UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION I
OFFICE OF ENVIRONMENTAL MEASUREMENT AND EVALUATION
60 WESTVIEW STREET, LEXINGTON, MASSACHUSETTS 02421

MEMORANDUM

DATE: August 23, 1999

SUBJ: Centredale Manor Indoor Air Investigation Report

FROM: Peter R. Kahn, Environmental Engineer PRK
OEME/ECA

TO: Ted Bazenas, OSC

Attached is the final report describing the results of the Indoor Air Investigation at the Centredale Manor Site in North Providence, Rhode Island. The investigation was performed on August 3, 1999. If you have any questions, please feel free to call me at 781-860-4392.

Attachment:

FINAL REPORT

CENTREDALE MANOR INDOOR AIR SURVEY

NORTH PROVIDENCE, RI

AUGUST 1999

Prepared for: Office of Site Remediation & Restoration, MA Superfund
U.S. Environmental Protection Agency, New England

Prepared by: _____ Date: 8/23/99
Peter R. Kahn, ECA Air Monitoring Team Engineer

Reviewed by: _____ Date: 8/23/99
Norman J. Beloin, ECA Branch Chief/Air Monitoring Team Leader

U.S. ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND REGIONAL LABORATORY
OFFICE OF ENVIRONMENTAL MEASUREMENT & EVALUATION
60 WESTVIEW STREET
LEXINGTON, MA 02421

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1.0 Introduction

The EPA New England, Office of Environmental Measurement and Evaluation (OEME), at the request of Ted Bazenas, EPA On-Scene Coordinator (OSC) for the Centredale Manor Superfund Removal Site in North Providence, Rhode Island, performed an indoor air screening survey inside the Centredale Manor and the Brook Village housing complexes for the elderly on August 3, 1999. Peter Kahn was the OEME project manager for this survey and was responsible for the following tasks: communicated all aspects of the project to the OSC, coordinated the analytical support with OEME laboratory personnel, operated the portable instrumentation used for the project, prepared and collected indoor air canister samples, and prepared this final report. Dan Boudreau and Laurel Buttermore operated the OEME Laboratory GC/MS which was used to analyze the indoor air grab canister samples.

Also on August 3, members of Roy F. Weston START collected Tedlar bag samples at the same time and locations the canister samples were collected. The Tedlar bags were analyzed on-site using a portable gas chromatograph. A separate report will be prepared by Weston describing these results.

The EPA is concerned with the possible threat to public health from volatile organic compounds (VOCs) off gassing from contaminated soils and groundwater, migrating into buildings, and impacting indoor air quality. The EPA initiated this indoor air screening survey as a precautionary measure to investigate areas within the buildings where VOCs may migrate into the indoor air environment.

2.0 Sampling Objectives

The study focused on using portable instrumentation to screen areas where VOCs have the greatest potential to migrate into the buildings and then at selected locations collect grab samples for both on-site portable gas chromatography (GC) and laboratory gas chromatography/mass spectrometry (GC/MS) analyses. The objective of the survey was to collect data of known quality to support decisions on whether VOCs found in the contaminated soils and groundwater adjacent to and beneath the buildings were volatilizing and migrating into the buildings at the time samples were collected.

2.1 Target Compounds

The target compounds used for this survey have been identified in soil samples collected at the site. The target compounds are as follows: benzene, toluene, ethyl benzene, m-xylene, o-xylene, p-xylene, styrene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene.

2.2 Data Use and Reporting

The results of the survey are presented in this final report and will be provided to the EPA OSC for review. This report describes where samples were collected and the sampling and analytical procedures used for the study. In addition, all the sampling and quality assurance/quality control (QA/QC) data are reported in tabular form. The collected data were validated following the QC criteria described in Section 4.3. The air sampling and analytical techniques used for this survey provided screening data to investigate whether external sources of VOCs were migrating into the indoor air environment.

3.0 Total Hydrocarbon Monitoring Method

3.1 Foxboro Toxic Vapor Analyzer, TVA-1000 Description and Calibration Procedures

The Foxboro Toxic Vapor Analyzer, Model TVA-1000, is a portable, nonspecific, organic/inorganic vapor/gas monitor that uses both a flame ionization detector (FID) and a photo ionization detector (PID) to sample and measure the concentration of gases. The PID employs the principal of photo ionization to detect a variety of chemical compounds, both organic and inorganic with ionization potentials less than 10.6 eV. It will not detect freon, methane, ethane or propane in the PID mode. The instrument provides a direct-readout of trace gases as a total concentration in the dynamic range of 0.5 ppm to 2,000 ppm and 0.5 to 500 ppm (±25%) in the linear range, relative to isobutylene (the calibration reference standard). The FID employs the principal of hydrogen flame ionization to detect a variety of organic compounds, including methane. In the FID mode, the instrument will provide a direct-readout of the total concentration, in the dynamic range of 1.0 ppm to 50,000 ppm and 1.0 to 10,000 ppm (±25%) in the linear range, relative to methane (the calibration reference standard).

In the field, prior to monitoring the ambient air, the TVA-1000 was calibrated according to the procedures outlined in the operations manual. Initially, zero air was introduced to the instrument in order to determine the "background" signal for both FID and PID, then a 100 ppm isobutylene gas standard was introduced to the PID and a 100 ppm methane gas standard was introduced to the FID. The instrument automatically made all the necessary calculations to arrive at a "calibration constant." With the TVA-1000 in the run mode the signal was multiplied by the calibration constant and a response factor of one for both detectors, to arrive at the measured value in parts per million (ppm).

To check the accuracy of the TVA-1000, the Weston START contractor calibration gas was used to challenge the TVA-1000 at the end of the monitoring period. The calibration gas used was isobutylene at 100 ppm and methane at 73.6 ppm. The TVA-1000 detected isobutylene at 100 ppm and methane at 70 ppm showing excellent accuracy.

3.2 Total Hydrocarbon Monitoring Results

Table 1 and Table 2 shows the total hydrocarbon monitoring results obtained from inside and outside of the Centredale Manor and Brook Village apartment buildings on August 3, respectively. The concentrations are reported in parts per million (PPM) relative to isobutylene for the PID and relative to methane for the FID. Monitoring locations were chosen on the first floor in areas where VOCs have the greatest potential to move from the soils into the indoor air environment. These areas include, floor drains, conduits coming from underneath the building into a utility room, elevator shafts, etc. In addition, outside ambient air measurements were made to obtain background concentrations. Also, the indoor air breathing zone (3 to 6 feet above floor level) was measured for VOCs in rooms located on the first floor that had floor drains or conduits coming from underneath the building into the room. The average PID and FID concentrations of total hydrocarbons in outside/background ambient air were 0.2 ppm and 3 ppm, respectively. The average PID and FID concentrations of total hydrocarbons within the Centredale Manor breathing zone room air were 0.6 ppm and 4 ppm, respectively and for Brook Village the PID and FID average concentrations were 1 ppm and 3 ppm, respectively. The data collected using the TVA-1000 shows that volatile organic compounds (VOCs) were not present in the room air inside the buildings at concentrations significantly higher than the outside ambient air.

At Centredale Manor there were three locations where the concentrations were slightly higher than the ambient air and indoor breathing zone air. The compactor room floor drain (Sample #4) detected concentrations on the FID at 13 ppm and 12 ppm on the PID. In the utility room/elevator room the hole in the concrete where the conduit comes up through the concrete floor that houses the electrical line from the generator (Sample #6) detected concentrations on the FID at 3 ppm and 16 ppm on the PID. These two locations where sampled a second time using a tedlar bag followed by analysis using a portable Photovac GC and evacuated six liter canisters which were analyzed at the EPA Laboratory using a GC/MS. A floor drain between the two boilers in the boiler room (Sample #9) detected concentrations on the FID at 200 ppm and 125 ppm on the PID. There was a reddish colored liquid present in the floor drain during sampling. The maintenance worker indicated a product called Grease Away is used in the drains to cut grease. The product bottle label showed limonene octyl phenoxy (ethoxy) ethanol to be the main ingredient. The air space above the bottle contents was measured and showed levels in the range of 100 ppm to 200 ppm. Therefore, the levels detected in the floor drain are probably related to this product and not associated with contamination from underneath and adjacent to the building.

At the Brook Village apartment building there were two locations where the concentrations were slightly higher than the ambient air and indoor breathing zone air. The boiler room floor drain that is adjacent to the fire water pump (Sample #2) detected concentrations on the FID at 2 ppm and 34 ppm on the PID. The conduit for diesel fuel used in the generator room (Sample #5) detected concentrations on the FID at 2 ppm and 31 ppm on the PID. These two locations where sampled a second time using a tedlar bag followed by analysis using a portable Photovac GC and evacuated six liter canisters which were analyzed at the EPA Laboratory using a GC/MS.

The TVA-1000 was also used to take measurements from inside the underground Bell Atlantic Telephone Box which is located adjacent to the Centredale Manor north side visitors parking lot entrance. Measurements were made through a small hole in the cover. At no time was the cover removed for inspection. The FID and the PID detected concentrations at 3 ppm and 40 ppm, respectively.

4.0 Canister VOC Air Sampling and Analytical Methodology

4.1 Description

EPA Region I Standard Operating Procedure for the Sampling of Trace Volatile Organic Compounds using SUMMA Polished Stainless Steel Canisters, EPA-REG1-ESD/CAN-SAM-SOP, March 1994, Revision 1, was used to collect the air samples. Air grab samples were collected in evacuated 6 liter canisters using the procedure described in Part 1 of the Region I SOP, referenced above. Detailed descriptions of the quality assurance procedures are provided in Part 4 of the referenced SOP. The SOP can be found in a folder marked SOPs in Peter Kahn's office.

Canister grab samples were collected for approximately two minutes. The canister was initially at a pressure of -30 psig and after the canister valve was opened the sampled air was drawn into the canister until the canister pressure reaches atmospheric pressure (0 psig). The canister grab samples were brought back to the EPA laboratory, properly logged in and analyzed using a gas chromatograph/ion-trap mass spectrometer (GC/MS) following the EPA Region I standard operating procedure entitled, "The Determination of Volatile Organic Compounds in Ambient Air using Summa Passivated Canisters," a modification of EPA Method TO15 - The Determination of Volatile Organic Compounds in Ambient Air using SUMMA Passivated Canister Sampling and Gas Chromatographic Analysis, from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, EPA-600/4-84-041. This analytical procedure was used to identify and quantify the VOCs listed on Table 3. The SOP can be found on the OEME All Share "J" Drive.

Prior to analyzing the canisters, they were pressurized with humidified nitrogen to 30 psig. A 500-milliliter calibration standard was used to produce the calibration curve and with the 500-milliliter sample size from the canisters, a more accurate concentration and lower reporting limit can be reported. Smaller volumes were withdrawn from the canister to bring the concentrations within the calibration range.

TABLE 1

TOTAL HYDROCARBON MONITORING RESULTS

CENTREDALE MANOR

Sample Number	Time	Location	FID Concentration (PPM)	PID Concentration (PPM)
1	10:32	Outside front entrance ambient air	3	0.4
2	10:34	Compactor room, conduit caring telephone line to distribution panel	4	0.4
3	10:35	Compactor room, breathing zone indoor air	4	0.4
4	10:36	Compactor room, floor drain	13	12
5	10:38	Utility & elevator room, breathing zone indoor air	4	0.7
6	10:40	Utility & elevator room, hole in concrete where conduit comes up through the concrete floor caring electrical line from generator	3	16
7	10:42	Utility & elevator room, inside utility box for generator	4	0.5
8	10:43	Boiler room, breathing zone indoor air	4	0.3
9 *	10:44	Boiler room, floor drain between two boilers	200	125
10	10:46	Boiler room, floor drain under hot water tank	6	2
11	10:52	Laundry room, breathing zone indoor air	5	1
12	10:53	Laundry room, floor drain between machines #1, 2, and 3	4	2
13	10:54	Laundry room, floor drain by machine #7	4	0.7
14	10:56	Outside elevator in hallway, breathing zone indoor air	4	0.5

TABLE 1 - CONTINUED

TOTAL HYDROCARBON MONITORING RESULTS

CENTREDALE MANOR

Sample Number	Time	Location	FID Concentration (PPM)	PID Concentration (PPM)
15	10:56	Inside elevator shaft pit	4	0.4
16	10:58	Hobby room, breathing zone indoor air	4	0.4
17	10:59	Hobby room, inside closet, floor drain	4	2
18	11:01	Outside front entrance ambient air	3	0.2

NOTES: PID = Photo Ionization Detector
FID = Flame Ionization Detector
PPM = Part Per Million
The concentrations reported for the PID are relative to ppm of isobutylene.
The concentrations reported for the FID are relative to ppm of methane.
* = There was a reddish colored liquid in the floor drain. The maintenance worker indicated a product called Grease Away is used in the drains to cut grease. The product bottle label showed limonene octyl phenoxy (ethoxy) ethanol to be the main constituent. The air space above the bottle contents was measured and showed levels in the range of 100 ppm to 200 ppm.

TABLE 2

TOTAL HYDROCARBON MONITORING RESULTS

BROOK VILLAGE

Sample Number	Time	Location	FID Concentration (PPM)	PID Concentration (PPM)
1	12:34	Outside front entrance ambient air	2	0.2
2	12:38	Boiler room, fire pump room, floor drain	2	34
3	12:39	Boiler room, breathing zone indoor air	2	1
4	12:41	Generator room, breathing zone indoor air	2	0.2
5	12:42	Generator room, diesel conduit	2	31
6	12:43	Generator room, generator breaker box	2	0.7
7	12:45	Generator room, hole in floor near entrance	0.3	0.3
8	12:46	Boiler room, holes in cider block	5	1
9	12:47	Boiler room, floor drain between two rows of boilers	3	0.7
10	12:48	Boiler room, breathing zone indoor air between two rows of boilers	3	0.5
11 *	12:49	Equipment storage room, breathing zone indoor air	5	2
12 *	12:51	Equipment storage room, near hot water tank, breathing zone indoor air	5	2
13 *	12:51	Equipment storage room, near hot water tank, in 10 inch conduit for old fuel tank	6	4
14	12:53	Laundry room, breathing zone indoor air	3	0.6

TABLE 1 - CONTINUED

TOTAL HYDROCARBON MONITORING RESULTS

BROOK VILLAGE

Sample Number	Time	Location	FID Concentration (PPM)	PID Concentration (PPM)
15	12:54	Laundry room, floor drain	3	1
16	12:55	Outside front entrance ambient air	3	0.3

NOTES: PID = Photo Ionization Detector
FID = Flame Ionization Detector
PPM = Part Per Million
The concentrations reported for the PID are relative to ppm of isobutylene.
The concentrations reported for the FID are relative to ppm of methane.
* = There were lawnmowers and gasoline stored in the equipment storage room which could have contributed to the recorded concentrations.

TABLE 3 - EPA METHOD TO15 TARGET COMPOUND LIST

Propylene
Dichlorodifluoromethane (F12)
Chloromethane (Methyl Chloride)
1,2-Dichloro-1,1,2,2-Tetrafluoroethane (F114)
Vinyl Chloride
1,3-Butadiene
Methyl Bromide (Bromomethane)
Chloroethane
Acetone
Trichlorofluoromethane
Isopropyl Alcohol
1,1-Dichloroethylene
Methylene Chloride
Carbon Disulfide
1,1,2-Trichloro-1,2,2-Trifluoroethane (F113)
trans-1,2-Dichloroethene
1,1-Dichloroethane
Methyl-t-butyl ether
Methyl Ethyl Ketone
cis-1,2-Dichloroethene
Hexane
Chloroform
Ethyl Acetate
Tetrahydrofuran
1,2-Dichloroethane
1,1,1-Trichloroethane
Benzene
Carbon Tetrachloride
Cyclohexane
1,2-Dichloropropane
Bromodichloromethane
Trichloroethene
Heptane
cis-1,3-Dichloropropene
Methyl Isobutyl Ketone
trans-1,3-Dichloropropene
1,1,2-Trichloroethane
Toluene
2-Hexanone
Dibromochloromethane
1,2-Dibromoethane
Tetrachloroethene
Chlorobenzene
Ethyl Benzene
m,p-Xylene
Styrene
1,1,2,2-Tetrachloroethane
o-Xylene
4-Ethyltoluene
1,3,5-Trimethylbenzene
1,2,4-Trimethylbenzene
1,3-Dichlorobenzene
Chloromethylbenzene
1,4-Dichlorobenzene
1,2-Dichlorobenzene
1,2,4-Trichlorobenzene
Hexachlorobutadiene

4.2 Canister Cleaning and Leak Certification Procedures

4.2.1 Canister Cleaning Procedure

Prior to the sampling event, the canisters were cleaned by placing them in ovens maintained at 150°C, evacuated to at least 10^{-3} Torr, and then pressurized with humidified nitrogen to approximately 30 psig. This process was repeated three times. Detailed descriptions of these procedures are provided in the document entitled, "Canister Cleaning Standard Operating Procedures, EPA-REG1-OEME/CANISTER-CLEANING-SOP, April 1998, Revision 2." The SOP can be found in a folder marked SOPs in Peter Kahn's office.

4.2.2 Canister Leak Certification Procedure

At the end of the cleaning process described above, the canisters were evacuated to less than 10^{-3} Torr, with a Pirani sensor the vacuum in each canister was measured. The canisters were then placed on a shelf for at least 24 hours. At the conclusion of this period, the Pirani sensor was used again to measure the final canister vacuum which was then compared to the initial reading to determine if the canisters show signs of leaking. Detailed descriptions of these procedures are provided in the document entitled, "Canister Leak Certification Standard Operating Procedures, EPA-REG1-OEME/ CANISTER-LEAK-CERT-SOP, April 1998, Revision 2." The SOP can be found in a folder marked SOPs in Peter Kahn's office. All the canisters were certified leak free prior to sampling.

4.2.3 Canister Cleanliness Certification Procedure

After the canisters were certified leak free, each canister was pressurized with humidified nitrogen and then analyzed for contamination using the same GC/MS used for the sample analysis. Detailed descriptions of these procedures are provided in the document entitled, "Pressurized Canisters for Clean Certification Standard Operating Procedures, EPA-REG1-OEME/CANISTER-PREP-SOP, April 1998, Revision 2." The SOP can be found in a folder marked SOPs in Peter Kahn's office. All the canisters were certified clean prior to sampling.

The canisters were stored under pressure until the day before the sampling event, when they were re-evacuated to less than 10^{-3} Torr. Detailed descriptions of these procedures are provided in the document entitled, "Canister Evacuation Standard Operating Procedures, EPA-REG1-OEME/ CAN-VACUATION-SOP, May 1996." The SOP can be found in a folder marked SOPs in Peter Kahn's office.

4.3 Canister Analysis Quality Control/Quality Assurance

4.3.1 Laboratory Blank Results

Humidified nitrogen was introduced into the analytical instrument inlet line prior to analyzing the canisters to serve as a laboratory blank. The laboratory blank was analyzed to determine the background contamination present in the analytical instrumentation. If the canister samples detect compounds below three times the blank value, they were qualified as estimated values with a "B." If a compound concentration was not qualified, the blank value was not subtracted from the sample value.

The laboratory blank results are presented in Appendix A. Methylene Chloride, methyl-ethyl-ketone, benzene, toluene, and tetrachloroethene were detected above their reporting limits.

4.3.2 Data Accuracy Results

A quality control canister sample (AAL-21380) containing selected VOCs was analyzed with each batch of canister samples to determine analytical accuracy. The results of the observed concentrations were compared to the known acceptable range and are reported on Table 4. The observed concentrations were all within the acceptable QC range, therefore, the data does not need to be qualified as estimated values.

4.3.3 Canister Surrogate Spiking Results

Prior to analysis, surrogate compounds' dichloroethene d4, toluene d8, and p-bromofluoro-benzene were added to the analytical system prior to analyzing each sample. The percent recovery data for the surrogate compounds are reported with the data in Appendix A. The results were evaluated to determine if they were within the acceptable range (60% - 140%). All the surrogates were within the acceptable range, therefore, the data does not need to be qualified as estimated values.

4.3.4 Chain of Custody

Chain of custody documentation was completed by the field engineer. All canister samples were logged into the laboratory on August 3, transferring the sample custody to the laboratory personnel. Canisters were stored on the shelves in the hallway outside the Air Calibration Room.

4.3.5 Data Validation and Usability

The analytical report provided by the OEME Laboratory was validated by Peter Kahn. The data reported by the laboratory were compared to the data quality performance criteria specified in Sections 4.3.1, 4.3.2, and 4.3.3 above to evaluate data usability. All data were reported and qualified as needed, and no data were rejected. In the conclusion section of this report statements on data quality are provided.

TABLE 4

AUDIT CYLINDER RESULTS

The following are the results of analyzing QC sample, AAL-21380. The QC samples were analyzed with the samples collected on 8/3/99.

COMPOUND	OBSERVED VALUE (ppb/v)	ACCEPTABLE RANGE (ppb/v)
Vinyl Chloride	5.18	4.16 - 6.81
1,3-Butadiene	4.24	4.98 (Accepted Value)
Methyl Bromide	5.84	4.48 - 8.00
Trichlorofluoromethane	4.75	4.30 - 6.80
Methylene Chloride	4.41	3.87 - 7.87
Chloroform	4.20	4.09 - 6.16
1,2-Dichloroethane	4.97	4.21 - 6.38
1,1,1-Trichloroethane	4.79	3.87 - 6.13
Benzene	4.46	3.93 - 6.08
Carbon Tetrachloride	5.03	3.21 - 6.91
1,2-Dichloropropane	4.21	3.26 - 7.19
Trichloroethene	4.13	3.93 - 6.28
Toluene	4.25	3.99 - 6.23
1,2-Dibromoethane	3.57	3.23 - 5.65
Tetrachloroethene	4.53	4.14 - 6.34
Chlorobenzene	4.64	4.33 - 6.21
Ethylbenzene	4.42	3.87 - 5.55
o-Xylene	4.34	4.20 - 6.60

4.4 Indoor Air Canister Sampling Results and Discussions

On August 3, 1999, indoor air grab samples were collected inside Centredale Manor and Brook Village apartment complexes' located in North Providence, Rhode Island for volatile organic compounds. Four sampling locations were selected based on the results obtained using the TVA-1000 total hydrocarbon analyzer. In the Centredale Manor, two canister grab samples were collected, canister #1574 was collected at 12:10 from the floor drain in the compactor room and canister #1582 was collected at 12:18 in the utility room/elevator room, from the hole in the concrete where the conduit comes up through the concrete floor that houses the electrical line from the generator. In the Brook Village complex two canister grab samples were collected, canister #1589 was collected at 14:05 from the floor drain in the boiler room adjacent to the fire water pump and canister #5790 was collected at 14:08 in the generator room, from the conduit that houses the diesel fuel line.

The canister data are reported in Appendix A and the data is summarized on Table 5. The target compounds for this survey were benzene, toluene, ethylbenzene, m,p- xylene, o-xylene, styrene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene. Within the Centredale Manor apartment complex benzene, styrene, and 1,3-dichlorobenzene were not detected above their reporting limits at the two sampling locations. However, toluene, ethylbenzene, m,p-xylene, o-xylene, and 1,4-dichlorobenzene were detected at the two sampling stations well above the reporting limits. Toluene was detected at 8 ug/m^3 (2 ppb/v) in the compactor room floor drain and 10 ug/m^3 (3 ppb/v) in a hole where a conduit comes up through the concrete floor located in the utility/elevator room. Ethylbenzene was detected at 13 ug/m^3 (3 ppb/v) in the compactor room floor drain and 7 ug/m^3 (2 ppb/v) in a hole where a conduit comes up through the concrete floor located in the utility/elevator room. The concentration of m,p-xylene in the compactor room floor drain was 50 ug/m^3 (12 ppb/v), and 23 ug/m^3 (5 ppb/v) in a hole where a conduit comes up through the concrete floor located in the utility/elevator room. The o-xylene levels detected in the compactor room floor drain and the hole where a conduit comes up through the concrete floor located in the utility/elevator room were 14 ug/m^3 (3 ppb/v) and 7ug/m^3 (2 ppb/v), respectively. 1,4-Dichlorobenzene was detected at 35 ug/m^3 (6 ppb/v) in the compactor room floor drain and 49 ug/m^3 (8 ppb/v) in a hole where a conduit comes up through the concrete floor located in the utility/elevator room. There were other VOCs detected at the two sampling locations above their reporting limits namely: propylene (6 - 8 ppb/v), dichlorodifluoromethane (3 - 4 ppb/v), chloromethane (0.6 - 0.7 ppb/v), 1,3-butadiene (ND - 0.5 ppb/v), acetone (9 ppb/v), trichlorofluoromethane (0.6 - 1 ppb/v), isopropyl alcohol (9 - 11 ppb/v), methylene chloride (0.4 ppb/v B), methyl ethyl ketone (ND - 0.5 ppb/v B), hexane (ND - 0.7 ppb/v), ethyl acetate (1 - 3 ppb/v), 1,1,1-trichloroethane (2 ppb/v), 2-hexanone (0.3 ppb/v B), and 1,2,4-trimethylbenzene (ND - 0.7 ppb/v). The levels for toluene, ethylbenzene, m,p-xylene, and o-xylene are below the average concentrations detected at the State of Rhode Island air monitoring station in North Providence during the summer. The target compounds, 1,4-dichlorobenzene and 1,3-dichlorobenzene are not monitored for at the site. The data collected at the monitoring station represent ambient air concentrations in an urbanized area, i.e., North Providence.

Within the Brook Village apartment complex the target compounds, toluene, benzene, m,p-xylene, o-xylene, and styrene were not detected above their reporting limits at the two sampling locations. However, ethylbenzene, 1,3-dichlorobenzene, and 1,4-dichlorobenzene were detected at one of two sampling stations or both at relatively low concentrations. Ethylbenzene was not detected above the reporting limit in the floor drain located in the fire water pump room, but was detected at 2 ug/m^3 (0.5 ppb/v) in the generator room from a conduit that surrounds a pipe used for diesel fuel. The concentration of 1,3-dichlorobenzene in the generator room from a conduit that surrounds a pipe used for diesel fuel was 6 ug/m^3 (1 ppb/v), and was not detected above the reporting limits in the sample collected from the floor drain located in the fire water pump room. The 1,4-dichlorobenzene levels detected in the generator room from a conduit that surrounds a pipe used for diesel fuel and in the floor drain located in the fire water pump room were 2 ug/m^3 (0.4 ppb/v) and 5ug/m^3 (0.8 ppb/v), respectively. There were other VOCs detected at the two sampling locations above their reporting limits namely: propylene (0.4 - 0.6 ppb/v), dichlorodifluoromethane (0.8 - 7 ppb/v), chloromethane (0.5 ppb/v), trichlorofluoromethane (0.3 ppb/v), methylene chloride (0.4 ppb/v B), carbon disulfide (ND - 1 ppb/v), methyl-t-butyl-ether (0.4 ppb/v B), methyl ethyl ketone (0.3 ppb/v B), 2-hexanone (0.4 ppb/v B), and tetrachloroethene (1.5 ppb/v B).

The data presented in this report are of acceptable quality to represent the levels of volatile organic compounds present at the sampling locations under the specific conditions prevailing during sampling on August 3, 1999. These levels may vary given differing site activities, the time of year, and the characteristics of the soils and groundwater plume. The screening data collected shows there are no significant VOCs migrating into the buildings at the points samples were collected

TABLE 5
CANISTER INDOOR AIR SAMPLING RESULTS SUMMARY

This table shows a comparison of the data collected on August 3, 1999, from each air sampling station. Only those values detected above the reporting limits are presented. The concentrations reported in Appendix A were rounded-up and presented in this table.

COMPOUND	Canister #1574 Centredale Manor Compactor Room Floor Drain (ug/m3)	Canister #1582 Centredale Manor Utility/Elevator Room Hole in the concrete where the conduit comes up through the floor (ug/m3)	Canister #1589 Brook Village Fire Water Pump Room Floor Drain (ug/m3)	Canister #5790 Brook Village Generator Room Conduit for diesel fuel (ug/m3)
Propylene	11	14	1	0.7
Dichlorodifluoromethane	16	21	4	32
Chloromethane	1	2	0.9	0.4 L
1,3-Butadiene	ND (0.7)	1	ND (0.7)	ND (0.7)
Acetone	22	21	4 B, L	4 B, L
Trichlorofluoromethane	3	6	2	2
Isopropyl Alcohol	27	22	ND (0.7)	ND (0.7)
Methylene Chloride	1 B	1 B	1 B, L	1 B
Carbon Disulfide	ND (0.9)	ND (0.9)	ND (0.9)	4
Methyl-t-Butyl Ether	0.9 B, L	ND (1)	2 B	0.9 B, L
Methyl Ethyl Ketone	2 B	ND (0.8)	0.7 B, L	0.9 B
Hexane	3	ND (1)	ND (1)	ND (1)
Ethyl Acetate	10	5	ND (1)	ND (1)
1,1,1-Trichloroethane	10	9	ND (2)	0.7 L
Toluene	8	10	1 B, L	0.7 B, L
2-Hexanone	1 B	1 B, L	1 B, L	2 B
Tetrachloroethene	ND (2)	2 B, L	ND (2)	10 B
Ethylbenzene	13	7	0.6 B, L	2 B
m,p-Xylene	50	23	2 B, L	2 B, L
o-Xylene	14	7	0.6 L	0.6 B, L
1,2,4-Trimethylbenzene	ND (1)	4	0.7 L	ND (2)
1,3-Dichlorobenzene	ND (2)	ND (2)	ND (2)	6
1,4-Dichlorobenzene	35	49	2	5

Notes: B = Analyte is associated with blank contamination
ND = not detected above reporting limit, reporting limit shown within parentheses
L = Estimated value, value is below the calibration range

APPENDIX A

AIR SAMPLING RESULTS - VOLATILE ORGANIC COMPOUNDS

PROJECT NAME: Centredale Manor
PROJECT LOCATION: North Providence, RI
SAMPLING LOCATION: Cenredale Manor, Compactor Room Floor Drain
SAMPLE DATE: 8/3/99
SAMPLE TIME: 12:10
CANISTER NUMBER: 1574
VOLUME ANALYZED: 0.25 liters
REPORT FACTOR: 6.084

COMPOUND	CONCENTRATION PPB,V/V		CONCENTRATION UG/M3		RL UG/M3
Propylene	**6.4**		**11.1**		**0.51**
Dichlorodifluoromethane	**3.2**		**15.6**		**1.44**
Chloromethane	**0.6**		**1.3**		**0.6**
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		ND		1.87
Vinyl Chloride	ND		ND		0.76
1,3-Butadiene	ND		ND		0.65
Methyl Bromide	ND		ND		1.13
Chloroethane	ND		ND		0.77
Acetone	**9.1**		**21.6**		**7.24**
Trichlorofluoromethane	**0.6**		**3.3**		**1.61**
Isopropyl Alcohol	**11**		**27.4**		**0.68**
1,1-Dichloroethylene	ND		ND		1.21
Methylene Chloride	**0.4**	**B**	**1.2**	**B**	**1.06**
Carbon Disulfide	ND		ND		0.9
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.1**	**L**	**1.0**	**L**	**2.28**
trans-1,2-Dichloroethene	ND		ND		1.16
1,1-Dichloroethane	ND		ND		1.23
Methyl-t-Butyl Ether	**0.3**	**B, L**	**0.9**	**B, L**	**1.05**
Methyl Ethyl Ketone	**0.5**	**B**	**1.6**	**B**	**0.8**
cis-1,2-Dichloroethene	ND		ND		1.21
Hexane	**0.7**		**2.6**		**1.06**
Chloroform	ND		ND		1.43
Ethyl Acetate	**2.6**		**9.5**		**1.05**
Tetrahydrofuran	ND		ND		0.84
1,2-Dichloroethane	ND		ND		1.21
1,1,1-Trichloroethane	**1.8**		**9.9**		**1.63**
Benzene	**0.2**	**B, L**	**0.6**	**B, L**	**0.97**
Carbon Tetrachoride	**0.1**	**L**	**0.6**	**L**	**1.41**
Cyclohexane	ND		ND		1.03
1,2-Dichloropropane	ND		ND		1.38
Bromodichloromethane	ND		ND		1.01
Trichloroethene	ND		ND		1.58
Heptane	ND		ND		1.23
cis-1,3-Dichloropropene	ND		ND		1.33
Methyl Isobutyl Ketone	**0.2**	**L**	**0.7**	**L**	**1.14**
trans-1,3-Dichloropropene	ND		ND		1.33
1,1,2-Trichloroethane	ND		ND		1.63
Toluene	**2**		**7.7**		**1.14**
2-Hexanone	**0.3**	**B**	**1.3**	**B**	**1.23**
Dibromochloromethane	ND		ND		2.48
1,2-Dibromoethane	ND		ND		2.29
Tetrachloroethene	ND		ND		2.03
Chlorobenzene	ND		ND		1.37
Ethyl Benzene	**3**		**13**		**1.29**
m,p-Xylene	**12**		**50**		**2.56**
Styrene	**0.1**	**B, L**	**0.6**	**B, L**	**1.22**
1,1,2,2-Tetrachloroethane	ND		ND		2
o-Xylene	**3.3**		**14.2**		**1.26**
4-Ethyl Toluene	ND		ND		1.37
1,3,5-Trimethylbenzene	ND		ND		1.43
1,2,4-Trimethylbenzene	ND		ND		1.4
1,3-Dichlorobenzene	ND		ND		1.72
Chloromethylbenzene	ND		ND		1.32
1,4-Dichlorobenzene	**5.7**		**34.6**		**1.72**
1,2-Dichlorobenzene	**0.2**	**L**	**1.0**	**L**	**1.68**
1,2,4-Trichlorobenzene	ND		ND		2.03
Hexachlorobutadiene	ND		ND		2.98

TENTATIVELY IDENTIFIED COMPOUNDS	ESTIMATED CONCENTRATION PPB, V/V
Unknown Hydrocarbon	15
Unknown Hydrocarbon	37

SURROGATE COMPOUNDS	RECOVERY (%)	QC LIMIT (%)
Dichloroethene, d4	94	60 - 140
Toluene, d8	94	60 - 140
p-Bromofluorobenzene	101	60 - 140

NOTES:

RL = Reporting Limit

B = Analyte is associated with lab or field/trip blank contamination.
Value is qualified when the observed concentration
in the sample is less than three times the blank level.

L = Estimated value, below the calibration range

ND = not detected above RL

ug/m3 = ppb/v * MW/24.267

AIR SAMPLING RESULTS - VOLATILE ORGANIC COMPOUNDS

PROJECT NAME: Centredale Manor
PROJECT LOCATION: North Providence, RI
SAMPLING LOCATION: Cenredale Manor, Utility/Elevator Room, hole in concrete where conduit comes up through floor
SAMPLE DATE: 8/3/99
SAMPLE TIME: 12:18
CANISTER NUMBER: 1582
VOLUME ANALYZED: 0.25 liters
REPORT FACTOR: 6.006

COMPOUND	CONCENTRATION PPB V/V		CONCENTRATION UG/M3		RL UG/M3
Propylene	**7.9**		**13.6**		**0.5**
Dichlorodifluoromethane	**4.3**		**21.2**		**1.42**
Chloromethane	**0.7**		**1.5**		**0.6**
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		ND		1.85
Vinyl Chloride	ND		ND		0.75
1,3-Butadiene	**0.5**		**1.2**		**0.64**
Methyl Bromide	ND		ND		1.12
Chloroethane	ND		ND		0.76
Acetone	**9**		**21.3**		**7.15**
Trichlorofluoromethane	**1**		**5.8**		**1.59**
Isopropyl Alcohol	**8.8**		**21.7**		**0.67**
1,1-Dichloroethylene	ND		ND		1.19
Methylene Chloride	**0.4**	**B**	**1.3**	**B**	**1.04**
Carbon Disulfide	ND		ND		0.88
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.2**	**L**	**1.3**	**L**	**2.25**
trans-1,2-Dichloroethene	ND		ND		1.14
1,1-Dichloroethane	ND		ND		1.22
Methyl-t-Butyl Ether	ND		ND		1.04
Methyl Ethyl Ketone	ND		ND		0.79
cis-1,2-Dichloroethene	ND		ND		1.19
Hexane	ND		ND		1.04
Chloroform	ND		ND		1.41
Ethyl Acetate	**1.4**		**4.9**		**1.04**
Tetrahydrofuran	ND		ND		0.83
1,2-Dichloroethane	ND		ND		1.19
1,1,1-Trichloroethane	**1.7**		**9.2**		**1.61**
Benzene	**0.3**	**B, L**	**0.8**	**B, L**	**0.95**
Carbon Tetrachoride	**0.2**	**L**	**0.8**	**L**	**1.4**
Cyclohexane	**0.2**	**L**	**0.6**	**L**	**1.02**
1,2-Dichloropropane	ND		ND		1.36
Bromodichloromethane	ND		ND		1
Trichloroethene	ND		ND		1.56
Heptane	**0.2**	**B, L**	**0.8**	**B, L**	**1.21**
cis-1,3-Dichloropropene	ND		ND		1.31
Methyl Isobutyl Ketone	ND		ND		1.13
trans-1,3-Dichloropropene	ND		ND		1.31
1,1,2-Trichloroethane	ND		ND		1.61
Toluene	**2.6**		**9.8**		**1.13**
2-Hexanone	**0.3**	**B, L**	**1.2**	**B, L**	**1.21**
Dibromochloromethane	ND		ND		2.45
1,2-Dibromoethane	ND		ND		2.26
Tetrachloroethene	**0.2**	**B, L**	**1.6**	**B, L**	**2**
Chlorobenzene	ND		ND		1.36
Ethyl Benzene	**1.7**		**7.3**		**1.27**
m,p-Xylene	**5.4**		**23.4**		**2.52**
Styrene	ND		ND		1.2
1,1,2,2-Tetrachloroethane	ND		ND		1.97
o-Xylene	**1.7**		**7.2**		**1.25**
4-Ethyl Toluene	**0.2**	**L**	**0.8**	**L**	**1.35**
1,3,5-Trimethylbenzene	**0.3**	**L**	**1.2**	**L**	**1.41**
1,2,4-Trimethylbenzene	**0.7**		**3.5**		**1.38**
1,3-Dichlorobenzene	ND		ND		1.7
Chloromethylbenzene	ND		ND		1.3
1,4-Dichlorobenzene	**8.2**		**49.2**		**1.7**
1,2-Dichlorobenzene	ND		ND		1.66
1,2,4-Trichlorobenzene	ND		ND		2
Hexachlorobutadiene	ND		ND		2.94

TENTATIVELY IDENTIFIED COMPOUNDS	ESTIMATED CONCENTRATION PPB,V/V
1,1-Dichloroethane	11
Unknown Hydrocarbon	7
Unknown Hydrocarbon	10
Unknown Hydrocarbon	12
Unknown Hydrocarbon	6

SURROGATE COMPOUNDS	RECOVERY (%)	QC LIMIT (%)
Dichloroethene, d4	99	60 - 140
Toluene, d8	93	60 - 140
p-Bromofluorobenzene	103	60 - 140

NOTES:

RL = Reporting Limit

B = Analyte is associated with lab or field/trip blank contamination.
Value is qualified when the observed concentration
in the sample is less than three times the blank level.

L = Estimated value, below the calibration range

ND = not detected above RL

ug/m3 = ppb/v * MW/24.267

AIR SAMPLING RESULTS - VOLATILE ORGANIC COMPOUNDS

PROJECT NAME: Centredale Manor
PROJECT LOCATION: North Providence, RI
SAMPLING LOCATION: Brook Village, Fire water Pump Room Floor Drain
SAMPLE DATE: 8/3/99
SAMPLE TIME: 14:05
CANISTER NUMBER: 1589
VOLUME ANALYZED: 0.25 liters
REPORT FACTOR: 6.068

COMPOUND	CONCENTRATION PPB V/V		CONCENTRATION UG/M3		RL UG/M3
Propylene	**0.59**		**1**		**0.5**
Dichlorodifluoromethane	**0.8**		**3.9**		**1.44**
Chloromethane	**0.5**		**0.9**		**0.6**
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		ND		1.87
Vinyl Chloride	ND		ND		0.76
1,3-Butadiene	ND		ND		0.65
Methyl Bromide	ND		ND		1.13
Chloroethane	ND		ND		0.77
Acetone	**1.7**	**B, L**	**3.9**	**B, L**	**7.22**
Trichlorofluoromethane	**0.3**		**1.7**		**1.6**
Isopropyl Alcohol	ND		ND		0.67
1,1-Dichloroethylene	ND		ND		1.2
Methylene Chloride	**0.3**	**B, L**	**1.0**	**B, L**	**1.05**
Carbon Disulfide	ND		ND		0.89
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.1**	**L**	**1.0**	**L**	**2.28**
trans-1,2-Dichloroethene	ND		ND		1.15
1,1-Dichloroethane	ND		ND		1.23
Methyl-t-Butyl Ether	**0.4**	**B**	**1.5**	**B**	**1.05**
Methyl Ethyl Ketone	**0.2**	**B, L**	**0.7**	**B, L**	**0.8**
cis-1,2-Dichloroethene	ND		ND		1.2
Hexane	ND		ND		1.05
Chloroform	ND		ND		1.42
Ethyl Acetate	ND		ND		1.05
Tetrahydrofuran	ND		ND		0.84
1,2-Dichloroethane	ND		ND		1.2
1,1,1-Trichloroethane	ND		ND		1.62
Benzene	**0.2**	**B, L**	**0.5**	**B, L**	**0.96**
Carbon Tetrachoride	**0.1**	**L**	**0.6**	**L**	**1.41**
Cyclohexane	ND		ND		1.03
1,2-Dichloropropane	ND		ND		1.38
Bromodichloromethane	ND		ND		1.01
Trichloroethene	ND		ND		1.58
Heptane	ND		ND		1.22
cis-1,3-Dichloropropene	ND		ND		1.33
Methyl Isobutyl Ketone	ND		ND		1.14
trans-1,3-Dichloropropene	ND		ND		1.33
1,1,2-Trichloroethane	ND		ND		1.62
Toluene	**0.3**	**B, L**	**1.1**	**B, L**	**1.14**
2-Hexanone	**0.2**	**B, L**	**1.0**	**B, L**	**1.23**
Dibromochloromethane	ND		ND		2.47
1,2-Dibromoethane	ND		ND		2.28
Tetrachloroethene	ND		ND		2.02
Chlorobenzene	ND		ND		1.37
Ethyl Benzene	**0.1**	**B, L**	**0.6**	**B, L**	**1.29**
m,p-Xylene	**0.4**	**B, L**	**1.5**	**B, L**	**2.55**
Styrene	ND		ND		1.21
1,1,2,2-Tetrachloroethane	ND		ND		2
o-Xylene	**0.1**	**L**	**0.6**	**L**	**1.26**
4-Ethyl Toluene	ND		ND		1.37
1,3,5-Trimethylbenzene	ND		ND		1.43
1,2,4-Trimethylbenzene	**0.1**	**L**	**0.7**	**L**	**1.4**
1,3-Dichlorobenzene	ND		ND		1.72
Chloromethylbenzene	ND		ND		1.32
1,4-Dichlorobenzene	**0.4**		**2.2**		**1.72**
1,2-Dichlorobenzene	ND		ND		1.68
1,2,4-Trichlorobenzene	ND		ND		2.02
Hexachlorobutadiene	ND		ND		2.97

TENTATIVELY IDENTIFIED COMPOUNDS	ESTIMATED CONCENTRATION PPB,V/V
NONE	

SURROGATE COMPOUNDS	RECOVERY (%)	QC LIMIT (%)
Dichloroethene, d4	97	60 - 140
Toluene, d8	102	60 - 140
p-Bromofluorobenzene	97	60 - 140

NOTES:

RL = Reporting Limit

B = Analyte is associated with lab or field/trip blank contamination.
Value is qualified when the observed concentration
in the sample is less than three times the blank level.

L = Estimated value, below the calibration range

ND = not detected above RL

ug/m3 = ppb/v * MW/24.267

AIR SAMPLING RESULTS - VOLATILE ORGANIC COMPOUNDS

PROJECT NAME: Centredale Manor
PROJECT LOCATION: North Providence, RI
SAMPLING LOCATION: Brook Village, Generator Room, Conduit for diesel fuel
SAMPLE DATE: 8/3/99
SAMPLE TIME: 14:08
CANISTER NUMBER: 5790
VOLUME ANALYZED: 0.25 liters
REPORT FACTOR: 6.378

COMPOUND	CONCENTRATION PPB,V/V		CONCENTRATION UG/M3		RL UG/M3
Propylene	**0.4**		**0.7**		**0.53**
Dichlorodifluoromethane	**6.5**		**32.2**		**1.51**
Chloromethane	**0.2**	**L**	**0.4**	**L**	**0.63**
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		ND		1.96
Vinyl Chloride	ND		ND		0.8
1,3-Butadiene	ND		ND		0.68
Methyl Bromide	ND		ND		1.19
Chloroethane	ND		ND		0.81
Acetone	**1.7**	**B, L**	**4.1**	**B, L**	**7.59**
Trichlorofluoromethane	**0.3**		**1.9**		**1.68**
Isopropyl Alcohol	ND		ND		0.71
1,1-Dichloroethylene	ND		ND		1.27
Methylene Chloride	**0.4**	**B**	**1.3**	**B**	**1.11**
Carbon Disulfide	**1.2**		**3.7**		0.94
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.1**	**L**	**1.0**	**L**	**2.39**
trans-1,2-Dichloroethene	ND		ND		1.21
1,1-Dichloroethane	ND		ND		1.29
Methyl-t-Butyl Ether	**0.3**	**B, L**	**0.9**	**B, L**	**1.11**
Methyl Ethyl Ketone	**0.3**	**B**	**0.9**	**B**	**0.84**
cis-1,2-Dichloroethene	ND		ND		1.27
Hexane	ND		ND		1.11
Chloroform	ND		ND		1.49
Ethyl Acetate	ND		ND		1.1
Tetrahydrofuran	ND		ND		0.88
1,2-Dichloroethane	ND		ND		1.27
1,1,1-Trichloroethane	**0.1**	**L**	**0.7**	**L**	1.71
Benzene	ND		ND		**1.01**
Carbon Tetrachoride	ND		ND		**1.48**
Cyclohexane	ND		ND		1.08
1,2-Dichloropropane	ND		ND		1.45
Bromodichloromethane	ND		ND		1.06
Trichloroethene	ND		ND		1.66
Heptane	ND		ND		1.28
cis-1,3-Dichloropropene	ND		ND		1.39
Methyl Isobutyl Ketone	ND		ND		1.2
trans-1,3-Dichloropropene	ND		ND		1.39
1,1,2-Trichloroethane	ND		ND		1.71
Toluene	**0.2**	**B, L**	**0.7**	**B, L**	**1.2**
2-Hexanone	**0.4**	**B**	**1.5**	**B**	**1.29**
Dibromochloromethane	ND		ND		1.26
1,2-Dibromoethane	ND		ND		2.4
Tetrachloroethene	**1.5**	**B**	**10**	**B**	2.13
Chlorobenzene	ND		ND		1.44
Ethyl Benzene	**0.5**	**B**	**2.1**	**B**	**1.35**
m,p-Xylene	**0.4**	**B, L**	**1.9**	**B, L**	**2.68**
Styrene	ND		ND		1.27
1,1,2,2-Tetrachloroethane	ND		ND		2.1
o-Xylene	**0.2**	**B, L**	**0.6**	**B, L**	**1.33**
4-Ethyl Toluene	ND		ND		1.44
1,3,5-Trimethylbenzene	ND		ND		1.5
1,2,4-Trimethylbenzene	ND		ND		**1.47**
1,3-Dichlorobenzene	**1**		**6.1**		1.8
Chloromethylbenzene	ND		ND		1.38
1,4-Dichlorobenzene	**0.8**		**5**		**1.8**
1,2-Dichlorobenzene	ND		ND		1.77
1,2,4-Trichlorobenzene	ND		ND		2.13
Hexachlorobutadiene	ND		ND		3.12

TENTATIVELY IDENTIFIED COMPOUNDS	ESTIMATED CONCENTRATION PPB V/V
NONE	

SURROGATE COMPOUNDS	RECOVERY (%)	QC LIMIT (%)
Dichloroethene, d4	99	60 - 140
Toluene, d8	104	60 - 140
p-Bromofluorobenzene	102	60 - 140

NOTES:

RL = Reporting Limit

B = Analyte is associated with lab or field/trip blank contamination.
Value is qualified when the observed concentration
in the sample is less than three times the blank level.

L = Estimated value, below the calibration range

ND = not detected above RL

ug/m3 = ppb/v * MW/24.267

AIR SAMPLING RESULTS - VOLATILE ORGANIC COMPOUNDS

PROJECT NAME: Centredale Manor
PROJECT LOCATION: North Providence, RI
SAMPLING LOCATION: Laboratory Blank
ANALYSIS DATE: 8/5/99
SAMPLE TIME: NA
CANISTER NUMBER: NA
VOLUME ANALYZED: 0.5 liters
REPORT FACTOR: 1

COMPOUND	CONCENTRATION PPBV/V		CONCENTRATION UG/M3		RL UG/M3
Propylene	ND		ND		0.08
Dichlorodifluoromethane	ND		ND		0.24
Chloromethane	ND		ND		0.1
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND		ND		0.31
Vinyl Chloride	ND		ND		0.13
1,3-Butadiene	ND		ND		0.11
Methyl Bromide	ND		ND		0.19
Chloroethane	ND		ND		0.13
Acetone	**0.16**	**L, J**	**0.39**	**L, J**	**1.19**
Trichlorofluoromethane	ND		ND		0.26
Isopropyl Alcohol	ND		ND		0.11
1,1-Dichloroethylene	ND		ND		0.2
Methylene Chloride	**0.14**		**0.49**		**0.17**
Carbon Disulfide	ND		ND		0.15
1,1,2-Trichloro-1,2,2-trifluoroethane	ND		ND		0.38
trans-1,2-Dichloroethene	ND		ND		0.19
1,1-Dichloroethane	ND		ND		0.2
Methyl-t-Butyl Ether	**0.03**	**L**	**0.11**	**L**	**0.17**
Methyl Ethyl Ketone	**0.05**		**0.14**		**0.13**
cis-1,2-Dichloroethene	ND		ND		0.2
Hexane	ND		ND		0.17
Chloroform	ND		ND		0.23
Ethyl Acetate	ND		ND		0.17
Tetrahydrofuran	ND		ND		0.14
1,2-Dichloroethane	ND		ND		0.2
1,1,1-Trichloroethane	ND		ND		0.27
Benzene	**0.05**		**0.17**		**0.16**
Carbon Tetrachoride	ND		ND		0.23
Cyclohexane	ND		ND		0.17
1,2-Dichloropropane	ND		ND		0.23
Bromodichloromethane	ND		ND		0.17
Trichloroethene	**0.03**	**L**	**0.16**	**L**	**0.26**
Heptane	**0.04**	**L**	**0.16**	**L**	**0.2**
cis-1,3-Dichloropropene	ND		ND		0.22
Methyl Isobutyl Ketone	ND		ND		0.19
trans-1,3-Dichloropropene	ND		ND		0.22
1,1,2-Trichloroethane	ND		ND		0.27
Toluene	**0.09**		**0.32**		**0.19**
2-Hexanone	**0.04**	**L**	**0.17**	**L**	**0.2**
Dibromochloromethane	ND		ND		0.41
1,2-Dibromoethane	ND		ND		0.38
Tetrachloroethene	**0.09**		**0.58**		**0.33**
Chlorobenzene	ND		ND		0.23
Ethyl Benzene	**0.03**	**L**	**0.14**	**L**	**0.21**
m,p-Xylene	**0.08**	**L**	**0.32**	**L**	**0.42**
Styrene	**0.04**	**L**	**0.18**	**L**	**0.2**
1,1,2,2-Tetrachloroethane	ND		ND		0.33
o-Xylene	**0.04**	**L**	**0.18**	**L**	**0.21**
4-Ethyl Toluene	ND		ND		0.23
1,3,5-Trimethylbenzene	ND		ND		0.24
1,2,4-Trimethylbenzene	ND		ND		0.23
1,3-Dichlorobenzene	ND		ND		0.28
Chloromethylbenzene	ND		ND		0.22
1,4-Dichlorobenzene	ND		ND		0.28
1,2-Dichlorobenzene	ND		ND		0.28
1,2,4-Trichlorobenzene	ND		ND		0.33
Hexachlorobutadiene	ND		ND		0.49

TENTATIVELY IDENTIFIED COMPOUNDS	ESTIMATED CONCENTRATION PPB V/V
Unknown Hydrocarbons	7
Unknown Hydrocarbons	9

SURROGATE COMPOUNDS	RECOVERY (%)	QC LIMIT (%)
Dichloroethene, d4	94	60 - 140
Toluene, d8	98	60 - 140
p-Bromofluorobenzene	95	60 - 140

NOTES:

RL = Reporting Limit

J = Approximate Value

L = Estimated value, below the calibration range

ND = not detected above RL

ug/m3 = ppb/v * MW/24.267