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REPORT ON THE INVESTIGATION OF THE PFOHL BROTHERS LANDFILL CHEEKTOWAGA, NEW YORK

February 16, 1984

Prepared For:

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

This report describes work performed by Ecology and Environment, Inc., (E & E) for the firm of Hodgson, Russ, Andrews, Woods, and Goodyear on the Pfohl Brothers Landfill site in Cheektowaga, New York. The work was performed in accordance with E & E's proposal dated September 15, 1983.

The purpose of E & E's investigation is to determine if the landfill currently has posed or has the potential for posing either an environmental or a public health threat under Superfund and related state legislation and regulations. The landfill received a relatively high score on the United States Environmental Protection Agency (USEPA) Hazard Ranking System, largely because of alleged potential threats to groundwater and surface water resources. E & E's investigation has aimed at characterizing the types and concentrations of contaminants that are present at the site perimeter and that may have left the site via surface water and groundwater.

Section 2 of the report outlines the field methodology. Section 3 presents and interprets the data. Section 4 contains E & E's conclusions and recommendations. The text is followed by appendices which present the laboratory data.

2. FIELD METHODOLOGY

E & E sampled three types of media at the Pfohl Brothers site:

- Groundwater,
- Sediment, and
- Leachate.

Groundwater samples were obtained through the installation and use of monitoring wells. The sampling locations shown on Figure 2-1 were selected to provide an adequate number of stations, spaced sufficiently close together, to insure that any groundwater contamination arising from past activities would be detected. Review of available New York State Department of Environmental Conservation file information revealed past disposal locations of such activities. Temporary monitoring wells were sited so that at least one well would be downgradient of each historical disposal area.

The borings for the wells were dug with a soil bucket hand auger to a depth of approximately two feet below the water table. A 1-1/4-inch nominal diameter, schedule 40, PVC well screen/pipe, with threaded flush joints, was then placed into the borehole. The hole was backfilled with washed sand around the screen and cuttings to the surface.

Groundwater Sampling. Immediately following well installation, groundwater samples were collected during a three-day period, December 6 to 9, 1983. Each well was pumped with a vacuum sample pump until

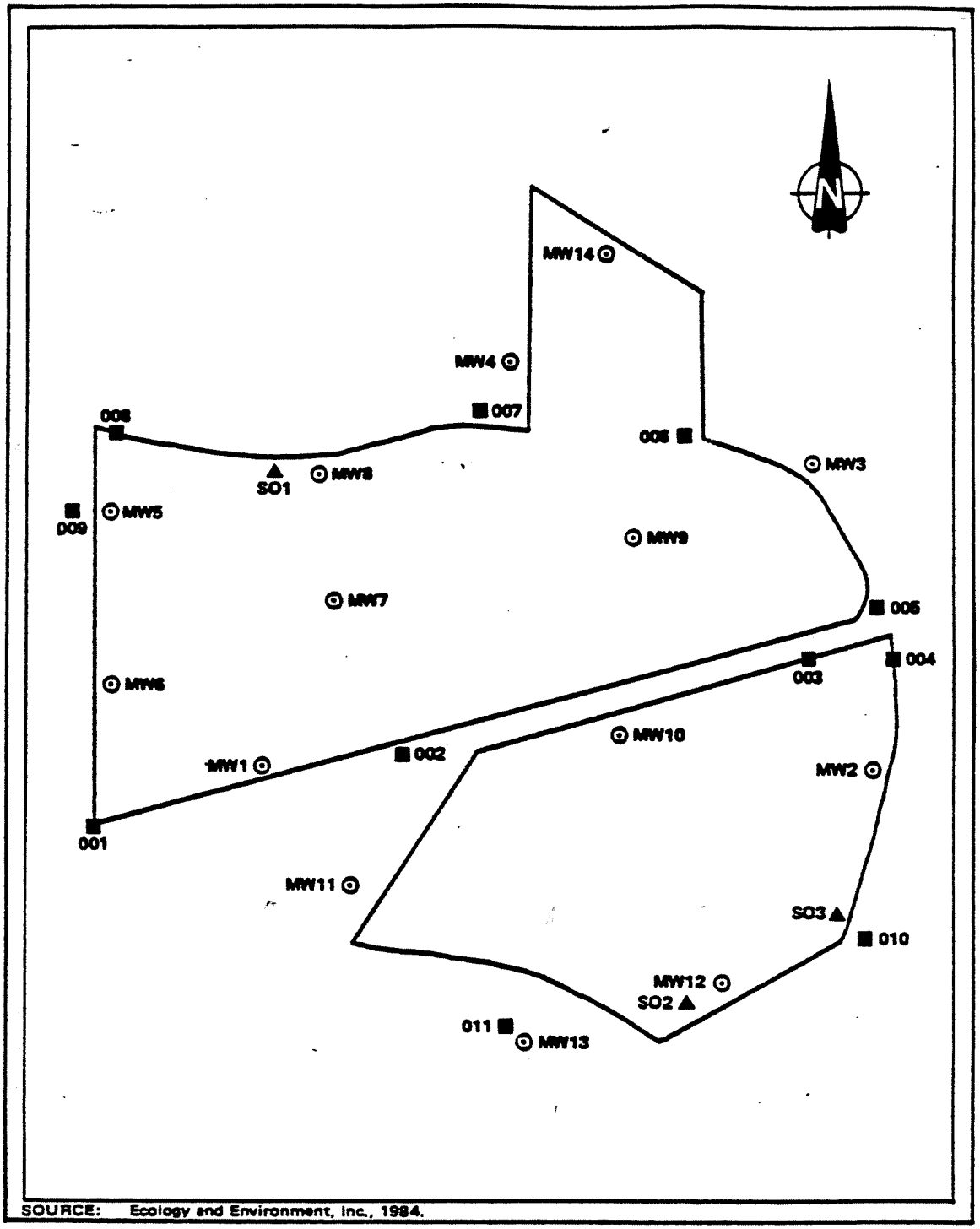


Figure 2–1 SITE SAMPLING LOCATIONS

approximately three static well volumes had been purged, whereupon the sample was taken. A total of seven bottles was collected at each well; two milliliter vials with Teflon-coated septa for volatile organic analyis (a bailer was used to take the volatile organic samples), two 1/2-gallon bottles for base neutral extractable organic analysis, one 1-liter acid-washed polypropylene bottle for heavy metal analysis, one 1-liter polypropylene bottle for phenol analysis, and one 500-milliliter polypropylene bottle for pH and conductively analysis. The heavy metal sample was preserved with nitric acid, and the phenol sample was preserved with phosphoric acid and copper sulfate. Samples were not filtered, and were immediately transferred to E & E's Analytical Services Center (ASC) and analyzed for the parameters shown on Table 2-1.

The recharge rate of the wells was generally rapid, although wells MW 5, MW 10, MW 13, and MW 14 were dewatered by the pumping procedure. Each of the dewatered wells was drilled in an area of extensive clay layers.

The top-of-casing elevations for all wells were surveyed in relation to a common site datum (defined by E & E to be 100 feet below the top of well MW 1). All survey traverses were closed and an accuracy of 0.01 feet was maintained. Water levels were measured with a steel tape on February 9, 1984. Two wells, MW 3 and MW 14, were not located beneath the snow pack. Table 2-2 displays the top-of-casing elevations and water level elevations.

To detect any offsite, overland migration of contaminants, E & E collected 11 soil samples in drainage ditches (see Figure 2-1 for locations). Sample locations were selected so that representative samples could be obtained from all major drainage paths offsite.

An attempt was also made to characterize leachate seeps on the perimeter of the site. Three such locations were identified visually (see Figure 2-1), but only one of them, SO 3, had enough flow to sample as a liquid. The other two, SO 1 and SO 2, were sampled as soils.

Soils samples were taken with a soil bucket auger which was used to excavate a boring approximately two feet deep. Using a stainless steel trowel, a composite sample of the soil from each boring was placed in a wide-mouth glass jar, covered with a Teflon-coated cap, and retained in a cooler. All sampling equipment was washed between

Table 2-1

PARAMETER LIST

Parameter	Analytical Method Number			
	Water	Reference	Sediment	Reference
Volatile organics	624	1*	8240	2
Base-neutral organics	625	1	8250	2
Phenols	510B	3	510B	3
Polychlorinated biphenyls	608	1	8080	2
Oil and grease	503A	3	503A	3
Aluminum	306A	3	306A	3
Chromium	312A	3	7190	2
Barium	308	3	7080	2
Beryllium	309A	3	7090	2
Cadmium	310A	3	7130	2
Cobalt	303A	3	303A	3
Copper	313A	3	7210	2
Iron	315A	3	315A	3
Lead	316A	3	420	2
Nickel	321A	3	7520	2
Manganese	319A	3	319A	3
Zinc	328A	3	7950	2
Boron	404A	3	404A	3
Vanadium	303C	3	7910	2
Calcium	311A	3	311A	3
Magnesium	318A	3	318A	3
Sodium	303A	3	303A	3
pH	423	3	9040	2
Specific conductivity	205	3	9050	3

*References:

1. Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, EPA-600/4-82-057, United States Environmental Protection Agency, July 1982.

2. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 2nd ed., United States Environmental Protection Agency, 1982.

3. Standard Methods for the Examination of Water and Wastewater, 15th ed., American Public Health Association, American Water Works Association, and Water Pollution Control Federation, 1980.

Source: Ecology and Environment, Inc.

Table 2-2

MONITORING WELL ELEVATIONS

Well Number	Top of Casing Elevation[1]	Depth to Static Water Level	Static Water Level Elevation[2]
MW 1	100.00	4.16	95.84
MW 2	94.33	1.49	92.84
MW 4	94.65	2.71	91.92
MW 5	95.82	1.81	94.01
MW 6	99.81	4.97	94.84
MW 7	106.73	7.11	99.62
MW 8	97.67	1.29	96.38
MW 9	102.17	8.14	94.03
MW 10	100.10	1.24	98.86
MW 11	102.44	4.81	97.63
MW 12	99.40	5.02	94.38
MW 13	96.39	0.36	96.03

[1]Relative to a datum 100 feet below the top of MW 1.

[2]As measued on February 9, 1984.

Source: Ecology and Environment, Inc.

borings with clean water. The seep (SO 3) sample was taken by excavating a shallow hole with a shovel and filling the sampling bottle from the leachate that seeped into the hole. At the completion of the sampling, the samples were taken to the ASC for testing for the parameters indicated on Table 2-1.

3. PRESENTATION AND INTERPRETATION OF DATA

At present, most of the landfill surface area is above the original land surface elevation. A groundwater mound has formed beneath the site, as is usual under such circumstances. The water table contours as measured on February 9, 1984, are shown on Figure 3-1. As the map shows, groundwater movement off the site will occur in a radial pattern, flowing in all compass directions. The ultimate discharge points for this shallow groundwater flow are wetlands immediately to the east and northeast of the site, a lake immediately to the north of the site, and Ellicott Creek which flows in an easterly WESTERLY direction 500 feet south of the site.

The groundwater quality data are presented in Appendix A. No quantifiable detectable levels of any specific volatile organic compounds were found in any of the monitoring well samples, with the exception of methylene chloride. However, methylene chloride is a compound used in the gas chromatography/mass spectroscopy (GC/MS) process, and commonly turns up in low concentrations as an artifact of laboratory contamination. When this compound occurs at detectable levels in samples in which no other organic compounds are detectable, it is almost certainly a laboratory artifact and not representative of the samples themselves. Exactly this situation has occurred, as is evidenced in Appendix A.

Some volatile organic compounds were detected in a few of the samples but at levels too low to be quantified (less than 10 ug/l). These include benzene in MW 2, MW 8, MW 9, and MW 10; and chlorobenzene in MW 8.

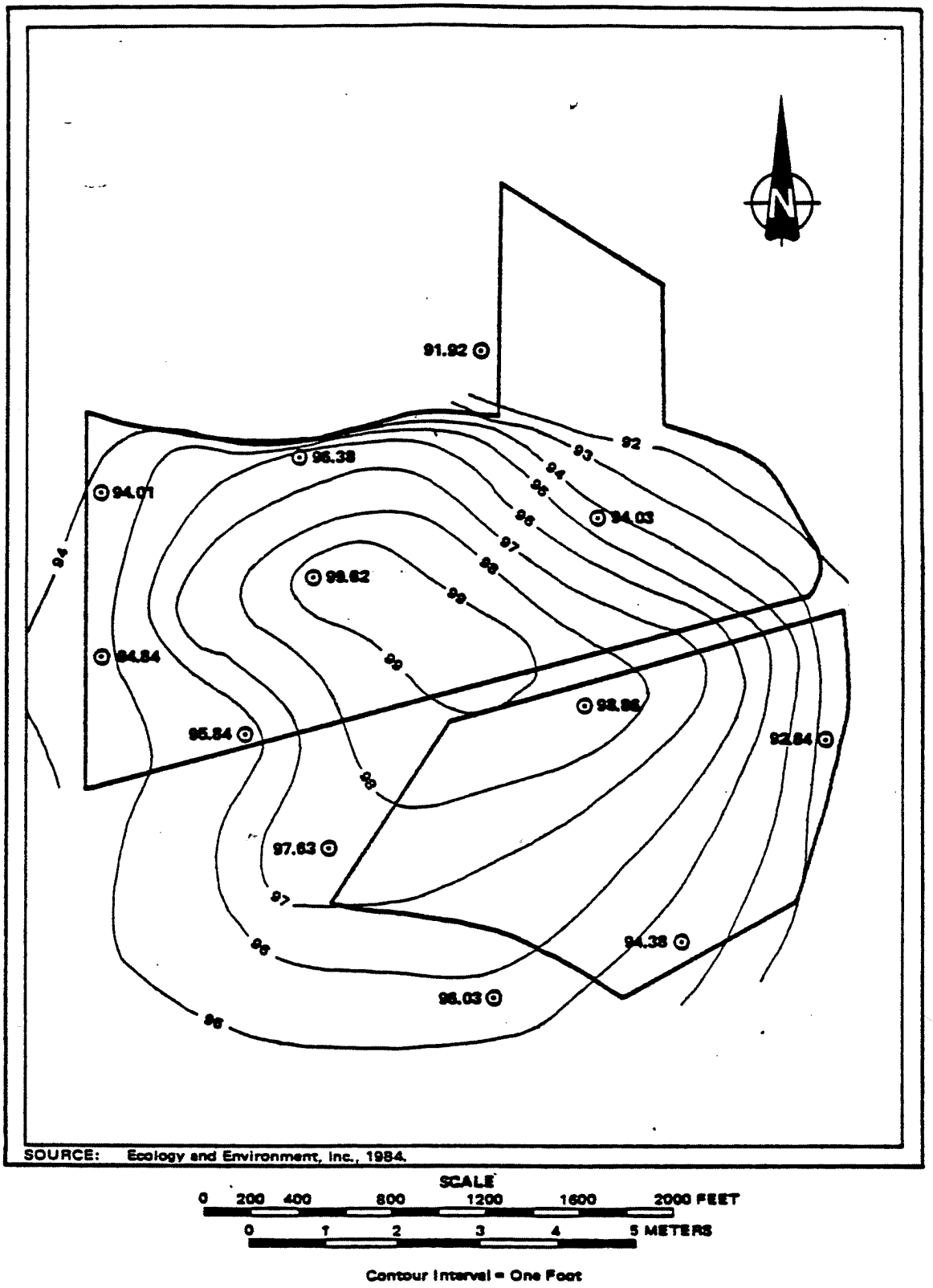


Figure 3–1 WATER TABLE CONTOUR MAP (ON-SITE DATUM)

Some very low concentrations (less than 10 ug/l) of base-neutral organic compounds were found in the leachate sample, SO 3. These compounds, anthracene, chrysene, fluoranthene, and pyrene, were among the parameters detected and reported by the New York State Department of Environmental Conservation (NYSDEC) in previous on-site surface samples. None of these parameters were detected in any of the monitoring wells, however.

No PCBs were detected in any of the groundwater samples. Phenols and oil-and-grease were detected, but generally at low concentrations. The highest phenol concentration, 550 ug/l, occurred in MW 10, in the center of the site. The highest oil-and-grease concentration, 400 mg/l, was found in the same well.

Metal concentrations were high in many of the wells. USEPA interim primary drinking water standards were exceeded in 13 of the wells for barium, 12 for lead, 11 for chromium, and four for cadmium. This is of little direct importance, however, since the site is not underlain by a used drinking water aquifer, nor it is likely that aquifers within the vicinity of the site environs will ever be used for drinking water purposes, with Lake Erie nearby for a drinking water source. Nevertheless, the concentrations detected indicate that some metals degradation of the shallow groundwater has occurred beneath the site.

Appendix A contains the metals data for all the wells sampled. In order to be able to visually display these data in a meaningful manner, E & E undertook the following averaging technique:

- For each metal parameter, the highest level detected was noted.

- For each metal parameter, the value detected in each well was computed as a percentage of the highest level detected. For example, the highest aluminum value detected was 456,000 ug/l in MW 6. The percentage value assigned to aluminum for MW 6, therefore, was:

$$\frac{456{,}000}{456{,}000} \times 100 = 100\%$$

In the case of MW 1, the aluminum concentration was 152,000 ug/l. Thesefore, the percentage value assigned to aluminum for MW 1 was:

$$\frac{152,000}{456,000} \times 100 = 33.3\%$$

This was done for every metal parameter in every well.

- For each well, the percentages thus obtained were averaged, to produce an average percentage value.

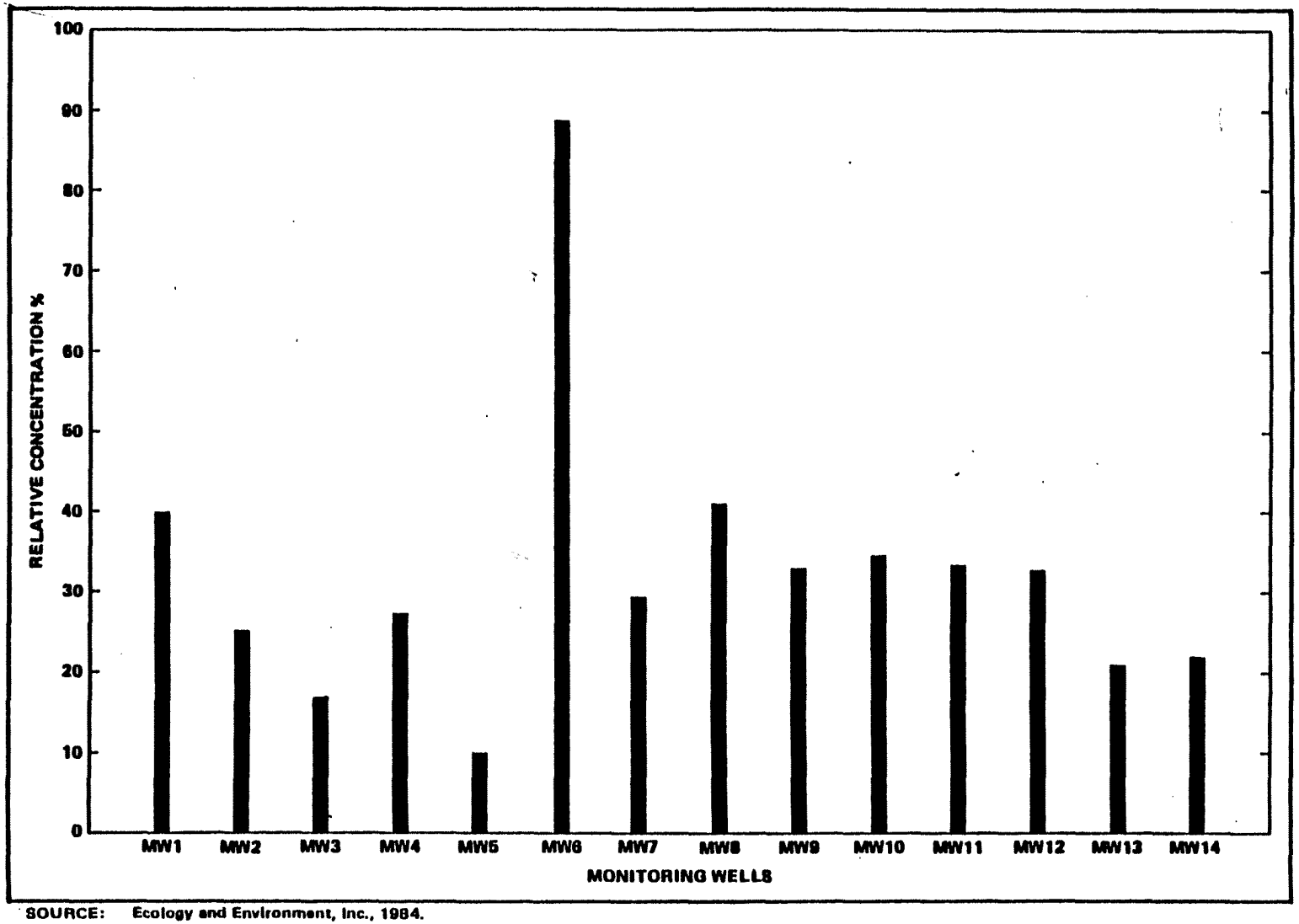
The average percentage values, which are essentially relative numbers comparing all of the metals values on a well-by-well basis, are plotted as a histogram on Figure 3-2.

It becomes at once visually apparent that the metals concentrations measured in MW 6 were much higher than in all the other wells. Also significantly high are values in MW 1 and MW 8.

The same average percentage values are plotted and contoured on Figure 3-3. It is apparent that the greatest values are mostly clustered on the western end of the site. According to NYSDEC reports based on historical air photos, this area was active in the period 1958 to 1959, but not subsequently in 1960, 1965, or 1969 to 1972. Not enough information is available, however, to determine the nature of the buried wastes that have produced the elevated values.

Some off-site migration of metals seems to have taken place in the groundwater. This statement is based on data from MW 11 and MW 13, both of which are located more than 100 feet from the old disposal areas, and both of which (especially MW 11) show signs of degradation. However, since in order to evaluate worst-case conditions, the samples were not filtered, it is possible that much if not most of the contaminants were adsorbed onto soil particles and not dissolved in the groundwater. Additional sampling of selected wells for selected parameters and employing filtering would clarify this situation.

The soil sediment laboratory data are presented in Appendix B. The same types of metals contamination detected in the groundwater are present in the soil samples. In addition, some organic compounds are



SOURCE: Ecology and Environment, Inc., 1984.

Figure 3–2 RELATIVE CONCENTRATIONS OF TOTAL METALS IN GROUNDWATER

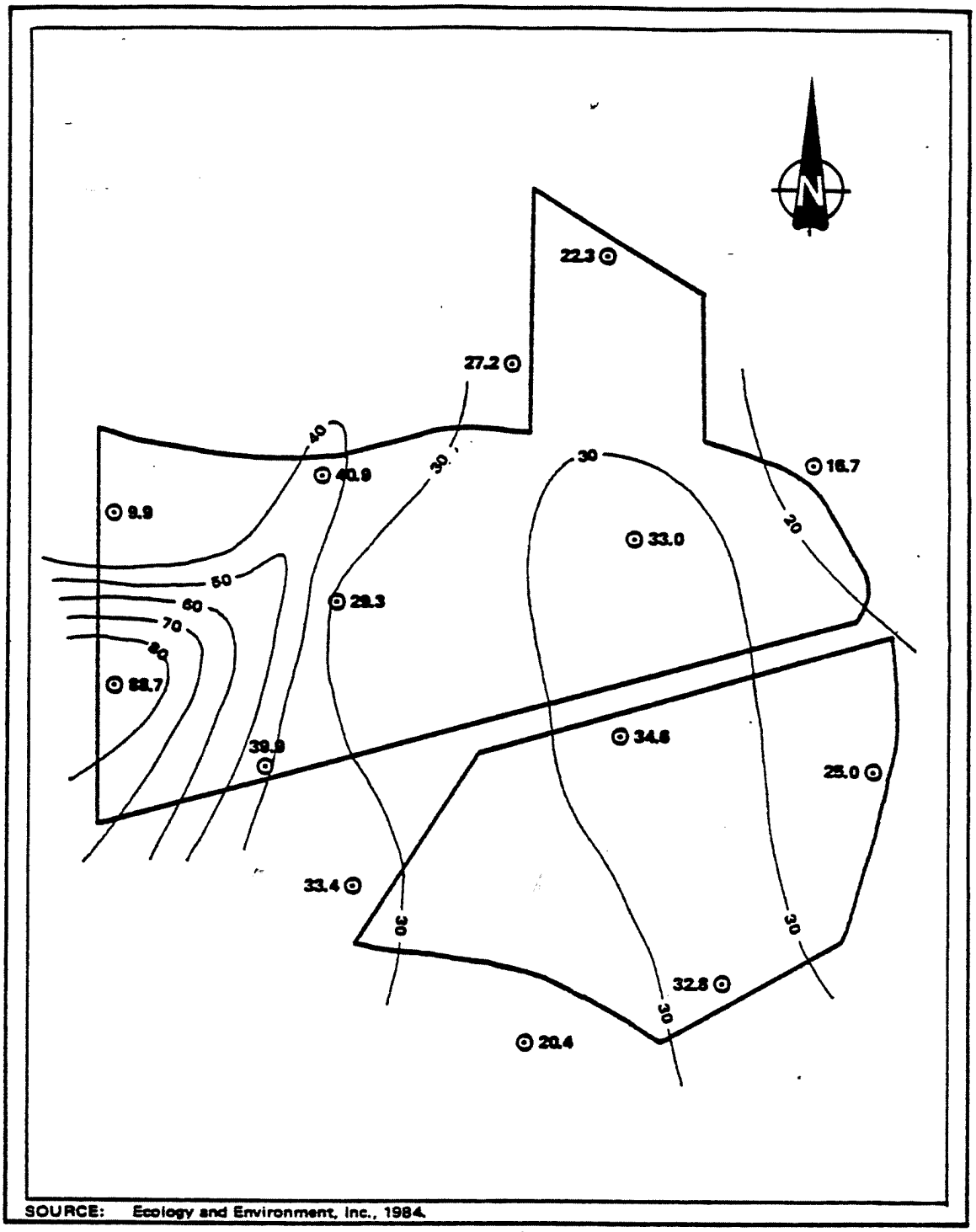


Figure 3–3 RELATIVE TOTAL METALS CONCENTRATION DISTRIBUTION IN GROUNDWATER (IN PERCENT)

present in the low mg/kg range. These include phenol, anthracene, chrysene, fluoranthene, fluorene, and pyrene. All the compounds noted seem to occur ubiquitously in these sediment samples, indicating that most surface areas of the site contribute contaminated runoff. It is beyond the scope of the present investigation to undertake a health and risk evaluation of toxicological and environmental hazards posed by the site. However, generally speaking, the groundwater quality in the vicinity of the site seems to be quite good, at least with respect to organics. E & E found no evidence whatsoever that any subsurface cells of organic liquids occur at the site. The only potential groundwater quality problem would be with respect to heavy metals. Analysis of a few filtered samples should determine whether there is a problem or not.

If there is a problem at the site, it may be related to the off-site movement of contaminated sediments. The contaminants involved are not volatile in nature (although they could be inhaled in the form of contaminated dust) and are probably contained for the most part in environments where human contact is not a problem. However, there is reason to believe that the contaminants have entered the wetland areas along the north and southeast boundaries of the site. In addition, it is possible that they have entered the lake north of the site. It is conceivable that the metals and organic contaminants, could, under some circumstances, enter the wetland and lake food webs, bioaccumulating at succeeding trophic levels. This could be especially significant in the case of the lake, since it is used as a sport fishery.

4. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

- The groundwater beneath the site is mounded and flows off-site in all compass directions. It discharges into wetlands to the north and east, and into Ellicott Creek to the south and west.

- The groundwater is not significantly contaminated with organic compounds.

- The groundwater as analyzed (unfiltered) contains significant levels of metals contamination above USEPA interim primary drinking water standards. However, because the samples were unfiltered, the values obtained may be more representative of the surrounding soil matrix than of the groundwater.

- Potentially significant levels of metals and some organic contaminants have migrated off-site in the form of contaminated sediment. These contaminated materials are present in wetlands and drainage ditches adjacent to the site.

Recommendations

- Additional groundwater samples should be obtained from MW 1, MW 6, and MW 8. These samples should be split; half should be

filtered, and half should be unfiltered. Each split should be analyzed for barium, cadmium, chromium, and lead. The three wells chosen had the highest metals contamination, and the four parameters chosen are the most toxic of the metals listed on Table 2-1. This test should resolve the question as to whether the metals concentrations measured are primarily related to the soil matrix or to the groundwater.

- The USEPA EP-Toxicity test should be run on the soil samples to determine if they must be classified as hazardous waste under the Federal Resource Conservation and Recovery Act (RCRA) definition.

- Upon completion of the tasks outlined in the first two recommendations, a toxicological risk assessment should be undertaken to evaluate what remedial measures may be needed.

APPENDIX A

WATER QUALITY DATA

GC/MS FRACTION - VOLATILE COMPOUNDS - METHOD 624
(Detection limits: at least 10 ug/L except for Acrolein and Acrylonitrile at 100 ug/L)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, ug/L						
E & E Lab Number Client I.D.	4651 MW4	4652 MW5	4653 MW6	4654 MW10	4655 MW13	4656 MW14	4709 MW12
1V. Acrolein (107-02-8)	ND	ND	ND	ND	ND	ND	ND
2V. Acrylonitrile (107-13-1)	ND	ND	ND	ND	ND	ND	ND
3V. Benzene (71-43-2)	ND	ND	ND	BMDL	ND	ND	ND
4V. Bis (Chloromethyl) Ether (542-88-1)	ND	ND	ND	ND	ND	ND	ND
5V. Bromoform (75-25-2)	ND	ND	ND	ND	ND	ND	ND
6V. Carbon Tetrachloride (56-23-5)	ND	ND	ND	ND	ND	ND	ND
7V. Chlorobenzene (108-90-7)	ND	ND	ND	ND	ND	ND	ND
8V. Chlorodibromomethane (124-48-1)	ND	ND	ND	ND	ND	ND	ND
9V. Chloroethane (75-00-3)	ND	ND	ND	ND	ND	ND	ND
10V. 2-Chloroethylvinyl Ether (110-75-8)	ND	ND	ND	ND	ND	ND	ND
11V. Chloroform (67-66-3)	ND	ND	ND	ND	ND	ND	ND

SHEET 1 OF 3

BMDL = Compound present, but below measurable detection limits.

GC/MS FRACTION - VOLATILE COMPOUNDS - METHOD 624
(Detection limits: at least 10 ug/L except for Acrolein and Acrylonitrile at 100 ug/L)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, ug/L						
E & E Lab Number Client I.D.	4651 MW4	4652 MW5	4653 MW6	4654 MW10	4655 MW13	4656 MW14	4709 MW12
12V. Dichloro-bromomethane (75-27-4)	ND	ND	ND	ND	ND	ND	ND
13V. Dichloro-difluoromethane (75-71-8)	ND	ND	ND	ND	ND	ND	ND
14V. 1,1-Dichloro-ethane (75-34-3)	ND	ND	ND	ND	ND	ND	ND
15V. 1,2-Dichloro-ethane (107-06-2)	ND	ND	ND	ND	ND	ND	ND
16V. 1,1-Dichloro-ethylene (75-35-4)	ND	ND	ND	ND	ND	ND	ND
17V. 1,2-Dichloro-propane (78-87-5)	ND	ND	ND	ND	ND	ND	ND
18V. 1,3-Dichloro-propylene (542-75-6)	ND	ND	ND	ND	ND	ND	ND
19V. Ethylbenzene (100-41-4)	ND	ND	ND	ND	ND	ND	ND
20V. Methyl Bromide (74-83-9)	ND	ND	ND	ND	ND	ND	ND
21V. Methyl Chloride (74-87-3)	ND	ND	ND	ND	ND	ND	ND
22V. Methylene Chloride (75-09-2)	397	39	ND	41	1150	ND	ND
23V. 1,1,2,2-Tetra-chloroethane (79-34-5)	ND	ND	ND	ND	ND	ND	ND
24V. Tetrachloro-ethylene (127-18-4)	ND	ND	ND	ND	ND	ND	ND

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GC/MS FRACTION - VOLATILE COMPOUNDS - METHOD 624
(Detection limits: at least 10 ug/L except for Acrolein and Acrylonitrile at 100 ug/L)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, ug/L						
E & E Lab Number Client I.D.	4651 MW4	4652 MW5	4653 MW6	4654 MW10	4655 MW13	4656 MW14	4709 MW12
25V. Toluene (108-88-3)	ND	ND	ND	BMDL	ND	ND	ND
26V. 1,2-Trans-Dichloroethylene (156-60-5)	ND	ND	ND	ND	ND	ND	ND
27V. 1,1,1-Trichloroethane (71-55-6)	ND	ND	ND	ND	ND	ND	ND
28V. 1,1,2-Trichloroethane (79-00-5)	ND	ND	ND	ND	ND	ND	ND
29V. Trichloroethylene (79-01-6)	ND	ND	ND	ND	ND	ND	ND
30V. Trichlorofluoromethane (75-69-4)	ND	ND	ND	ND	ND	ND	ND
31V. Vinyl Chloride (75-01-4)	ND	ND	ND	ND	ND	ND	ND

SHEET 3 OF 3

BMDL = Compound present, but below measurable detection limits.

GC/MS FRACTION - VOLATILE COMPOUNDS - METHOD 624
(Detection limits: at least 10 ug/L except for Acrolein and Acrylonitrile at 100 ug/L)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, ug/L						
E & E Lab Number Client I.D.	4619 MW1	4620 MW3	4621 MW7	4622 MW8	4623 MW9	4624 MW11	4650 MW2
1V. Acrolein (107-02-8)	ND	ND	ND	ND	ND	ND	ND
2V. Acrylonitrile (107-13-1)	ND	ND	ND	ND	ND	ND	ND
3V. Benzene (71-43-2)	ND	ND	ND	BMDL	BMDL	ND	BMDL
4V. Bis (Chloromethyl) Ether (542-88-1)	ND	ND	ND	ND	ND	ND	ND
5V. Bromoform (75-25-2)	ND	ND	ND	ND	ND	ND	ND
6V. Carbon Tetrachloride (56-23-5)	ND	ND	ND	ND	ND	ND	ND
7V. Chlorobenzene (108-90-7)	ND	ND	ND	BMDL	ND	ND	ND
8V. Chlorodibromomethane (124-48-1)	ND	ND	ND	ND	ND	ND	ND
9V. Chloroethane (75-00-3)	ND	ND	ND	ND	ND	ND	ND
10V. 2-Chloroethylvinyl Ether (110-75-8)	ND	ND	ND	ND	ND	ND	ND
11V. Chloroform (67-66-3)	ND	ND	ND	ND	ND	ND	ND

SHEET 1 OF 3

BMDL = Compound present but below measurable detection limits.

GC/MS FRACTION - VOLATILE COMPOUNDS - METHOD 624
(Detection limits: at least 10 ug/L except for Acrolein and Acrylonitrile at 100 ug/L)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, ug/L						
E & E Lab Number Client I.D.	4619 MW1	4620 MW3	4621 MW7	4622 MW8	4623 MW9	4624 MW11	4650 MW2
12V. Dichloro-bromomethane (75-27-4)	ND	ND	ND	ND	ND	ND	ND
13V. Dichloro-difluoromethane (75-71-8)	ND	ND	ND	ND	ND	ND	ND
14V. 1,1-Dichloro-ethane (75-34-3)	ND	ND	ND	ND	ND	ND	ND
15V. 1,2-Dichloro-ethane (107-06-2)	ND	ND	ND	ND	ND	ND	ND
16V. 1,1-Dichloro-ethylene (75-35-4)	ND	ND	ND	ND	ND	ND	ND
17V. 1,2-Dichloro-propane (78-87-5)	ND	ND	ND	ND	ND	ND	ND
18V. 1,3-Dichloro-propylene (542-75-6)	ND	ND	ND	ND	ND	ND	ND
19V. Ethylbenzene (100-41-4)	ND	ND	ND	ND	ND	ND	ND
20V. Methyl Bromide (74-83-9)	ND	ND	ND	ND	ND	ND	ND
21V. Methyl Chloride (74-87-3)	ND	ND	ND	ND	ND	ND	ND
22V. Methylene Chloride (75-09-2)	ND	ND	ND	ND	110	243	1440
23V. 1,1,2,2-Tetra-chloroethane (79-34-5)	ND	ND	ND	ND	ND	ND	ND
24V. Tetrachloro-ethylene (127-18-4)	ND	ND	ND	ND	ND	ND	ND

GC/MS FRACTION - VOLATILE COMPOUNDS - METHOD 624
(Detection limits: at least 10 ug/L except for Acrolein and Acrylonitrile at 100 ug/L)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, ug/L						
E & E Lab Number Client I.D.	4619 MW1	4620 MW3	4621 MW7	4622 MW8	4623 MW9	4624 MW11	4650 MW2
25V. Toluene (108-88-3)	ND	ND	ND	ND	ND	ND	ND
26V. 1,2-Trans-Dichloroethylene (156-60-5)	ND	ND	ND	ND	ND	ND	ND
27V. 1,1,1-Trichloroethane (71-55-6)	ND	ND	ND	ND	ND	ND	ND
28V. 1,1,2-Trichloroethane (79-00-5)	ND	ND	ND	ND	ND	ND	ND
29V. Trichloroethylene (79-01-6)	ND	ND	ND	ND	ND	ND	ND
30V. Trichlorofluoromethane (75-69-4)	ND	ND	ND	ND	ND	ND	ND
31V. Vinyl Chloride (75-01-4)	ND	ND	ND	ND	ND	ND	ND

SHEET 3 OF 3

GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS - METHOD 625
(Detection limits: at least 10 ug/L)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, ug/L						
E & E Lab Number 83- Client I.D.	4651 MW4	4652 MW5	4653 MW6	4654 MW10	4655 MW13	4656 MW14	4709 MW12
1B. Acenaphthene (83-32-9)	ND	ND	ND	ND	ND	ND	ND
2B. Acenaphthylene (208-96-8)	ND	ND	ND	ND	ND	ND	ND
3B. Anthracene (120-12-7)	ND	ND	ND	ND	ND	ND	ND
4B. Benzidine (92-87-5)	ND	ND	ND	ND	ND	ND	ND
5B. Benzo (a) Anthracene (56-55-3)	ND	ND	ND	ND	ND	ND	ND
6B. Benzo (a) Pyrene (50-32-8)	ND	ND	ND	ND	ND	ND	ND
7B. 3,4-Benzo-Fluoranthene (205-99-2)	ND	ND	ND	ND	ND	ND	ND
8B. Benzo (ghi) Perylene (191-24-2)	ND	ND	ND	ND	ND	ND	ND
9B. Benzo (k) Fluoranthene (207-08-9)	ND	ND	ND	ND	ND	ND	ND
10B. Bis (2-Chloro-ethoxy) Methane (111-91-1)	ND	ND	ND	ND	ND	ND	ND
11B. Bis (2-Chloro-ethyl) Ether (111-44-4)	ND	ND	ND	ND	ND	ND	ND

SHEET 1 OF 4

GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS - METHOD 625
(Detection limits: at least 10 ug/L)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, ug/L						
E & E Lab Number 83- Client I.D.	4651 MW4	4652 MW5	4653 MW6	4654 MW10	4655 MW13	4656 MW14	4709 MW12
12B. Bis (2-Chloro-isopropyl) Ether (39638-32-9)	ND	ND	ND	ND	ND	ND	ND
13B. Bis (2-Ethyl-hexyl) Phthalate (117-81-7)	ND	ND	ND	ND	ND	ND	ND
14B. 4-Bromo-phenyl Phenyl Ether (101-55-3)	ND	ND	ND	ND	ND	ND	ND
15B. Butyl Benzyl Phthalate (85-68-7)	ND	ND	ND	ND	ND	ND	ND
16B. 2-Chloro-naphthalene (91-58-7)	ND	ND	ND	ND	ND	ND	ND
17B. 4-Chloro-phenyl Phenyl Ether (7005-72-3)	ND	ND	ND	ND	ND	ND	ND
18B. Chrysene (218-01-9)	ND	ND	ND	ND	ND	ND	ND
19B. Dibenzo (a,h) Anthracene (53-70-3)	ND	ND	ND	ND	ND	ND	ND
20B. 1,2-Dichloro-benzene (95-50-1)	ND	ND	ND	ND	ND	ND	ND
21B. 1,3-Dichloro-benzene (541-73-1)	ND	ND	ND	ND	ND	ND	ND
22B. 1,4-Dichloro-benzene (106-46-7)	ND	ND	ND	ND	ND	ND	ND
23B. 3,3'-Dichloro-benzidine (91-94-1)	ND	ND	ND	ND	ND	ND	ND

SHEET 2 OF 4

GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS - METHOD 625
(Detection limits: at least 10 ug/L)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, ug/L						
E & E Lab Number 83- Client I.D.	4651 MW4	4652 MW5	4653 MW6	4654 MW10	4655 MW13	4656 MW14	4709 MW12
24B. Diethyl Phthalate (84-65-2)	ND	ND	ND	ND	ND	ND	ND
25B. Dimethyl Phthalate (131-11-3)	ND	ND	ND	ND	ND	ND	ND
26B. Di-N-Butyl Phthalate (84-74-2)	ND	ND	ND	ND	ND	ND	ND
27B. 2,4-Dinitro-toluene (121-14-2)	ND	ND	ND	ND	ND	ND	ND
28B. 2,6-Dinitro-toluene (606-20-2)	ND	ND	ND	ND	ND	ND	ND
29B. Di-N-Octyl Phthalate (117-84-0)	ND	ND	ND	ND	ND	ND	ND
30B. 1,2-Diphenyl-hydrazine (as Azo-benzene) (122-66-7)	ND	ND	ND	ND	ND	ND	ND
31B. Fluoranthene (206-44-0)	ND	ND	ND	ND	ND	ND	ND
32B. Fluorene (86-73-7)	ND	ND	ND	ND	ND	ND	ND
33B. Hexa-chlorobenzene (118-71-1)	ND	ND	ND	ND	ND	ND	ND
34B. Hexa-chlorobutadiene (87-68-3)	ND	ND	ND	ND	ND	ND	ND
35B. Hexachloro-cyclopentadiene (77-47-4)	ND	ND	ND	ND	ND	ND	ND

SHEET 3 OF 4

GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS - METHOD 625
(Detection limits: at least 10 ug/L)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, ug/L						
E & E Lab Number 83- Client I.D.	4651 MW4	4652 MW5	4653 MW6	4654 MW10	4655 MW13	4656 MW14	4709 MW12
36B. Hexachloro-ethane (67-72-1)	ND	ND	ND	ND	ND	ND	ND
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)	ND	ND	ND	ND	ND	ND	ND
38B. Isophorone (78-59-1)	ND	ND	ND	ND	ND	ND	ND
39B. Naphthalene (91-20-3)	ND	ND	ND	ND	ND	ND	ND
40B. Nitrobenzene (98-95-3)	ND	ND	ND	ND	ND	ND	ND
41B. N-Nitrosodi-methylamine (62-75-9)	ND	ND	ND	ND	ND	ND	ND
42B. N-Nitrosodi-N-Propylamine (621-64-7)	ND	ND	ND	ND	ND	ND	ND
43B. N-Nitro-sodiphenylamine (86-30-6)	ND	ND	ND	ND	ND	ND	ND
44B. Phenanthrene (85-01-8)	ND	ND	ND	ND	ND	ND	ND
45B. Pyrene (129-00-0)	ND	ND	ND	ND	ND	ND	ND
46B. 1,2,4-Tri-chlorobenzene (120-82-1)	ND	ND	ND	ND	ND	ND	ND

SHEET 4 OF 4

GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS - METHOD 625
(Detection limits: at least 10 ug/L)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, ug/L							
E & E Lab Number 83- Client I.D.	4053 S03	4619 MW1	4620 MW3	4621 MW7	4622 MW8	4623 MW9	4624 MW11	4650 MW2
1B. Acenaphthene (83-32-9)	ND	ND	ND	ND	ND	ND	ND	ND
2B. Acenaphthylene (208-96-8)	ND	ND	ND	ND	ND	ND	ND	ND
3B. Anthracene (120-12-7)	4.71†	ND	ND	ND	ND	ND	ND	ND
4B. Benzidine (92-87-5)	ND	ND	ND	ND	ND	ND	ND	ND
5B. Benzo (a) Anthracene (56-55-3)	*	ND	ND	ND	ND	ND	ND	ND
6B. Benzo (a) Pyrene (50-32-8)	ND	ND	ND	ND	ND	ND	ND	ND
7B. 3,4-Benzo-Fluoranthene (205-99-2)	ND	ND	ND	ND	ND	ND	ND	ND
8B. Benzo (ghi) Perylene (191-24-2)	ND	ND	ND	ND	ND	ND	ND	ND
9B. Benzo (k) Fluoranthene (207-08-9)	ND	ND	ND	ND	ND	ND	ND	ND
10B. Bis (2-Chloro-ethoxy) Methane (111-91-1)	ND	ND	ND	ND	ND	ND	ND	ND
11B. Bis (2-Chloro-ethyl) Ether (111-44-4)	ND	ND	ND	ND	ND	ND	ND	ND

† Anthracene and Phenanthrene are an isomeric pair not seperable by packed column chromatography. Values are calculated using a combined standard and reported as Anthracene

* Benzo(a) Anthracene and Chrysene are an isomeric pair not seperable by packed column chromatography. Values are calculated using a combined standard and reported as Chrysene.

ppb

GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS - METHOD 625
(Detection limits: at least 10 ug/L)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, ug/L							
E & E Lab Number 83- Client I.D.	4053 S03	4619 MW1	4620 MW3	4621 MW7	4622 MW8	4623 MW9	4624 MW11	4650 MW2
12B. Bis (2-Chloro-isopropyl) Ether (39638-32-9)	ND	ND	ND	ND	ND	ND	ND	ND
13B. Bis (2-Ethyl-hexyl) Phthalate (117-81-7)	ND	ND	ND	ND	ND	ND	ND	ND
14B. 4-Bromo-phenyl Phenyl Ether (101-55-3)	ND	ND	ND	ND	ND	ND	ND	ND
15B. Butyl Benzyl Phthalate (85-68-7)	ND	ND	ND	ND	ND	ND	ND	ND
16B. 2-Chloro-naphthalene (91-58-7)	ND	ND	ND	ND	ND	ND	ND	ND
17B. 4-Chloro-phenyl Phenyl Ether (7005-72-3)	ND	ND	ND	ND	ND	ND	ND	ND
18B. Chrysene (218-01-9)	4.95*	ND	ND	ND	ND	ND	ND	ND
19B. Dibenzo (a,h) Anthracene (53-70-3)	ND	ND	ND	ND	ND	ND	ND	ND
20B. 1,2-Dichloro-benzene (95-50-1)	ND	ND	ND	ND	ND	ND	ND	ND
21B. 1,3-Dichloro-benzene (541-73-1)	ND	ND	ND	ND	ND	ND	ND	ND
22B. 1,4-Dichloro-benzene (106-46-7)	ND	ND	ND	ND	ND	ND	ND	ND
23B. 3,3'-Dichloro-benzidine (91-94-1)	ND	ND	ND	ND	ND	ND	ND	ND

* Benzo(a) Anthracene and Chrysene are an isomeric pair not seperable by packed column chromatography. Values are calculated using a combined standard and reported as Chrysene.

GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS - METHOD 625
(Detection limits: at least 10 ug/L)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, ug/L							
E & E Lab Number 83- Client I.D.	4053 S03	4619 MW1	4620 MW3	4621 MW7	4622 MW8	4623 MW9	4624 MW11	4650 MW2
24B. Diethyl Phthalate (84-65-2)	ND	ND	ND	ND	ND	ND	ND	ND
25B. Dimethyl Phthalate (131-11-3)	ND	ND	ND	ND	ND	ND	ND	ND
26B. Di-N-Butyl Phthalate (84-74-2)	ND	ND	ND	ND	ND	ND	ND	ND
27B. 2,4-Dinitro-toluene (121-14-2)	ND	ND	ND	ND	ND	ND	ND	ND
28B. 2,6-Dinitro-toluene (606-20-2)	ND	ND	ND	ND	ND	ND	ND	ND
29B. Di-N-Octyl Phthalate (117-84-0)	ND	ND	ND	ND	ND	ND	ND	ND
30B. 1,2-Diphenyl-hydrazine (as Azo-benzene) (122-66-7)	ND	ND	ND	ND	ND	ND	ND	ND
31B. Fluoranthene (206-44-0)	9.87	ND	ND	ND	ND	ND	ND	ND
32B. Fluorene (86-73-7)	ND	ND	ND	ND	ND	ND	ND	ND
33B. Hexa-chlorobenzene (118-71-1)	ND	ND	ND	ND	ND	ND	ND	ND
34B. Hexa-chlorobutadiene (87-68-3)	ND	ND	ND	ND	ND	ND	ND	ND
35B. Hexachloro-cyclopentadiene (77-47-4)	ND	ND	ND	ND	ND	ND	ND	ND

GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS - METHOD 625
(Detection limits: at least 10 ug/L)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, ug/L							
E & E Lab Number 83- Client I.D.	4053 S03	4619 MW1	4620 MW3	4621 MW7	4622 MW8	4623 MW9	4624 MW11	4650 MW2
36B. Hexachloro-ethane (67-72-1)	ND	ND	ND	ND	ND	ND	ND	ND
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)	ND	ND	ND	ND	ND	ND	ND	ND
38B. Isophorone (78-59-1)	ND	ND	ND	ND	ND	ND	ND	ND
39B. Naphthalene (91-20-3)	ND	ND	ND	ND	ND	ND	ND	ND
40B. Nitrobenzene (98-95-3)	ND	ND	ND	ND	ND	ND	ND	ND
41B. N-Nitrosodi-methylamine (62-75-9)	ND	ND	ND	ND	ND	ND	ND	ND
42B. N-Nitrosodi-N-Propylamine (621-64-7)	ND	ND	ND	ND	ND	ND	ND	ND
43B. N-Nitro-sodiphenylamine (86-30-6)	ND	ND	ND	ND	ND	ND	ND	ND
44B. Phenanthrene (85-01-8)	†	ND	ND	ND	ND	ND	ND	ND
45B. Pyrene (129-00-0)	4.60	ND	ND	ND	ND	ND	ND	ND
46B. 1,2,4-Tri-chlorobenzene (120-82-1)	ND	ND	ND	ND	ND	ND	ND	ND

SHEET 4 OF 4

† Anthracene and Phenanthrene are an isomeric pair not seperable by packed column chromatography. Values are calculated using a combined standard and reported as Anthracene

RESULTS OF WATER ANALYSIS FOR
POLYCHLORINATED BIPHENYLS

(all results in ug/L)

PP #	CAS #	Compound	E & E Lab No. 83- Client I.D.	4053 S03	4614 MW1	4620 MW3	4621 MW7	4622 MW2
(106P)	53469-21-9	PCB-1242		<0.05	<0.05	<0.05	<0.05	<0.05
(107P)	11097-69-1	PCB-1254		<0.05	<0.05	<0.05	<0.05	<0.05
(108P)	11104-28-2	PCB-1221		<0.05	<0.05	<0.05	<0.05	<0.05
(109P)	11141-16-5	PCB-1232		<0.05	<0.05	<0.05	<0.05	<0.05
(110P)	12672-29-6	PCB-1248		<0.05	<0.05	<0.05	<0.05	<0.05
(111P)	11096-82-5	PCB-1260		<0.05	<0.05	<0.05	<0.05	<0.05
(112P)	12674-11-2	PCB-1016		<0.05	<0.05	<0.05	<0.05	<0.05

< = None detected at stated detection limit.

RESULTS OF WATER ANALYSIS FOR
POLYCHLORINATED BIPHENYLS

(all results in ug/L)

PP #	CAS #	Compound	E & E Lab No. 83- Client I.D.	4623 MW9	4624 MW11	4650 MW2	4651 MW5	4652 MW6
(106P)	53469-21-9	PCB-1242		<0.05	<0.05	<0.05	<0.05	<0.05
(107P)	11097-69-1	PCB-1254		<0.05	<0.05	<0.05	<0.05	<0.05
(108P)	11104-28-2	PCB-1221		<0.05	<0.05	<0.05	<0.05	<0.05
(109P)	11141-16-5	PCB-1232		<0.05	<0.05	<0.05	<0.05	<0.05
(110P)	12672-29-6	PCB-1248		<0.05	<0.05	<0.05	<0.05	<0.05
(111P)	11096-82-5	PCB-1260		<0.05	<0.05	<0.05	<0.05	<0.05
(112P)	12674-11-2	PCB-1016		<0.05	<0.05	<0.05	<0.05	<0.05

< = None detected at stated detection limit.

RESULTS OF WATER ANALYSIS FOR
POLYCHLORINATED BIPHENYLS

(all results in ug/L)

PP #	CAS #	Compound	E & E Lab No. 83- Client I.D.	4653 MW10	4654 MW4	4655 MW13	4656 MW14	4709 MW12
(106P)	53469-21-9	PCB-1242		<0.05	<0.05	<0.05	<0.05	<0.05
(107P)	11097-69-1	PCB-1254		<0.05	<0.05	<0.05	<0.05	<0.05
(108P)	11104-28-2	PCB-1221		<0.05	<0.05	<0.05	<0.05	<0.05
(109P)	11141-16-5	PCB-1232		<0.05	<0.05	<0.05	<0.05	<0.05
(110P)	12672-29-6	PCB-1248		<0.05	<0.05	<0.05	<0.05	<0.05
(111P)	11096-82-5	PCB-1260		<0.05	<0.05	<0.05	<0.05	<0.05
(112P)	12674-11-2	PCB-1016		<0.05	<0.05	<0.05	<0.05	<0.05

< = None detected at stated detection limit.

RESULTS OF CHEMICAL ANALYSIS OF WATER SAMPLES

E & E Lab No. / Client I.D.	4053 SO3	4619 MW1	4620 MW3	4621 MW7	4622 MW8	4623 MW9	4624 MW11	4650 MW2	4651 MW5	4652 MW6	4653 MW10	4654 MW4	4655 MW13	4656 MW14	4709 MW12
Oil and Grease, mg/L	*	<1.0	1.10	1.40	<1.0	1.70	5.50	180	<1.0	52.5	400	<1.0	1.80	<1.0	64.3
Total Phenols, mg/L	*	<0.004	0.017	<0.004	0.008	0.029	0.010	<0.004	0.018	0.018	0.55	<0.004	0.031	<0.004	0.017
pH, S.U.	*	6.92	7.45	6.84	6.67	6.59	6.86	6.93	7.41	6.91	6.81	6.79	7.02	7.54	6.80
Specific Conductivity umhos/cm	252	520	680	115	115	205	120	747	252	1060	747	767	667	697	260

*Insufficient sample

RESULTS OF METAL ANALYSES OF WATER SAMPLES
(ug/L)
ppb

E & E Lab No. / Client I.D.	4053 SO3	4619 MW1	4620 MW3	4621 MW7	4622 MW8	4623 MW9	4624 MW11	4650 MW2	4651 MW5	4652 MW6	4653 MW10	4654 MW4	4655 MW13	4656 MW14	4709 MW12
Aluminum	158,000	152,000	21,800	27,700	27,700	18,800	27,700	27,700	12,900	456,000	108,000	12,900	33,700	27,700	51,500
Barium	115,000	59,400	50,100	87,400	57,500	51,900	44,500	50,100	743	121,000	61,300	55,700	51,900	51,900	55,700
Beryllium	11.6	21.2	1.47	5.54	3.72	2.16	2.22	7.48	<1.0	77.9	16.5	<1.0	4.16	3.79	6.60
Boron	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Cadmium	78.3	3.83	2.19	6.72	21.0	19.0	20.0	3.14	2.29	80.9	3.7	9.27	2.85	1.24	1.57
Calcium	678,000	155,000	107,000	184,000	292,000	315,000	184,000	161,000	426,000	420,000	200,000	82,000	174,000	130,000	273,000
Chromium	199	272	32.8	102	108	59.9	376	109	12.5	444	181	53.8	45.0	51.8	113
Cobalt	74.6	93.0	21.4	27.8	61.8	46.2	34.2	51.9	<20	126	39.8	37.0	32.0	35.6	56.9
Copper	1,060	367	51.7	873	543	237	1,700	200	<50	852	300	228	54.7	63.9	91.1
Iron	403,000	399,000	9,300	79,500	139,000	139,000	82,600	78,500	9,940	628,000	399,000	17,000	24,600	33,800	78,300
Lead	4,160	174	309	548	623	264	220	83.9	114	563	144	234	39.0	9.0	159
Magnesium	127,000	114,000	27,000	33,700	74,400	93,200	11,800	81,100	16,700	176,000	68,300	44,000	65,300	59,200	99,900
Manganese	8,690	2,910	652	952	2,310	2,500	869	3,540	208	6,220	4,780	301	4,160	704	1,980
Nickel	195	366	225	246	376	250	213	177	72.9	392	221	558	211	437	504
Sodium	148	11,100	37,500	34,400	51,200	49,500	4,530	39,700	2,830	43,500	22,400	86,500	29,000	82,000	58,300
Vanadium	374	368	<100	108	163	193	102	132	<100	1,100	320	<100	<100	<100	157
Zinc	13,400	1,030	171	372	3,295	2,447	6,151	352	46.7	3,663	991	1,888	160	160	352

Note: Underlined values exceed USEPA interim primary drinking water standards.

ppb

APPENDIX B

SOIL CHEMISTRY DATA

GC/MS FRACTION - VOLATILE COMPOUNDS - METHOD 8240
(Detection limits: at least 0.1 mg/kg except for Acrolein and Acrylonitrile at 1 mg/kg)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, mg/kg							
E & E Lab Number Station No.	4040 001	4041 002	4042 003	4043 004	4044 005	4045 006	4046 007	4047 008
1V. Acrolein (107-02-8)	ND	ND	ND	ND	ND	ND	ND	ND
2V. Acrylonitrile (107-13-1)	ND	ND	ND	ND	ND	ND	ND	ND
3V. Benzene (71-43-2)	ND	ND	ND	ND	ND	ND	ND	ND
4V. Bis (Chloromethyl) Ether (542-88-1)	ND	ND	ND	ND	ND	ND	ND	ND
5V. Bromoform (75-25-2)	ND	ND	ND	ND	ND	ND	ND	ND
6V. Carbon Tetrachloride (56-23-5)	ND	ND	ND	ND	ND	ND	ND	ND
7V. Chlorobenzene (108-90-7)	ND	ND	ND	ND	ND	ND	ND	ND
8V. Chlorodibromomethane (124-48-1)	ND	ND	ND	ND	ND	ND	ND	ND
9V. Chloroethane (75-00-3)	ND	ND	ND	ND	ND	ND	ND	ND
10V. 2-Chloroethylvinyl Ether (110-75-8)	ND	ND	ND	ND	ND	ND	ND	ND
11V. Chloroform (67-66-3)	ND	ND	ND	ND	ND	ND	ND	ND

SHEET 1 OF 3

GC/MS FRACTION - VOLATILE COMPOUNDS - METHOD 8240
(Detection limits: at least 0.1 mg/kg except for Acrolein and Acrylonitrile at 1 mg/kg)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, mg/kg							
E & E Lab Number Station No.	4040 001	4041 002	4042 003	4043 004	4044 005	4045 006	4046 007	4047 008
12V. Dichlorobromomethane (75-27-4)	ND	ND	ND	ND	ND	ND	ND	ND
13V. Dichlorodifluoromethane (75-71-8)	ND	ND	ND	ND	ND	ND	ND	ND
14V. 1,1-Dichloroethane (75-34-3)	ND	ND	ND	ND	ND	ND	ND	ND
15V. 1,2-Dichloroethane (107-06-2)	ND	ND	ND	ND	ND	ND	ND	ND
16V. 1,1-Dichloroethylene (75-35-4)	ND	ND	ND	ND	ND	ND	ND	ND
17V. 1,2-Dichloropropane (78-87-5)	ND	ND	ND	ND	ND	ND	ND	ND
18V. 1,3-Dichloropropylene (542-75-6)	ND	ND	ND	ND	ND	ND	ND	ND
19V. Ethylbenzene (100-41-4)	ND	ND	ND	ND	ND	ND	ND	ND
20V. Methyl Bromide (74-83-9)	ND	ND	ND	ND	ND	ND	ND	ND
21V. Methyl Chloride (74-87-3)	ND	ND	ND	ND	ND	ND	ND	ND
22V. Methylene Chloride (75-09-2)	2.70	1.16	0.74	1.62	1.20	1.33	4.96	1.82
23V. 1,1,2,2-Tetrachloroethane (79-34-5)	ND	ND	ND	ND	ND	ND	ND	ND
24V. Tetrachloroethylene (127-18-4)	ND	ND	ND	ND	ND	ND	ND	ND

GC/MS FRACTION - VOLATILE COMPOUNDS - METHOD 8240
(Detection limits: at least 0.1 mg/kg except for Acrolein and Acrylonitrile at 1 mg/kg
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, mg/kg							
E & E Lab Number Station No.	4040 001	4041 002	4042 003	4043 004	4044 005	4045 006	4046 007	4047 008
25V. Toluene (108-88-3)	ND	ND	ND	ND	ND	ND	ND	ND
26V. 1,2-Trans-Dichloroethylene (156-60-5)	ND	ND	ND	ND	ND	ND	ND	ND
27V. 1,1,1-Trichloroethane (71-55-6)	ND	ND	ND	ND	ND	ND	ND	ND
28V. 1,1,2-Trichloroethane (79-00-5)	ND	ND	ND	ND	ND	ND	ND	ND
29V. Trichloroethylene (79-01-6)	ND	ND	ND	ND	ND	ND	ND	ND
30V. Trichlorofluoromethane (75-69-4)	ND	ND	ND	ND	ND	ND	ND	ND
31V. Vinyl Chloride (75-01-4)	ND	ND	ND	ND	ND	ND	ND	ND

SHEET 3 OF 3

GC/MS FRACTION - VOLATILE COMPOUNDS - METHOD 8240
(Detection limits: at least 0.1 mg/kg except for Acrolein and Acrylonitrile at 1 mg/kg)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, mg/kg				
E & E Lab Number 83- Station No.	4048 009	4049 010	4050 011	4051 S01	4052 S02
1V. Acrolein (107-02-8)	ND	ND	ND	ND	ND
2V. Acrylonitrile (107-13-1)	ND	ND	ND	ND	ND
3V. Benzene (71-43-2)	ND	ND	ND	ND	ND
4V. Bis (Chloromethyl) Ether (542-88-1)	ND	ND	ND	ND	ND
5V. Bromoform (75-25-2)	ND	ND	ND	ND	ND
6V. Carbon Tetrachloride (56-23-5)	ND	ND	ND	ND	ND
7V. Chlorobenzene (108-90-7)	ND	ND	ND	ND	ND
8V. Chlorodibromomethane (124-48-1)	ND	ND	ND	ND	ND
9V. Chloroethane (75-00-3)	ND	ND	ND	ND	ND
10V. 2-Chloroethylvinyl Ether (110-75-8)	ND	ND	ND	ND	ND
11V. Chloroform (67-66-3)	ND	ND	ND	ND	ND

SHEET 1 OF 3

GC/MS FRACTION - VOLATILE COMPOUNDS - METHOD 8240
(Detection limits: at least 0.1 mg/kg except for Acrolein and Acrylonitrile at 1 mg/kg)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, mg/kg				
E & E Lab Number 83- Station No.	4048 009	4049 010	4050 011	4051 S01	4052 S02
12V. Dichloro-bromomethane (75-27-4)	ND	ND	ND	ND	ND
13V. Dichloro-difluoromethane (75-71-8)	ND	ND	ND	ND	ND
14V. 1,1-Dichloro-ethane (75-34-3)	ND	ND	ND	ND	ND
15V. 1,2-Dichloro-ethane (107-06-2)	ND	ND	ND	ND	ND
16V. 1,1-Dichloro-ethylene (75-35-4)	ND	ND	ND	ND	ND
17V. 1,2-Dichloro-propane (78-87-5)	ND	ND	ND	ND	ND
18V. 1,3-Dichloro-propylene (542-75-6)	ND	ND	ND	ND	ND
19V. Ethylbenzene (100-41-4)	ND	ND	ND	ND	ND
20V. Methyl Bromide (74-83-9)	ND	ND	ND	ND	ND
21V. Methyl Chloride (74-87-3)	ND	ND	ND	ND	ND
22V. Methylene Chloride (75-09-2)	0.96	0.32	0.24	1.43	0.98
23V. 1,1,2,2-Tetra-chloroethane (79-34-5)	ND	ND	ND	ND	ND
24V. Tetrachloro-ethylene (127-18-4)	ND	ND	ND	ND	ND

GC/MS FRACTION - VOLATILE COMPOUNDS - METHOD 8240
(Detection limits: at least 0.1 mg/kg except for Acrolein and Acrylonitrile at 1 mg/kg)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, mg/kg				
E & E Lab Number 83- Station No.	4048 009	4049 010	4050 011	4051 S01	4052 S02
25V. Toluene (108-88-3)	ND	ND	ND	ND	ND
26V. 1,2-Trans-Dichloroethylene (156-60-5)	ND	ND	ND	ND	ND
27V. 1,1,1-Trichloroethane (71-55-6)	ND	ND	ND	ND	ND
28V. 1,1,2-Trichloroethane (79-00-5)	ND	ND	ND	ND	ND
29V. Trichloroethylene (79-01-6)	ND	ND	ND	ND	ND
30V. Trichlorofluoromethane (75-69-4)	ND	ND	ND	ND	ND
31V. Vinyl Chloride (75-01-4)	ND	ND	ND	ND	ND

GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS - METHOD 8250
(Detection limits: at least 0.1 mg/kg)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, mg/kg							
E & E Lab Number 83- Station No.	4040 001	4041 002	4042 003	4043 004	4044 005	4045 006	4046 007	4047 008
1B. Acenaphthene (83-32-9)	ND	ND	ND	ND	ND	ND	ND	ND
2B. Acenaphthylene (208-96-8)	ND	ND	ND	ND	ND	0.16	ND	ND
3B. Anthracene (120-12-7)	2.08†	0.44†	ND†	ND†	0.63†	1.47†	0.39†	ND†
4B. Benzidine (92-87-5)	ND	ND	ND	ND	ND	ND	ND	ND
5B. Benzo (a) Anthracene (56-55-3)	*	*	*	*	*	*	*	*
6B. Benzo (a) Pyrene (50-32-8)	ND	ND	ND	ND	ND	ND	ND	ND
7B. 3,4-Benzo-Fluoranthene (205-99-2)	ND	ND	ND	ND	ND	ND	ND	ND
8B. Benzo (ghi) Perylene (191-24-2)	ND	ND	ND	ND	ND	ND	ND	ND
9B. Benzo (k) Fluoranthene (207-08-9)	ND	ND	ND	ND	ND	ND	ND	ND
10B. Bis (2-Chloro-ethoxy) Methane (111-91-1)	ND	ND	ND	ND	ND	ND	ND	ND
11B. Bis (2-Chloro-ethyl) Ether (111-44-4)	ND	ND	ND	ND	ND	ND	ND	ND

† Anthracene and Phenanthrene are an isomeric pair not seperable by packed column chromatography. Values are calculated using a combined standard and reported as Anthracene

* Benzo(a) Anthracene and Chrysene are an isomeric pair not seperable by packed column chromatography. Values are calculated using a combined standard and reported as Chrysene.

GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS - METHOD 8250
(Detection limits: at least 0.1 mg/kg)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, mg/kg							
E & E Lab Number 83- Station No.	4040 001	4041 002	4042 003	4043 004	4044 005	4045 006	4046 007	4047 008
128. Bis (2-Chloro-isopropyl) Ether (39638-32-9)	ND	ND	ND	ND	ND	ND	ND	ND
138. Bis (2-Ethyl-hexyl) Phthalate (117-81-7)	ND	ND	ND	ND	ND	ND	ND	ND
148. 4-Bromo-phenyl Phenyl Ether (101-55-3)	ND	ND	ND	ND	ND	ND	ND	ND
158. Butyl Benzyl Phthalate (85-68-7)	ND	ND	ND	ND	ND	ND	ND	ND
168. 2-Chloro-naphthalene (91-58-7)	ND	ND	ND	ND	ND	ND	ND	ND
178. 4-Chloro-phenyl Phenyl Ether (7005-72-3)	ND	ND	ND	ND	ND	ND	ND	ND
188. Chrysene (218-01-9)	2.74*	0.48*	ND*	0.29*	1.17*	2.28*	0.52*	0.65*
198. Dibenzo (a,h) Anthracene (53-70-3)	ND	ND	ND	ND	ND	ND	ND	ND
208. 1,2-Dichloro-benzene (95-50-1)	ND	ND	ND	ND	ND	ND	ND	ND
218. 1,3-Dichloro-benzene (541-73-1)	ND	ND	ND	ND	ND	ND	ND	ND
228. 1,4-Dichloro-benzene (106-46-7)	ND	ND	ND	ND	ND	ND	ND	ND
238. 3,3'-Dichloro-benzidine (91-94-1)	ND	ND	ND	ND	ND	ND	ND	ND

* Benzo(a) Anthracene and Chrysene are an isomeric pair not seperable by packed column chromatography. Values are calculated using a combined standard and reported as Chrysene.

GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS - METHOD 8250
(Detection limits: at least 0.1 mg/kg)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, mg/kg							
E & E Lab Number 83- Station No.	4040 001	4041 002	4042 003	4043 004	4044 005	4045 006	4046 007	4047 008
24B. Diethyl Phthalate (84-65-2)	ND	ND	ND	ND	ND	ND	ND	ND
25B. Dimethyl Phthalate (131-11-3)	ND	ND	ND	ND	ND	ND	ND	ND
26B. Di-N-Butyl Phthalate (84-74-2)	ND	ND	ND	ND	ND	ND	ND	ND
27B. 2,4-Dinitro-toluene (121-14-2)	ND	ND	ND	ND	ND	ND	ND	ND
28B. 2,6-Dinitro-toluene (606-20-2)	ND	ND	ND	ND	ND	ND	ND	ND
29B. Di-N-Octyl Phthalate (117-84-0)	ND	ND	ND	ND	ND	ND	ND	ND
30B. 1,2-Diphenyl-hydrazine (as Azo-benzene) (122-66-7)	ND	ND	ND	ND	ND	ND	ND	ND
31B. Fluoranthene (206-44-0)	4.77	0.60	ND	0.25	1.75	5.21	1.02	0.71
32B. Fluorene (86-73-7)	ND	ND	ND	ND	ND	0.26	0.10	ND
33B. Hexa-chlorobenzene (118-71-1)	ND	ND	ND	ND	ND	ND	ND	ND
34B. Hexa-chlorobutadiene (87-68-3)	ND	ND	ND	ND	ND	ND	ND	ND
35B. Hexachloro-cyclopentadiene (77-47-4)	ND	ND	ND	ND	ND	ND	ND	ND

GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS - METHOD 8250
(Detection limits: at least 0.1 mg/kg)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, mg/kg							
E & E Lab Number 83- Station No.	4040 001	4041 002	4042 003	4043 004	4044 005	4045 006	4046 007	4047 008
36B. Hexachloro-ethane (67-72-1)	ND	ND	ND	ND	ND	ND	ND	ND
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)	ND	ND	ND	ND	ND	ND	ND	ND
38B. Isophorone (78-59-1)	ND	ND	ND	ND	ND	ND	ND	ND
39B. Naphthalene (91-20-3)	ND	ND	ND	ND	ND	ND	ND	ND
40B. Nitrobenzene (98-95-3)	ND	ND	ND	ND	ND	ND	ND	ND
41B. N-Nitrosodi-methylamine (62-75-9)	ND	ND	ND	ND	ND	ND	ND	ND
42B. N-Nitrosodi-N-Propylamine (621-64-7)	ND	ND	ND	ND	ND	ND	ND	ND
43B. N-Nitro-sodiphenylamine (86-30-6)	ND	ND	ND	ND	ND	ND	ND	ND
44B. Phenanthrene (85-01-8)	†	†	†	†	†	†	†	†
45B. Pyrene (129-00-0)	2.37	0.35	ND	0.18	1.08	2.39	0.47	0.44
46B. 1,2,4-Tri-chlorobenzene (120-82-1)	ND	ND	ND	ND	ND	ND	ND	ND

† Anthracene and Phenanthrene are an isomeric pair not seperable by packed column chromatography. Values are calculated using a combined standard and reported as Anthracene

GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS - METHOD 8250
(Detection limits: at least 0.1 mg/kg)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, mg/kg				
E & E Lab Number 83- Station No.	4048 009	4049 010	4050 011	4051 S01	4052 S02
1B. Acenaphthene (83-32-9)	ND	76	ND	ND	ND
2B. Acenaphthylene (208-96-8)	ND	0.13	ND	ND	ND
3B. Anthracene (120-12-7)	ND†	1.80†	0.20†	ND†	0.91†
4B. Benzidine (92-87-5)	ND	ND	ND	ND	ND
5B. Benzo (a) Anthracene (56-55-3)	*	*	*	*	*
6B. Benzo (a) Pyrene (50-32-8)	ND	ND	ND	ND	ND
7B. 3,4-Benzo-Fluoranthene (205-99-2)	ND	ND	ND	ND	ND
8B. Benzo (ghi) Perylene (191-24-2)	ND	ND	ND	ND	ND
9B. Benzo (k) Fluoranthene (207-08-9)	ND	ND	ND	ND	ND
10B. Bis (2-Chloro-ethoxy) Methane (111-91-1)	ND	ND	ND	ND	ND
11B. Bis (2-Chloro-ethyl) Ether (111-44-4)	ND	ND	ND	ND	ND

SHEET 1 OF 4

† Anthracene and Phenanthrene are an isomeric pair not seperable by packed column chromatography. Values are calculated using a combined standard and reported as Anthracene

* Benzo(a) Anthracene and Chrysene are an isomeric pair not seperable by packed column chromatography. Values are calculated using a combined standard and reported as Chrysene.

GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS - METHOD 8250
(Detection limits: at least 0.1 mg/kg)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, mg/kg				
E & E Lab Number 83- Station No.	4048 009	4049 010	4050 011	4051 S01	4052 S02
12B. Bis (2-Chloro-isopropyl) Ether (39638-32-9)	ND	ND	ND	ND	ND
13B. Bis (2-Ethyl-hexyl) Phthalate (117-81-7)	ND	ND	ND	ND	ND
14B. 4-Bromo-phenyl Phenyl Ether (101-55-3)	ND	ND	ND	ND	ND
15B. Butyl Benzyl Phthalate (85-68-7)	ND	ND	ND	ND	ND
16B. 2-Chloro-naphthalene (91-58-7)	ND	ND	ND	ND	ND
17B. 4-Chloro-phenyl Phenyl Ether (7005-72-3)	ND	ND	ND	ND	ND
18B. Chrysene (218-01-9)	ND*	0.50*	0.81*	ND*	0.83*
19B. Dibenzo (a,h) Anthracene (53-70-3)	ND	ND	ND	ND	ND
20B. 1,2-Dichloro-benzene (95-50-1)	ND	ND	ND	ND	ND
21B. 1,3-Dichloro-benzene (541-73-1)	ND	ND	ND	ND	ND
22B. 1,4-Dichloro-benzene (106-46-7)	ND	ND	ND	ND	ND
23B. 3,3'-Dichloro-benzidine (91-94-1)	ND	ND	ND	ND	ND

* Benzo(a) Anthracene and Chrysene are an isomeric pair not seperable by packed column chromatography. Values are calculated using a combined standard and reported as Chrysene.

GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS - METHOD 8250
(Detection limits: at least 0.1 mg/kg)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, mg/kg				
E & E Lab Number 83- Station No.	4048 009	4049 010	4050 011	4051 S01	4052 S02
24B. Diethyl Phthalate (84-65-2)	ND	ND	ND	ND	ND
25B. Dimethyl Phthalate (131-11-3)	ND	ND	ND	ND	ND
26B. Di-N-Butyl Phthalate (84-74-2)	ND	ND	ND	ND	ND
27B. 2,4-Dinitro-toluene (121-14-2)	ND	ND	ND	ND	ND
28B. 2,6-Dinitro-toluene (606-20-2)	ND	ND	ND	ND	ND
29B. Di-N-Octyl Phthalate (117-84-0)	ND	ND	ND	ND	ND
30B. 1,2-Diphenyl-hydrazine (as Azo-benzene) (122-66-7)	ND	ND	ND	ND	ND
31B. Fluoranthene (206-44-0)	0.16	0.97	1.11	ND	1.36
32B. Fluorene (86-73-7)	ND	0.14	ND	ND	ND
33B. Hexa-chlorobenzene (118-71-1)	ND	ND	ND	ND	ND
34B. Hexa-chlorobutadiene (87-68-3)	ND	ND	ND	ND	ND
35B. Hexachloro-cyclopentadiene (77-47-4)	ND	ND	ND	ND	ND

GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS - METHOD 8250
(Detection limits: at least 0.1 mg/kg)
ND: Material was analyzed for but not detected

POLLUTANT AND CAS NUMBER	CONCENTRATION, mg/kg				
E & E Lab Number 83- Station No.	4048 009	4049 010	4050 011	4051 S01	4052 S02
36B. Hexachloro-ethane (67-72-1)	ND	ND	ND	ND	ND
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)	ND	ND	ND	ND	ND
38B. Isophorone (78-59-1)	ND	ND	ND	ND	ND
39B. Naphthalene (91-20-3)	ND	ND	ND	ND	ND
40B. Nitrobenzene (98-95-3)	ND	ND	ND	ND	ND
41B. N-Nitrosodi-methylamine (62-75-9)	ND	ND	ND	ND	ND
42B. N-Nitrosodi-N-Propylamine (621-64-7)	ND	ND	ND	ND	ND
43B. N-Nitro-sodiphenylamine (86-30-6)	ND	ND	ND	ND	ND
44B. Phenanthrene (85-01-8)	†	†	†	†	†
45B. Pyrene (129-00-0)	0.07	0.63	0.66	ND	0.98
46B. 1,2,4-Tri-chlorobenzene (120-82-1)	ND	ND	ND	ND	ND

SHEET 4 OF 4

† Anthracene and Phenanthrene are an isomeric pair not seperable by packed column chromatography. Values are calculated using a combined standard and reported as Anthracene

RESULTS OF SOIL ANALYSIS FOR
POLYCHLORINATED BIPHENYLS

(all results in mg/kg)

PP #	CAS #	Compound	E & E Lab No. 83- Station No.	4040 001	4041 002	4042 003	4043 004	4044 005
(106P)	53469-21-9	PCB-1242		<0.01	<0.01	<0.01	<0.01	<0.01
(107P)	11097-69-1	PCB-1254		<0.01	<0.01	<0.01	<0.01	<0.01
(108P)	11104-28-2	PCB-1221		<0.01	<0.01	<0.01	<0.01	<0.01
(109P)	11141-16-5	PCB-1232		<0.01	<0.01	<0.01	<0.01	<0.01
(110P)	12672-29-6	PCB-1248		<0.01	<0.01	<0.01	<0.01	<0.01
(111P)	11096-82-5	PCB-1260		<0.01	<0.01	<0.01	<0.01	<0.01
(112P)	12674-11-2	PCB-1016		<0.01	<0.01	<0.01	<0.01	<0.01

< = None detected at stated detection limit.

RESULTS OF SOIL ANALYSIS FOR
POLYCHLORINATED BIPHENYLS

(all results in mg/kg)

PP #	CAS #	Compound	E & E Lab No. 83- Station No.	4045 006	4046 007	4047 008	4048 009	4049 010
(106P)	53469-21-9	PCB-1242		<0.01	<0.01	<0.01	<0.01	<0.01
(107P)	11097-69-1	PCB-1254		<0.01	<0.01	<0.01	<0.01	<0.01
(108P)	11104-28-2	PCB-1221		<0.01	<0.01	<0.01	<0.01	<0.01
(109P)	11141-16-5	PCB-1232		<0.01	<0.01	<0.01	<0.01	<0.01
(110P)	12672-29-6	PCB-1248		<0.01	<0.01	<0.01	<0.01	<0.01
(111P)	11096-82-5	PCB-1260		<0.01	<0.01	<0.01	<0.01	<0.01
(112P)	12674-11-2	PCB-1016		<0.01	<0.01	<0.01	<0.01	<0.01

< = None detected at stated detection limit.

RESULTS OF SOIL ANALYSIS FOR
POLYCHLORINATED BIPHENYLS

(all results in mg/kg)

PP #	CAS #	Compound	E & E Lab No. 83- Station No.	4050 011	4051 S01	4052 S02
(106P)	53469-21-9	PCB-1242		<0.01	<0.01	<0.01
(107P)	11097-69-1	PCB-1254		<0.01	<0.01	<0.01
(108P)	11104-28-2	PCB-1221		<0.01	<0.01	<0.01
(109P)	11141-16-5	PCB-1232		<0.01	<0.01	<0.01
(110P)	12672-29-6	PCB-1248		<0.01	<0.01	<0.01
(111P)	11096-82-5	PCB-1260		<0.01	<0.01	<0.01
(112P)	12674-11-2	PCB-1016		<0.01	<0.01	<0.01

< = None detected at stated detection limit.

RESULTS OF CHEMICAL ANALYSIS OF SOIL SAMPLES

E & E Lab No. / Station No.	4040 001	4041 002	4042 003	4043 004	4044 005	4045 006	4046 007	4047 008	4048 009	4049 010	4050 011	4051 S01	4052 S02
Oil and Grease, mg/kg	<50	50	210	<50	<50	60	480	80	<50	1.50	200	<50	200
Total Phenols, mg/kg	<0.2	<0.2	0.68	<0.2	0.62	0.74	7.3	1.4	<0.2	<0.2	0.44	2.6	0.66
pH, S.U.(1)	8.24	8.10	8.30	8.54	8.18	8.30	7.70	7.20	7.60	7.53	7.80	7.50	8.19
Specific Conductivity(1) umhos/cm	70	110	90	60	60	140	99	280	80	61	140	53	135

<None detected at stated detection limit

(1)of a water extract

RESULTS OF METAL ANALYSES OF SOIL SAMPLES
(mg/kg as received)

ppm

E & E Lab No. / Client I.D.	4040 001	4041 002	4042 003	4043 004	4044 005	4045 006	4046 007	4047 008	4048 009	4049 010	4050 011	4051 S01	4052 S02
Aluminum	8,430	7,850	10,450	9,270	10,820	8,680	7,500	7,490	7,550	11,030	8,410	1,000	8,690
Barium	10,010	11,000	6,170	5,170	4,270	6,660	6,110	6,840	8,960	8,200	5,930	49,600	11,460
Beryllium	1.76	2.01	1.20	1.23	1.54	<1	<1	1.87	1.99	1.86	1.13	2.97	<1
Boron	<0.2	<0.2	<0.2	<0.2	<0.2	3.6	3.0	<0.2	2.7	<0.2	2.0	3.5	3.3
Cadmium	2.85	<1	<1	<1	<1	1.55	<1	<1	1.15	<1	2.32	2.89	<1
Calcium	40,140	79,590	15,440	3,984	8,216	38,350	16,040	10,050	6,620	13,640	11,390	18,440	49,450
Chromium	32.7	24.2	22.5	19.3	21.0	27.6	18.8	22.4	26.8	26.5	16.9	7.55	22.2
Cobalt	8.00	11.9	4.67	5.62	4.62	6.96	5.06	4.21	4.69	5.85	5.54	2.42	15.7
Copper	52.5	54.0	23.6	21.8	16.1	29.0	22.2	25.8	18.8	26.5	21.8	310	30.7
Iron	22,220	23,170	23,010	10,860	23,150	23,010	15,340	30,550	20,060	27,680	13,890	561,400	30,610
Lead	150	154	547	234	774	146	11.0	125	39.9	64.0	56.3	510	50.0
Magnesium	9,820	21,760	2,390	1,960	3,010	12,250	4,990	3,840	2,100	5,580	3,610	942	11,860
Manganese	2,180	1,080	436	622	272	273	249	228	184	313	1,150	209	496
Nickel	66.7	7.18	17.9	10.0	10.3	32.1	14.6	10.8	94.1	15.3	10.1	55.8	46.5
Sodium	462	551	550	271	238	527	305	215	200	363	123	750	187
Vanadium	27.1	56.1	31.3	25.3	29.6	31.3	21.8	21.1	32.6	27.3	24.6	25.9	25.8
Zinc	231	269	114	69.0	114	209	161	222	146	159	131	2,134	558

APPENDIX C

LABORATORY QUALITY ASSURANCE/QUALITY CONTROL

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
FOR SPIKED WATER SAMPLES

Compound	E & E Laboratory No. 83-	Original Value	Amount Added	Amount Determined	Percent Recovery
		(ug/L)			
Naphthalene	4709	ND	72	67.2	93.3
	4053	ND	1,800	1,825	101
Pyrene	4709	ND	222	188	84.7
	4053	ND	444	262	59.0
Aroclor 1254	4053	<0.05	10	11.9	119
Beryllium	4624	2.22	10.0	12.1	98.8
	4654	<1.00	10.0	10.7	107
Cadmium	4621	6.72	10.0	15.7	89.8
	4656	1.24	1.00	2.17	93.5
Calcium	4621	184,000	200,000	413,000	115
	4653	200,000	200,000	413,000	107
Chromium	4623	59.9	50.0	110	100
	4709	115	50.0	164	98.0
Cobalt	4621	28.7	50	75.8	94.2
Copper	4053	1,060	500	1,540	96.0
Lead	4620	309	1,000	1,330	102
	4652	563	1,000	1,540	97.7
Magnesium	4624	11,800	50,000	59,800	96.0
	4651	16,700	50,000	68,300	103
Manganese	4620	652	100	755	103
	4624	869	100	972	103
Nickel	4657	72.9	50	121	96.2
	4654	55.8	50	103	94.4
Vanadium	4623	193	500	665	94.4
	4650	132	500	599	93.4

Note: All spike results fall within the 95% confidence limits of our control charts.

ND = None detected.

< = None detected at stated detection limit

QUALITY CONTROL FOR PRECISION,
RESULTS OF WATER REPLICATE ANALYSES

	E & E Laboratory No. 83-	(ug/L) Original Analysis A	(ug/L) Replicate Analysis B	Relative Percent Difference RPD
Base/Neutral Extractable Organics	4620	ND	ND	0
Volatile Organics	4620	ND	ND	0
Polychlorinated Biphenyls	4620	<0.05	<0.05	0
Beryllium	4621	5.54	5.29	4.6
Cadmium	4621	6.72	7.05	4.8
Calcium	4621	184	181	1.6
Chromium	4621	102	103	1.0
Cobalt	4621	27.8	46.2	49.7
Copper	4621	873	863	1.2
Lead	4621	548	608	10.2
Magnesium	4621	33,700	31,300	7.4
Manganese	4621	952	900	5.6
Nickel	4621	246	304	20.6
Sodium	4621	34,400	27,900	20.8
Vanadium	4621	108	157	37.2
Zinc	4621	1,372	1,174	15.5

Note: These results fall within the 95% confidence limits of our control charts.

ND = None detected

< = None detected at the stated detection limit

$$RPD = \frac{[A-B]}{A+B/2} \times 100$$

QUALITY CONTROL FOR ACCURACY: PERCENT RECOVERY
FOR SPIKED SOIL SAMPLES

Compound	E & E Laboratory No. 83-	mg/kg Original Value	mg/kg Amount Added	mg/kg Amount Determined	Percent Recovery
Naphthalene	4048	ND	1,110	603	54.4
Pyrene	4048	70.1	1,770	1,183	62.9
Methylene Chloride	4052	980	1,480	1,590	41.2
Toluene	4052	ND	969	841	86.8
Aroclor 1254	4048	<0.01	1.49	1.46	88
Total Phenols	4041	<0.2	25	28	112
Aluminum	4040	8,430	5,010	13,700	105
	4041	7,850	5,020	13,400	111
	4042	10,500	4,980	16,300	116
Barium	4043	5,170	39,800	51,800	117
	4044	4,270	40,100	50,400	115
	4045	6,660	39,800	52,500	115
Beryllium	4051	2.97	9.99	12.9	99.4
Calcium	4042	15,400	19,900	37,400	111
Cobalt	4047	4.21	5.01	9.04	96.6
Copper	4051	2.32	5.00	7.03	94.2
	4046	22.2	5.02	26.2	80.0
	4048	18.8	5.00	23.1	86.0
Chromium	4051	7.55	5.00	12.7	103
Iron	4040	22,200	1,000	23,200	100
	4041	23,200	10,000	33,900	107
	4044	23,100	10,000	33,900	108
Lead	4043	234	1,000	1,270	104
Magnesium	4048	2,100	5,020	6,970	97.0
Manganese	4048	184	10.0	196	120
Nickel	4043	10.0	5.00	14.7	94.0
Sodium	4041	557	502	1,000	89.4
	4042	550	996	1,540	99.4
Vanadium	4043	25.3	50.0	70.1	89.7
Zinc	4047	222	24.9	246	96.4
	4049	159	25.1	188	116

Note: All spike results fall within the 95% confidence limits of our control charts.

ND = None detected.

< = None detected at stated detection limit

QUALITY CONTROL FOR PRECISION:
RESULTS OF SOIL REPLICATE ANALYSES

	E & E Laboratory No. 83-	mg/kg Original Analysis A	mg/kg Replicate Analysis B	Relative Percent Difference RPD
Oil and Grease	4045	60	70	15
Total Phenols	4043	<0.2	<0.2	0
Polychlorinated Biphenyls	4045	<0.01	<0.01	0
Anthracene/Phenanthrene†	4045	1.47	1.66	12.1
Fluoranthene	4045	5.2	6.50	22.0
Pyrene	4045	2.39	3.72	43.5
Benzo(a) Anthracent (Chrysene*)	4045	2.28	3.51	42.5
Methylene Chloride	4044	1.20	0.91	27.3
Beryllium	4050	1.13	1.25	10.1
Cadmium	4050	2.32	2.22	4.4
Calcium	4050	11,390	12,300	7.7
Chromium	4050	16.9	16.1	4.8
Cobalt	4050	5.54	6.75	19.7
Copper	4050	21.8	22.7	4.0
Iron	4050	13,890	20,020	36.2
Lead	4050	56.3	56.3	0
Magnesium	4050	3,610	3,130	14.2
Manganese	4050	1,150	1,350	16.0
Nickel	4050	10.1	9.10	10.4
Sodium	4050	123	132	7.0
Vanadium	4050	24.6	27.2	10.0
Zinc	4050	131	143	8.8

Note: These results fall within the 95% confidence limits of our control charts.

NA = Not applicable.

< = None detected at the stated detection limit

$$RPD = \frac{[A-B]}{A+B/2} \times 100$$

QUALITY CONTROL FOR ACCURACY:
PERCENT DIFFERENCE--EPA QUALITY ASSURANCE MATERIALS

Element	Material No. WP 475 Concentrations in ug/L Known	Determined	Percent Difference
Cadmium	39.0	41.7	6.7
Chromium	261	272	4.1
Cobalt	261	264	1.1
Nickel	207	221	6.5
Vanadium	846	883	4.3

Note: These results are within the 95% confidence interval for these parameters.