have been removed. In addition, there are several more compounds that were tentatively identified downwind of the complex that were not identified in the background sampler.

The other data that was collected during the four test efforts during the second year of monitoring are presented in Appendix A. The ambient air sampler A-3 located along side the downwind sampler A-2 recorded concentrations that were generally higher than those recorded at A-2. The reason for this difference is probably attributed to constituent bypass in the high volume samples, since significant breakthrough was identified in the A-2 sample for the third quarterly test effort. To investigate the differences further, a set of SUMMA® canister samples were collected at the downwind A-2/A-3 location during the fourth quarter. For compounds identified by both the canister and the sorbent trap methods, the canister values generally fall in between the high and low volume results. Unfortunately, the detection level of the canister is limited, and therefore, a direct comparison is difficult. The results tend to confirm that the canister method is not as appropriate for this sampling program as the sorbent trap method. Most notable was the absence of carbon tetrachloride and tetrachloroethene in the canister analysis while these compounds were easily detected by the sorbent traps. More data should be collected using canisters to verify the values obtained to date since the EPA has been moving towards canister methods for ambient programs. As indicated by the data collected to date, several significant compounds would have gone undetected using the canister.

This second year of sampling provides further data on the ambient volatile organic compound concentrations in the vicinity of the complex for both ambient air and soil gas. In addition, data during

TABLE 2.4

OLD BETHPAGE LANDFILL
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Second Year, Annual Summary

OTHER LANDFILL AFFECTED AMBIENT AIR VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				ANNUAL AVERAGE	CURRENT AGC	FORMER AGC
SAMPLE IDENTIFICATION*	1A2	2A2	3A2	4A2	A2		
VOC COMPOUND NAME							
Acetone		0.203		0.225	0.214	14,000	35,600
Benzaldehyde							
2-Butanone	0.0735	0.812			0.443	300	1,967
2-Chloroethyl Vinyl Ether							
cis-1,2-Dichloroethene						1,900	1880**
Dichlorodifluoromethane			2.77	0.875	1.82		
Freon 13						530	133,333**
2-Hexanone							
4-Methyl-2-Pentanone						480	683

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				ANNUAL AVERAGE	CURRENT AGC	FORMER AGC
SAMPLE IDENTIFICATION*	1A2	2A2	3A2	4A2	A2		
VOC COMPOUND NAME							
2,3-Dihydro-1H-Indene							
2,5-Dimethylhexane							
4,6-Dimethylundecane	0.863				0.863		
2-Ethylhexanal				0.189	0.189		
Ethylmethylbenzene Isomer	3.26***	5.99***	3.72	0.985	2.30	0.1	0.03
Freon 113			0.121		0.121	90,000	90,476**
Hexachloroethane							
Hexane	0.480				0.480	420	
Methyl (methylethenyl) Cyclohexene		0.0274			0.0274		
Methylcyclopentane	0.186				0.186	8,300	8,333**
(1-Methylethyl)Benzene							
2-Methylheptane							
2-Methylpentane	0.333				0.333	830	
2-Methylhexane							
3-Methylpentane	1.37				1.37		
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.784			0.318	0.551	90,000	90,476**
Trimethylbenzene Isomer			1.91	0.760	1.34		
Undecane							

Notes:

Concentrations are in micrograms per cubic meter.

Shaded areas indicate concentrations that exceed the absolute value of the standard.

For further clarification see footnotes in Appendix A.

* Sample identification format: 1A2=first quarter sample at sampler A2.

** Proposed value.

***Tentatively Identified total (m,o,p) ethylmethylbenzene isomers. These values have not been included in the annual average.

TABLE 2.5

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Annual Summary

OTHER BACKGROUND AMBIENT AIR VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				ANNUAL AVERAGE	CURRENT AGC	FORMER AGC
SAMPLE IDENTIFICATION*	1A1	2A1	3A1	4A1	A2		
VOC COMPOUND NAME							
Acetone		0.894		0.192	0.543	14,000	35,600
Benzaldehyde							
2-Butanone	0.0952	0.784			0.440	300	1,967
2-Chloroethyl Vinyl Ether							
cis-1,2-Dichloroethene						1,900	1,880**
Dichlorodifluoromethane			0.762		0.762		
Freon 13						530	133,333**
2-Hexanone							
4-Methyl-2-Pentanone		0.181	0.143		0.162	480	683

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				ANNUAL AVERAGE	CURRENT AGC	FORMER AGC
SAMPLE IDENTIFICATION*	1A1	2A1	3A1	4A1	A2		
VOC COMPOUND NAME							
2,3-Dihydro-1H-Indene	0.514				0.514		
2,5-Dimethylhexane	0.495				0.495		
4,5-Dimethylundecane							
2-Ethylhexanal							
Ethylmethylbenzene Isomer	2.57***	5.33***	3.14	0.464	1.89	0.1	0.03
Freon 113			1.62		1.62	90,000	90,476
Hexachloroethane							
Hexane						420	
Methyl (methylethenyl) Cyclohexene							
Methylcyclopentane						8,300	8,333
(1-Methylethyl)Benzene							
2-Methylheptane							
2-Methylpentane						830	
2-Methylhexane	0.886				0.886		
3-Methylpentane							
1,1,2-Trichloro-1,2,2-Trifluoroethane						90,000	90,476
Trimethylbenzene Isomer			2.29	0.333	1.31		
Undecane							

Notes:

Concentrations are in micrograms per cubic meter.

Shaded areas indicate concentrations that exceed the absolute value of the standard.

For further clarification, see footnotes in Appendix A.

* Sample identification format: 1A1 = first quarter at sampler A1.

** Proposed value.

***Tentatively identified total (m,o,p) ethylmethylbenzene isomers. These values have not been included in the annual average.

the second year of sampling included pressure tests at various locations around the landfill. A comparison between the first and second year results show several areas of agreement, however, there are several notable differences. In general, the tests continue to confirm that benzene, tetrachloroethene, and trichloroethene concentrations are consistently over the NYSDEC ambient annual guideline values. Several other compounds observed during the first year test effort continue to appear, however at slightly lower concentration values. This net difference or decrease may in part be attributed to the capping of the landfill which was completed in January 1993. However, only three quarters of data are available for the completely capped landfill.

The exceptions and new findings are also significant. Observed levels of ethylmethylbenzene are above the ambient guideline values downwind of the landfill. This compound was recently added to the target compound list because research into the NYSDEC guidelines indicated a differentiation between isomers was required to determine if a concentration recorded at a site was in excess of the guideline. The work indicated that combined ortho and para ethylmethylbenzene isomers were reported at levels exceeding the state guidelines.

Soil gas concentrations of target constituents were also observed during the second year of testing. The soil gas concentrations observed during the second year have been presented in the quarterly reports and are reproduced in Appendix B. The observed concentrations for several compounds are in excess of the levels of ambient air guideline values specified by the NYSDEC. However, these are soil gas concentrations, and therefore, should not be compared to breathing zone guidelines. Soil gas concentrations as reported should dissipate rapidly upon entering the atmosphere.

A comparison of these data with data recorded during the first year of testing indicates many similarities. One notable exception is carbon disulfide which was identified in the first year of testing but was detected in only a few samples the second year. At present, there does not appear to be a reason for this change. The capping of the landfill should improve the soil gas collection efficiency if current extraction systems that are in place are operating. Unfortunately, only three data points were available after the capping of the landfill was completed so it was difficult to determine if a substantial decrease in gas release rates to the atmosphere had occurred.

Soil gas pressure measurements were also made during the second year of testing as prescribed in the Consent Order. The soil gas reading shows that a negative pressure gradient is being maintained at the observation points. As stated in the quarterly reports some effort should be placed into repairing or replacing one of the probes (PW2, 10 foot level) because of consistently zero pressure differentials.

3.0 SUMMARY AND CONCLUSION

In summary, the second year of collecting data on ambient air and soil gas volatile organic compound concentration and soil gas pressure readings was completed according to the monitoring plan which is in conformance with the Order of Consent. The data indicates that several compounds, most notably benzene, carbon tetrachloride, tetrachloroethene, trichloroethene, and ethylmethylbenzene have ambient air concentrations in excess of their respective state annual guideline concentrations. The benzene and combined ortho and para ethylmethylbenzene isomer values are in excess of the guideline value even though upwind or background concentration values are taken into account. Also, the ethylmethylbenzene (ortho and para) isomer concentrations identified in the last two quarters were not individually identified in the first two quarters of the second year, since ethylmethylbenzene was tentatively identified. As a tentatively identified compound, ethylmethylbenzene was detected during the last quarter of the first year of testing.

The analysis conducted in the second year also concentrated on refining the sampling techniques. To that end, canister samples were taken during the fourth quarter tests and these show some significant differences to samples taken using previously approved methods. The difference in sample loading volumes and a sample breakthrough analysis was also added to the sampling strategy. These efforts indicated that the canister methods, which are currently being promoted by the EPA, have severe limitations with respect to level of detection. This is particularly true for carbon tetrachloride and tetrachloroethene, both of which were not detected by the canister, however, using the approved modified VOST sampling technique both reported values were in excess of the state guideline values.

The program for monitoring volatile organic compounds in the vicinity of the landfill was designed and implemented prior to recent guidance documents on conducting air pathway analyses that has been issued by the NYSDEC and USEPA. Certain modifications to the monitoring program have been made as analytical capabilities have improved in order to keep the program current. In that recent guidance has

been issued (NYSDEC, August 20, 1993) for conducting air pathway analyses it would be appropriate to review the guidance and to determine what program modifications would be appropriate. The proposed program modifications can then be discussed with appropriate regulatory staff and upon consensus the program modifications, if any, can be implemented. The new guidance is based on Section 114(a) (D) of the Clean Air Act which provides a general direction on sampling emissions. The NYSDEC has taken those provisions and developed standard procedures and guideline documents that allow for a variety of techniques for measuring and evaluating air emissions, soil vapor surveys and meteorology. Those proposed changes should be incorporated into any further sampling and analysis programs.

In conclusion, the data base that has been accumulated to date is primarily for an uncapped landfill. Data collected since capping was completed is limited and needs to be verified by more sampling, especially since concentrations continue to be monitored in excess of ambient guideline values. Furthermore, the target compound list has been expanded because of continuing reviews of tentatively identified compounds being detected and enhanced analytical procedures. Therefore, compounds have been added to the target compound list. These compounds can be significant as illustrated by ethylmethylbenzene which is in excess of the current state annual guideline concentration. Based on the above, it appears prudent to continue the ambient air testing in the vicinity of the complex using the procedures currently available to address the above unresolved issues.

APPENDIX A
AMBIENT AIR CONCENTRATION DATA

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, First Quarter

AMBIENT AIR VOST SAMPLE RESULTS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION*	A1	A2	A3	A4	FB	TB	AGC	AGC
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)		(ug/m3)	(ug/m3)
Acetone							14,000	35,600
Benzene	1.62	1.68	2.29	1.61			0.12	100
Bromodichloromethane							0.02	0.03**
Bromoform							12	11.9**
Bromomethane								
2-Butanone	0.0952	0.0735		0.179			300	1,967
Carbon Disulfide							7	100
Carbon Tetrachloride	0.41	0.422		0.396			0.07	100
Chlorobenzene							20	1,170
Chloroethane							63,000	52,000
Chloroform							23	167
Chloromethane	0.0686	>0.0745		>0.132			770	2,100
Dibromochloromethane							0.1	0.03**
1,2-Dichlorobenzene (o)							200	1,000
1,3-Dichlorobenzene (m)	0.238	0.147		0.189			200	714**
1,4-Dichlorobenzene (p)							700**	
1,1-Dichloroethane							500	9,524**
1,2-Dichloroethane							0.039	0.2
1,1-Dichloroethene							0.02	66.7
trans-1,2-Dichloroethene							360	360**
1,2-Dichloropropane	0.0476	0.0500		0.0462			0.15	833**
cis-1,3-Dichloropropene								
trans-1,3-Dichloropropene								
Ethylbenzene	0.790	1.18		0.830			1,000	1,450
2-Hexanone								
4-Methyl-2-Pentanone							480	683
Methylene Chloride	0.305	0.461		0.368			27	1,170
Styrene							510	716
1,1,2,2-Tetrachloroethane							0.02	23.2
Tetrachloroethene	1.71	1.37	2.10	1.61			0.075	1,120
Toluene	>0.781	0.843	6.67	>0.698			2,000	7,500
1,1,1-Trichloroethane	1.24	1.26	3.05	1.23			1,000	38,000
1,1,2-Trichloroethane							0.06	150
Trichloroethene	0.229	0.206	4.10	0.217			0.45	900
Trichlorofluoromethane	0.819	1.04		0.840			700	
Vinyl Chloride							0.02	0.4
Xylenes (Total)	>2.57	>1.27	4.29	1.42			300	1,450

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, First Quarter

AMBIENT AIR VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION*	A1	A2	A3	A4	FB	TB	AGC	AGC
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)		(ug/m3)	(ug/m3)
Benzaldehyde								
2-Chloroethyl Vinyl Ether								
cis-1,2-Dichloroethene							1,900	1,880**
Freon 13							530	133,333**
Vinyl Acetate								

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION*	A1	A2	A3	A4	FB	TB	AGC	AGC
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)		(ug/m3)	(ug/m3)
2,3-Dihydro-1H-Indene	0.514							
2,5-Dimethylhexane	0.495							
4,6-Dimethylundecane		0.863						
Hexane		0.48		1.51			420	
Methylcyclopentane		0.186					8,300	8333**
(1-Methylethyl)Benzene			0.924					
2-Methylheptane				0.434				
2-Methylpentane		0.333					830	
2-Methylhexane	0.886			0.934				
3-Methylpentane		1.37	4.38					
1,1,2-Trichloro-1,2,2-Trifluoroethane		0.784					90,000	90,476**

*Sample Identification: (see Figure 2.1)

A1: High volume ambient upwind sample collected at the Battle Row Campground

A2: High volume ambient downwind sample collected 50 feet southwest of well M5

A3: Low volume ambient downwind (A2 duplicate) sample collected 50 feet southwest of well M5

A4: High volume ambient downwind sample collected 100 feet south of well M39.

FB: Field Blank

TB: Trip Blank

**Proposed Value.

All values are reported as ug/m3 except for field blank (FB) and trip blank (TB) mass loading results reported as nanograms (ng).

Shaded in values exceed current (as of 6/91) and/or previous AGC value.

All blank values are less than the lower quantitation limit. The lower quantitation limit for each sample is:

A1 = 0.0190 ug/m3

A2 = 0.0196 ug/m3

A3 = 1.90 ug/m3

A4 = 0.0189 ug/m3

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Second Quarter

AMBIENT AIR VOST SAMPLE RESULTS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION*	A1	A2	A3	A4	FB	TB	AGC	AGC
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)		(ug/m3)	(ug/m3)
Benzene	3.12	3.86	5.97	3.49			0.12	100
Bromodichloromethane							0.02	0.03**
Bromoform							12	11.9**
Bromomethane								
Carbon Disulfide	0.0302						7	100
Carbon Tetrachloride	0.402	0.386	1.10	0.391			0.07	100
Chlorobenzene							20	1,170
Chloroethane							63,000	52,000
Chloroform							23	167
Chloromethane	2.21	1.22	2.64	1.23			770	2,100
Dibromochloromethane							0.1	0.03**
1,2-Dichlorobenzene (o)							200	1,000
1,3-Dichlorobenzene (m)							200	714**
1,4-Dichlorobenzene (p)	0.402	0.284	0.573	0.298			700**	
1,1-Dichloroethane							500	9,524**
1,2-Dichloroethane							0.039	0.2
1,1-Dichloroethene							0.02	66.7
trans-1,2-Dichloroethene							360	360**
1,2-Dichloropropane							0.15	833**
cis-1,3-Dichloropropene								
trans-1,3-Dichloropropene								
Ethylbenzene	1.51	1.52	1.54	1.13			1,000	1,450
Methylene Chloride	2.21	1.83	2.86	1.85			27	1,170
Styrene			0.319				510	716
1,1,2,2-Tetrachloroethane							0.02	23.2
Tetrachloroethene	3.82	3.35	3.63	3.29			1.2***	1,120
Toluene	>1.71	9.41	11.0	8.12			2,000	7,500
1,1,1-Trichloroethane	2.21	1.93	6.61	2.06			1,000	38,000
1,1,2-Trichloroethane							0.06	150
Trichloroethene	2.01	1.52	1.76	2.36			0.45	900
Trichlorofluoromethane	1.91	1.62	1.76	1.85			700	
Vinyl Chloride							0.02	0.4
Xylenes (Total)	>4.02	>8.22	9.69	7.50			300	1,450

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Second Quarter

AMBIENT AIR VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION*	A1	A2	A3	A4	FB	TB	AGC	AGC
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)		(ug/m3)	(ug/m3)
Acetone	0.894	0.203	1.98	0.678			14,000	35,600
Benzaldehyde								
2-Butanone	0.784	0.812	2.09	0.843			300	1,967
2-Chloroethyl Vinyl Ether								
cis-1,2-Dichloroethene							1,900	1,880**
Freon 13							530	133,333**
2-Hexanone								
4-Methyl-2-Pentanone	0.181		0.231				480	683
Vinyl Acetate								

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION*	A1	A2	A3	A4	FB	TB	AGC	AGC
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)		(ug/m3)	(ug/m3)
Methyl (methylethenyl) Cyclohexene		0.0274						
Hexane				1.85			420	

*Sample Identification: (see Figure 2.1)

A1: High volume ambient upwind sample collected at the Battle Row Campground

A2: High volume ambient downwind sample collected 20 feet southwest of the southeast landfill gate.

A3: Low volume ambient downwind (A2 duplicate) sample collected 20 feet southwest of the southeast landfill gate.

A4: High volume ambient downwind sample collected 250 feet south of well M39.

FB: Field Blank

TB: Trip Blank

**Proposed Value.

***Current AGC for tetrachloroethene as of November 1991.

All values are reported as ug/m3 except for field blank (FB) and trip blank (TB) mass loading results reported as nanograms (ng).

Shaded in values exceed the level of the current (as of June 1991 or November 1991 for tetrachloroethene) and/or previous AGC values.

All blank values are less than the lower quantitation limit. The lower quantitation limit for each sample is:

A1 = 0.0201 ug/m3

A2 = 0.203 ug/m3, 0.0203 ug/m3 for back trap (break through analysis).

A3 = 0.220 ug/m3

A4 = 0.226 ug/m3

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Third Quarter

AMBIENT AIR VOST SAMPLE RESULTS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION*	A1	A2	A3	A4	FB	TB	AGC	AGC
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)		(ug/m3)	(ug/m3)
Benzene	0.657	0.523	2.28	NA			0.12	100
Bromodichloromethane				NA			0.02	0.03**
Bromoform				NA			12	11.9**
Bromomethane				NA				
Carbon Disulfide				NA			7	100
Carbon Tetrachloride	0.219	0.191	0.508	NA			0.07	100
Chlorobenzene				NA			20	1,170
Chloroethane				NA			63,000	52,000
Chloroform				NA			23	167
Chloromethane			175***	NA			770	2,100
Dibromochloromethane				NA			0.1	0.03**
Dibromomethane				NA				
1,2-Dichlorobenzene (o)				NA			200	1,000
1,3-Dichlorobenzene (m)				NA			200	714**
1,4-Dichlorobenzene (p)	0.305	0.271	0.342	NA			700**	
Dichlorodifluoromethane	0.762	2.77	7.02	NA				
1,1-Dichloroethane				NA			500	9,524**
1,2-Dichloroethane				NA			0.039	0.2
1,1-Dichloroethene				NA			0.02	66.7
trans-1,2-Dichloroethene				NA			360	360**
1,2-Dichloropropane				NA			0.15	833**
cis-1,3-Dichloropropene				NA				
trans-1,3-Dichloropropene				NA				
Ethylbenzene	0.952	0.824	0.965	NA			1,000	1,450
Iodomethane				NA				
Methylene Chloride	0.619	0.432	0.737	NA			27	1,170
Styrene				NA			510	716
1,1,2,2-Tetrachloroethane				NA			0.02	23.2
Tetrachloroethene	1.90	1.11	1.32	NA			1.2****	1,120
Toluene	6.57	6.05	4.30	NA			2,000	7,500
1,1,1-Trichloroethane	0.686	0.553	1.58	NA			1,000	38,000
1,1,2-Trichloroethane				NA			0.06	150
Trichloroethene	0.114	0.111	0.316	NA			0.45	900
Trichlorofluoromethane	1.05	1.16	2.11	NA			700	
Vinyl Chloride				NA			0.02	0.4
Xylenes (Total)	4.95	4.12	4.82	NA			300	1,450

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Third Quarter

AMBIENT AIR VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION*	A1	A2	A3	A4	FB	TB	AGC	AGC
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)		(ug/m3)	(ug/m3)
Acetone				NA			14,000	35,600
Benzaldehyde				NA				
2-Butanone			0.184	NA			300	1,967
2-Chloroethyl Vinyl Ether				NA				
cis-1,2-Dichloroethene				NA			1,900	1,880**
Freon 13				NA			530	133,333**
2-Hexanone				NA				
4-Methyl-2-Pentanone	0.143			NA			480	683

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE				BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION*	A1	A2	A3	A4	FB	TB	AGC	AGC
VOC COMPOUND NAME	CONC.	CONC.	CONC.	CONC.	(ng)		(ug/m3)	(ug/m3)
Ethylmethylbenzene Isomer	3.14	3.72	2.46	NA			0.1	0.03**
Freon 113	1.62	0.121		NA			90,000	90,476**
Hexachloroethane			1.58	NA				
Trimethylbenzene Isomer	2.29	1.91		NA			290	
Undecane			2.02	NA				

*Sample Identification: (see Figure 2.1)

A1: High volume ambient upwind sample collected at the Battle Row Campground (50 feet west and 30 feet south of the southeast campground gate).

A2: High volume ambient downwind sample collected 20 feet southwest of the southeast landfill gate.

A3: Low volume ambient downwind (A2 duplicate) sample collected 20 feet southwest of the southeast landfill gate.

A4: High volume ambient downwind sample collected 220 feet south of well M39.

FB: Field Blank

TB: Trip Blank

**Proposed Value.

***Suspect data (see text).

****Current ambient air Annual Guideline Concentration (AGC) for tetrachloroethene as of November 1991.

NA - Value not available for A4. The A4 sampling train malfunctioned during the test and therefore the samples from A4 were not analyzed.

All values are reported as ug/m3 except for field blank (FB) and trip blank (TB) mass loading results reported as nanograms (ng).

Shaded in values exceed the level of the current (as of June 1991 or November 1991 for tetrachloroethene) and/or previous AGC values.

All blank values are less than the lower quantitation limit. The lower quantitation limit for each sample is:

A1 = 0.0952 ug/m3

A2 = 0.101 ug/m3, 0.0201 ug/m3 for back trap (break through analysis).

A3 = 0.175 ug/m3

A4 = NA

FB = 20 ng

TB = 20 ng

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Fourth Quarter

AMBIENT AIR VOST SAMPLE RESULTS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE					BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION(1)	A1	A2	A3	A4	Canister	FB	TB	AGC	AGC
VOC COMPOUND NAME	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ng)		(ug/m3)	(ug/m3)
Benzene	<0.242	<0.298	1.28	<0.298	<0.733			0.12	100
Benzyl chloride (4)								0.02	16.7
Bromodichloromethane					NA			0.02	0.03(2)
Bromoform					NA			12	11.9(2)
Bromomethane									
Carbon Disulfide		<0.269			NA			7	100
Carbon Tetrachloride	<0.222	<0.218	0.668	<0.187				0.07	100
Chlorobenzene								20	1,170
Chloroethane								63,000	52,000
Chloroform								23	167
Chloromethane			2.07		0.715			770	2,100
3-Chloropropene (4)								7.1	10
Dibromochloromethane					NA			0.1	0.03(2)
1,2-Dibromoethane (4)								0.004	0.002
1,2-Dichlorobenzene (o)		<0.163						200	1,000
1,3-Dichlorobenzene (m)								200	714(2)
1,4-Dichlorobenzene (p)								700(2)	
Dichlorodifluoromethane (4)		<0.875			1.51				
1,1-Dichloroethane								500	9,524(2)
1,2-Dichloroethane								0.039	0.2
1,1-Dichloroethene								0.02	66.7
trans-1,2-Dichloroethene					NA			360	360(2)
1,2-Dichloropropane								0.15	833(2)
cis-1,3-Dichloropropene									
trans-1,3-Dichloropropene									
1,2-Dichloro-1,1,2,2-tetrafluoroethane (4)									
Ethylbenzene		<0.173		<0.140				1,000	1,450
1-Ethyl-2-methylbenzene					NA				
1-Ethyl-4-methylbenzene	<0.464	<0.885	0.753	<0.832	NA			0.1	0.03(2)
Hexachlorobutadiene (4)								0.05	0.8
Methylene Chloride		<0.203	0.450		<1.01			27	1,170
Styrene								510	716
1,1,2,2-Tetrachloroethane								0.02	23.2
Tetrachloroethene	<0.605	<0.731	0.826	<0.720				1.2(3)	1,120
Toluene	<1.53	<1.96	2.31	<2.26	<1.65			2,000	7,500
1,2,4-Trichlorobenzene (4)								9	133
1,1,1-Trichloroethane	<0.333	<0.385	1.14	<0.308	<1.09			1,000	38,000
1,1,2-Trichloroethane								0.06	150
Trichloroethene								0.45	900
Trichlorofluoromethane	<0.787	<1.31	5.10	<0.495	1.23			700	
1,1,2-Trichloro-1,2,2-trifluoroethane (4)		<0.318						90,000	90,476(2)
1,2,4-Trimethylbenzene (4)									
1,3,5-Trimethylbenzene (4)								290	
Vinyl Chloride								0.02	0.4
Xylenes (Total)	<1.03	<1.58	1.58	<1.42				300	1450(5)

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Fourth Quarter

AMBIENT AIR VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE					BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION*	A1	A2	A3	A4	Canister	FB	TB	AGC	AGC
VOC COMPOUND NAME	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ng)		(ug/m3)	(ug/m3)
Acetone	<0.192	<0.225		<0.185	NA			14,000	35,600
Benzaldehyde					NA				
2-Butanone			0.802		NA			300	1,967
2-Chloroethyl Vinyl Ether					NA				
cis-1,2-Dichloroethene								1,900	1,880(2)
Freon 13					NA			530	133,333(2)
2-Hexanone					NA				
4-Methyl-2-Pentanone					NA			480	683

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE TYPE	24-HR AMBIENT AIR SAMPLE					BLANK		CURRENT	FORMER
SAMPLE IDENTIFICATION*	A1	A2	A3	A4	Canister	FB	TB	AGC	AGC
VOC COMPOUND NAME	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ug/m3)	(ng)		(ug/m3)	(ug/m3)
1,2,3-Trimethylbenzene	<0.333	<0.760		<0.879	NA				
2-Ethylhexanal		<0.189			NA				

(1) See Figure 2.1 for ambient air and soil gas sampling locations

A1: High volume ambient upwind sample collected 6 feet south of property line to golf course, 90 feet west of Round Swamp Road.

A2: High volume ambient downwind sample collected 180 feet southwest of the Air Stripper tower.

A3: Low volume ambient downwind (A2 duplicate) sample collected 180 feet southwest of the Air Stripper tower.

A4: High volume ambient downwind sample collected 100 feet north northwest of well M5.

FB: Field Blank

TB: Trip Blank

(2) Proposed Value.

(3) Current ambient air Annual Guideline Concentration (AGC) for tetrachloroethene as of November 1991.

(4) Ten of the SUMMA target compounds were not VOST target compounds therefore, reported values for any of the VOCs in the VOST analyses are provided as tentatively identified (see A2 dichlorodifluoromethane and 1,1,2-trichloro-1,2,2-trifluoroethane).

(5) 1450 total for ortho and para xylenes and 1450 total for meta xylene.

NA - Because of the Target Compound List discrepancy between the VOST and SUMMA canister methodologies some VOCs reported for VOST were not available (NA) for the SUMMA canister samples.

All blank values are reported as ug/m3 except for field blank (FB) and trip blank (TB) mass loading results reported as nanograms (ng).

Field and trip blanks apply only to VOST samples.

Shaded in values exceed the level of the current (as of June 1991 or November 1991 for tetrachloroethene) and/or previous AGC values.

All blank values are less than the lower quantitation limit. The lower quantitation limit for each sample is:

A1 = 0.128 ug/m3

A2 = 0.154 ug/m3

A3 = 0.243 ug/m3

A4 = 0.131 ug/m3

Canister = 0.2 ppbv or 1.01 ug/m3 (@ <MW>=123)

FB = 20 ng

TB = 20 ng

APPENDIX B
SOIL GAS CONCENTRATION DATA

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, First Quarter

SOIL GAS VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	2.34	2.31	2.31	2.31	27.6	2.30	23.0	2.30	2.30	2.30	2.30	2.30	2.30	20.7	2.31	2.30	2.30	2.30	AGC	AGC
VOC COMPOUND NAME																				
Benzaldehyde																				
2-Chloroethyl Vinyl Ether																			1,900	1,880*
cis-1,2-Dichloroethene																			530	133,333*
Freon 13																				
Vinyl Acetate																				

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	2.34	2.31	2.31	2.31	27.6	2.30	23.0	2.30	2.30	2.30	2.30	2.30	2.30	20.7	2.31	2.30	2.30	2.30	AGC	AGC
VOC COMPOUND NAME																				
**																		32.2		
Limonene												2.76								
2-Methylbutane		85.5						60.8								66.7			8,300	8,333
3-Methyl-5-Propylnonane																	3.80			
alpha-Pinene												8.74	53.2					25.3		
2,2,5,5- Tetramethylhexane				2.54																

All values are report in micrograms per cubic meter (ug/m3).
All blank values are less than the lower quantitation limit reported for each sample.
Values in shaded areas exceed current (as of 6/91) and/or previous AGC values.

*Proposed Value

**2,2-Dimethyl-3-Methylenecyclo[2.2.1] heptane

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
Second Year, Second Quarter
SOIL GAS VOST SAMPLE RESULTS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	2.18	2.17	2.17	2.11	2.16	2.09	2.15	2.14	2.14	2.15	2.14	2.11	2.11	27.6	2.12	2.13	2.14	2.24	AGC	AGC
VOC COMPOUND NAME																				
Benzene					2.43								2.32						0.12	100
Bromodichloromethane																			0.02	0.03*
Bromoform																			12	11.9
Bromomethane																				
Carbon Disulfide																			7	100
Carbon Tetrachloride																			0.07	100
Chlorobenzene																			20	1,170
Chloroethane																			63,000	52,000
Chloroform														2.42					23	167
Chloromethane																			770	2,100
Dibromochloromethane																			0.1	0.03*
1,2-Dichlorobenzene (o)																			200	1,000
1,3-Dichlorobenzene (m)																			200	714*
1,4-Dichlorobenzene (p)																			700*	
1,1-Dichloroethane																			500	9,524*
1,2-Dichloroethane																			0.039	0.2
1,1,1-Dichloroethene																			0.02	66.7
trans-1,2-Dichloroethene																			360	360*
1,2-Dichloropropane																			0.15	833*
cis-1,3-Dichloropropene																				
trans-1,3-Dichloropropene																				
Ethylbenzene																			1,000	1,450
Methylene Chloride																			27	1,170
Styrene																			510	716
1,1,2,2-Tetrachloroethane																			0.02	23.3
Tetrachloroethene							2.47	2.59	2.58	3.93			2.11						1.2*	1,120
Toluene					3.02								5.27						2,000	7,500
1,1,1-Trichloroethane	2.29			2.63						2.37	3.22	2.11	3.48				2.14	2.68	1,000	38,000
1,1,2-Trichloroethane																			0.06	150
Trichloroethene																			0.45	900
Trichlorofluoromethane											3.43								700	
Vinyl Chloride																			0.02	0.40
Xylenes (Total)																			300	1,450*

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Second Quarter

SOIL GAS VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	2.18	2.17	2.17	2.11	2.16	2.09	2.15	2.14	2.14	2.15	2.14	2.11	2.11	27.6	2.12	2.13	2.14	2.24	AGC	AGC
VOC COMPOUND NAME																				
Acetone																			14,000	35,600
Benzaldehyde																				
2-Butanone																		8.39	300	1,967
2-Chloroethyl Vinyl Ether																				
cis-1,2-Dichloroethene																			1,900	1,880*
Freon 13																			530	133,333*
2-Hexanone																				
4-Methyl-2-Pentanone																			480	683
Vinyl Acetate																				

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	2.18	2.17	2.17	2.11	2.16	2.09	2.15	2.14	2.14	2.15	2.14	2.11	2.11	27.6	2.12	2.13	2.14	2.24	AGC	AGC
VOC COMPOUND NAME																				
alpha-Pinene					238															
***					48.6															
Dimethyloctene												2.11								
(1-Methylethyl) benzene													2.95							

All values are report in micrograms per cubic meter (ug/m3).

All blank values are less than the lower quantitation limit reported for each sample.

Values in shaded areas exceed the level of the current (as of 6/91 or 11/91 for Tetrachloroethene) and/or previous AGC values.

*Proposed Value

**Current AGC for Tetrachloroethene as of November 1991.

***1,7,7-Trimethylbicyclo[2.2.1] hept-2-ene

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
Second Year, Third Quarter
SOIL GAS VOST SAMPLE RESULTS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current AGC	Former AGC
LOWER QUANTITATION LIMIT	2.29	11.1	2.27	2.24	2.20	2.27	2.18	2.23	2.21	2.29	2.23	2.21	2.51	2.23	2.18	2.13	2.18	2.21		
VOC COMPOUND NAME																				
Benzene																			0.12	100
Bromodichloromethane																			0.02	0.03*
Bromoform																			12	11.9
Bromomethane																				
Carbon Disulfide																			7	100
Carbon Tetrachloride																			0.07	100
Chlorobenzene																			20	1,170
Chloroethane																			63,000	52,000
Chloroform														2.34					23	167
Chloromethane																			770	2,100
Dibromochloromethane																			0.1	0.03*
Dibromomethane																			200	1,000
1,2-Dichlorobenzene (o)																			200	714*
1,3-Dichlorobenzene (m)																			200	714*
1,4-Dichlorobenzene (p)																			700*	
Dichlorodifluoromethane	2.75					3.40	8.18	12.3	2.32					4.12			17.4			
1,1-Dichloroethane						15.3	17.4	5.26	3.31										500	9,524*
1,2-Dichloroethane																			0.039	0.2
1,1-Dichloroethene																			0.02	66.7
trans-1,2-Dichloroethene																			360	360*
1,2-Dichloropropane																			0.15	833*
cis-1,3-Dichloropropene																				
trans-1,3-Dichloropropene																				
Ethylbenzene																				
Iodomethane																			1,000	1,450
Methylene Chloride																			27	1,170
Styrene																			510	716
1,1,2,2-Tetrachloroethane																			0.02	23.3
Tetrachloroethene	4.36			11.1		5.87	5.02	4.80	3.42	12.5**	16.8	7.20		12.3	3.10		5.01	15.6	1.2**	1,120
Toluene		24.5																	2,000	7,500
1,1,1-Trichloroethane									19.9										1,000	38,000
1,1,2-Trichloroethane									5.86										0.06	150
Trichloroethene									2.21										0.45	900
Trichlorofluoromethane							3.93	32.4	6.62										700	
Vinyl Chloride																			0.02	0.40
Xylenes (Total)	<6.88	<6.69	<6.80	<6.71	<6.59	<6.80	<6.54	<6.70	<6.62	<6.88	<6.70	<6.64	<7.52	<6.69	<6.53	<6.38	<6.53	<6.64	300	1,450*

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX

Second Year, Third Quarter

SOIL GAS VOST SAMPLE RESULTS

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	2.29	11.1	2.27	2.24	2.20	2.27	2.18	2.23	2.21	2.29	2.23	2.21	2.51	2.23	2.18	2.13	2.18	2.21	AGC	AGC
VOC COMPOUND NAME																				
Acetone																			14,000	35,600
Benzaldehyde																				
2-Butanone		6.479*		17.2*	32.9							9.30	5.89					26.6	300	1,967
2-Chloroethyl Vinyl Ether																				
cis-1,2-Dichloroethene																			1,900	1,880*
Freon 13																			530	133,333*
2-Hexanone			3.74																	
4-Methyl-2-Pentanone																			480	683

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	2.29	11.1	2.27	2.24	2.20	2.27	2.18	2.23	2.21	2.29	2.23	2.21	2.51	2.23	2.18	2.13	2.18	2.21	AGC	AGC
VOC COMPOUND NAME																				
Carophyllene							8.18													
Cyclohexanone				28.0			8.18												240	238*
2,2-Dimethylbicyclo[2.2.1]heptane					121															
Hexachloroethane	10.7		4.64	12.3						2.98	16.8	16.6		4.57				11.0		
Methylmethyl ethylbenzene isomer																				
Methylpropylnonane isomer																	66.4			
4-Methylene-1-(1-methylethyl)cyclohexene													7.52							
beta-Myrcene													5.51							
alpha-Pinene													46.4							
1,1,2-Trichloro-1,2,2-trifluoroethane(Freon113)									41.9										90,000	90,476*
2,2,3-Trimethylbicyclo[2.2.1]heptane isomer																	31.6			
2,2,6-Trimethyldecane																	35.9			
Undecane																		29.9		

All values are reported in micrograms per cubic meter (ug/m3).

All blank values are less than the lower quantitation limit reported for each sample.

Values in shaded areas exceed the level of the current (as of 6/91 or 11/91 for Tetrachloroethene) and/or previous ambient air Annual Guideline Concentration (AGC) values.

*Proposed Value

**Suspect data (see text).

***Current AGC for Tetrachloroethene as of November 1991.

OLD BETHPAGE LANDFILL
OYSTER BAY SOLID WASTE DISPOSAL COMPLEX
Second Year, Fourth Quarter
SOIL GAS VOST SAMPLE RESULTS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	7.34	1.92	2.03	NA	2.00	1.96	2.04	1.98	1.98	**	1.92	**	1.98	1.92	1.90	1.87	2.01	2.01	AGC	AGC
VOC COMPOUND NAME																				
Benzene				NA						<1.02		<1.02							0.12	100
Benzyl chloride				NA						NA		NA							0.02	16.7
Bromodichloromethane				NA						<2.04		<2.04							0.02	0.03(1)
Bromoform				NA						<2.04		<2.04							12	11.9
Bromomethane				NA						<2.04		<2.04								
Carbon Disulfide		2.02		NA				2.18	2.18	<10.2	4.04	<10.2		6.44	4.86	3.55		2.11	7	100
Carbon Tetrachloride				NA						<2.04		<2.04							0.07	100
Chlorobenzene				NA						<1.02		<1.02							20	1,170
Chloroethane				NA						<1.02		<1.02							63,000	52,000
Chloroform			4.47	NA						<6.12		<6.12		9.62			4.51		23	167
Chloromethane				NA						<1.02		<1.02					62.2		770	2,100
3-Chloropropene				NA						NA		NA							7.1	10
Dibromochloromethane				NA						<2.04		<2.04							0.1	0.03(1)
1,2-Dibromoethane				NA						<2.04		<2.04							0.004	0.002
1,2-Dichlorobenzene (o)				NA						NA		NA							200	1,000
1,2-Dichlorobenzene (m)				NA						NA		NA							200	714(1)
1,3-Dichlorobenzene (p)				NA						NA		NA							700(1)	
Dichlorodifluoromethane(2)				NA					<1.58	NA		NA					17.4		500	9,524(1)
1,1-Dichloroethane				NA					3.17	<1.02		<1.02							0.039	0.2
1,2-Dichloroethane				NA						<2.04		<2.04							0.02	66.7
1,1-Dichloroethene				NA						<2.04		<2.04							360	360(1)
trans-1,2-Dichloroethene				NA						<2.04		<2.04							0.15	833(1)
1,2-Dichloropropane				NA						<1.02		<1.02								
cis-1,3-Dichloropropene				NA						<1.02		<1.02								
trans-1,3-Dichloropropene				NA						<1.02		<1.02								
1,2-Dichloro-1,1,2,2-tetrafluoroethane				NA						<1.02		<1.02								
Ethylbenzene				NA						NA		NA							1,000	1,450
1-Ethyl-2-methylbenzene				NA						<2.04		<2.04								
1-Ethyl-4-methylbenzene				NA						NA		NA							0.1	0.03
Hexachlorobutadiene				NA						NA		NA							0.05	0.8
Methylene Chloride				NA						<10.2		<10.2							27	1,170
Styrene				NA						<2.04		<2.04							510	716
1,1,2,2-Tetrachloroethane				NA						<2.04		<2.04							0.02	- 23.3
Tetrachloroethene	16.3	3.75	11.2	NA		9.41	6.21	8.12	18.3	18.3	6.38	4.30		18.3	11.40	4.58	6.32	26.1	1.2(3)	1,120
Toluene				NA						<2.04		<2.04					2.31		2,000	7,500
1,2,4-Trichlorobenzene				NA						NA		NA							9.0	133
1,1,1-Trichloroethane				NA				3.56	10.9	2.45		2.45					2.81		1,000	38,000

Second Year
SOIL GAS VOST SAMPLE RESULTS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	7.34	1.92	2.03	NA	2.00	1.96	2.04	1.98	1.98	**	1.92	**	1.98	1.92	1.90	1.87	2.01	2.01	AGC	AGC
VOC COMPOUND NAME																				
1,1,2-Trichloroethane				NA						<2.04		<2.04							0.06	130
Trichloroethene(4)				NA						<1.02		<1.02							0.45	900
Trichlorofluoromethane	56.9			NA						4.46		NA							700	
1,1,2-Trichloro-1,2,2-trifluoroethane(5)				NA				12.9		46.5		NA							90,000	90,476(1)
1,2,4-Trimethylbenzene				NA								NA								
1,3,5-Trimethylbenzene				NA								NA							290	
Vinyl Chloride				NA						<1.02		<1.02							0.02	0.40
Xylenes (Total)				NA						<2.04		<2.04							300	1,450(4)

TENTATIVELY IDENTIFIED TARGET COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	7.34	1.92	2.03	NA	2.00	1.96	2.04	1.98	1.98	**	1.92	**	1.98	1.92	1.90	1.87	2.01	2.01	AGC	AGC
VOC COMPOUND NAME																				
Acetone										22.4		11.2							14,000	35,600
Benzaldehyde										NA		NA								
2-Butanone		47.1								<2.04		<2.04					12.0		300	1,967
2-Chloroethyl Vinyl Ether										NA		NA								
cis-1,2-Dichloroethene										<2.04		<2.04							1,900	1,880(1)
Freon 13										NA		NA							530	133,333(1)
2-Hexanone										<1.02		<1.02								
4-Methyl-2-Pentanone										<1.02		<1.02							480	683

ADDITIONAL TENTATIVELY IDENTIFIED COMPOUNDS

SOIL GAS WELL ID	F1	M2	M4	M5	M6	M9(10)	M9(20)	M9(30)	M9(40)	M13	M16	M21	M22	M28	M31	M34	M37	M39	Current	Former
LOWER QUANTITATION LIMIT	7.34	1.92	2.03	NA	2.00	1.96	2.04	1.98	1.98	**	1.92	**	1.98	1.92	1.90	1.87	2.01	2.01	AGC	AGC
VOC COMPOUND NAME																				
1,2-Dibromo-1,1,2,2-tetrachloroethane(6)		<9.23	3.05																	
Hexachloroethane(6)		<9.23																		
alpha-Pinene													18.8							

All values are reported in micrograms per cubic meter (ug/m3).

All blank values are less than the lower quantitation limit reported for each sample.

Values in shaded areas exceed the level of the current (as of 6/91 or 1/91 for Tetrachloroethene) and/or previous ambient air Annual Guideline Concentration (AGC) values.

NA - Because of the Target Compound List (TCL) discrepancy between the SUMMA canister methodology and VOST TCL and differences between laboratories some compounds were not available for reporting. Also sample M5 was lost (not available) due to laboratory error.

(1) Proposed Value

(2) Dichlorodifluoromethane was tentatively identified in sample M9(40) coeluting with Xenon, therefore the level for Dichlorodifluoromethane was reported less than the total combined mass loading/concentration.

(3) Current AGC for Tetrachloroethene as of November 1991.

(4) Do

(5) Tentatively Identified.

(6) Coelution of 1,2-Dibromo-1,1,2,2-tetrachloroethane and hexachloroethane was observed in sample M2, therefore the level for each compound was reported less than the total combined mass loading/concentration.

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