SHIELD
ENVIRONMENTAL ASSOCIATES, INC.

Annual Monitoring Report

April 2003

Carroll and Dubies Superfund Site
Town of Deerpark, Orange County, New York

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July 2003

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1.0 Introduction

This *Annual Monitoring Report* has been prepared for the Carroll and Dubies (C&D) Superfund Site, on behalf of the Carroll and Dubies Superfund Site Potentially Responsible Parties (PRP) Group, by Shield Environmental Associates, Inc. (Shield Environmental). In a letter dated January 30, 2003, the United States Environmental Protection Agency (U.S. EPA) Region 2 approved a request to change the monitoring frequency for this site from semiannually to annually beginning in 2003. This report documents field activities and presents analytical data from field work completed between April 8 and April 10, 2003. The documents used as guidance for the field activities were:

- *Field Sampling and Analysis Plan Addendum* (Shield Environmental, 1998)
- *Final Remedial Design Work Plan Addendum* (Shield Environmental, 1998a)
- *Quality Assurance Project Plan Addendum* (Shield Environmental, 1998b)
- *Remedial Action Work Plan, Appendix B, Health and Safety Plan* (Shield Environmental, 1998c)

Historical data from the *Addendum to Supplemental Hydrogeologic Remedial Investigation* (Remediation Technologies Inc., 1995) and *Preliminary Remedial Investigation Results* (Blasland, Bouck, & Lee, Inc., 1992) have been incorporated into this report as well as data collected during previous Shield Environmental sampling events (Appendices A and B). These reports and earlier monitoring reports provide descriptions of the hydrogeology of the site and baseline water quality.

The remedial activities for this site are separated into two operable units. Operable Unit 1 (OU-1) addressed source control through remediation of the lagoons, which was completed in 1999. This report covers the Operable Unit 2 (OU-2) activities only, which addresses groundwater impacts and remediation.

1.1 Site Location and History

The three-acre C&D Superfund Site is located in the Town of Deerpark in Orange County, New York, which is approximately 3,000 feet northeast of the City of Port Jervis, New York (Figure 1). In 1970, the site began operating as a disposal facility. Liquid industrial wastes were received from approximately 1971 to 1979. The facility also accepted septic waste and municipal solid waste until 1989, which were the

majority of wastes disposed of at the site. The wastes disposed at the site were removed during remediation activities conducted in 1999. These activities are documented in the OU-1 Remedial Action Report (Shield Environmental, 2000).

The site is situated in the Neversink Valley. Gold Creek lies approximately 1,500 feet to the east, and the Neversink River is located approximately 2,000 feet beyond Gold Creek. The immediate surrounding area includes undeveloped woodlands to the north; undeveloped woodlands, a sand and gravel quarry pit, and the closed City of Port Jervis landfill to the east; the Orange County Transfer Station and a concrete products fabrication company to the south; and a sparsely vegetated, shale bedrock, hillside to the west.

1.2 Work Plan Variations

During this sampling event, there was one variation from the work plans:

- Sediment samples were collected using a decontaminated steel shovel rather than spoon or scoop. The samples were then placed by hand into the sample container, allowing free-draining water to drain off before collection. The field technician wore a clean pair of disposable nitrile gloves and chose sediment that had not come in contact with the shovel. These steps were taken to reduce the moisture content of the sediment samples, which has been a problem in the past.

2.0 Annual Monitoring Activities

This section outlines the procedures used for field sampling and monitoring activities, including measurement of groundwater elevations, collection of groundwater samples, measurement of field parameters in groundwater, surface water sampling, and sediment sampling. The results and interpretation of the monitoring program are provided in Section 3.0.

2.1 Groundwater Elevations

Groundwater elevations were determined based on measured depths to water from the reference point elevations before sampling began. The depth to groundwater was measured using a Solinst® electronic water-level meter and recorded in the field logbook to the 1/100th of a foot.

In addition to gauging groundwater levels, two surface water elevations were also measured. Three permanent staff gauges were installed, two along Gold Creek and one adjacent to the quarry pond east of monitoring well OW-8 during the June 2000 sampling event. These locations are shown in Figure 2 and are identified as SW-1, SW-2, and SW-3 (quarry pond). It was discovered during this sampling round that the SW-3 gauge is missing; therefore, there is no reading for SW-3 for the April 2003 groundwater sampling event. A replacement staff gauge will be installed at SW-3 before the next sampling event.

2.2 Monitoring Well Sample Collection

Dedicated low-flow purging and sampling pumps are utilized to sample the monitoring wells. After stabilization procedures were completed, groundwater samples were taken directly from the Tygon® tubing dedicated to each respective well pump.

Groundwater purged from the monitoring wells was generally clear and contained little suspended sediment. All groundwater samples were collected at a flow rate of between 100 and 300 milliliters per minute (mL/min). All monitoring wells maintained 0.33 foot of drawdown or less during purging and stabilization, with the exception of OW-19 (1.02 feet).

During purging of each monitoring well, temperature, dissolved oxygen (DO), redox potential, specific conductance, pH, and turbidity were monitored and recorded on field

forms (Appendix C) in average intervals of 5 minutes. The wells were pumped for periods ranging from 20 to 45 minutes. The goal was to obtain three consecutive readings of the field parameters within the following ranges:

- ±1.0 degrees centigrade (°C) for temperature
- ±10 percent (%) or ±0.3 milligrams per liter (mg/L) for DO (whichever is greater)
- ±10 millivolts (mV) for redox potential (redox)
- ±3% for specific conductance (conductivity)
- ±0.1 for pH
- ±10% or ±2 nephelometric turbidity units (NTUs) for turbidity (whichever is greater)

2.3 Groundwater Field Parameters

Groundwater field parameters were measured with a Horiba Model O-22 multiparameter unit equipped with a flow-through cell that was calibrated prior to sampling activities. Field parameters measured and recorded included:

- Temperature (°C)
- DO (mg/L)
- Redox potential (mV)
- Specific conductance (micromhos per centimeter [umhos/cm])
- pH (standard units)
- Turbidity (NTUs)

The final stabilized field parameter values are presented in Table 1.

Temperature

Although a range for temperature fluctuations was not established in the *Field Sampling and Analysis Plan Addendum* (Shield Environmental, 1998), fluctuations were less than 1.0°C for a minimum of three consecutive readings prior to sampling all of the monitoring wells. Groundwater temperatures ranged from 9.27° to 11.66°C.

Dissolved Oxygen

DO concentrations stabilized for a minimum of three consecutive measurements within the recommended ±10% or 0.3 mg/L range in all monitoring wells, with the exception of OW-6 and OW-19. DO is an important parameter in the interpretation of natural attenuation trends. DO readings across the site ranged from 0.00 to 5.80 mg/L.

Redox

Redox stabilized within the recommended ±10 mV range for three consecutive measurements in all monitoring wells. Redox is also an important parameter in the interpretation of natural attenuation trends. A wide range of redox readings were found in the wells, varying from -76 to 188 mV.

Specific Conductance

A minimum of three consecutive readings for specific conductance was achieved within the recommended ±3% range for all monitoring wells prior to sampling. Specific conductance varied from 114 to 1600 umhos/cm across the site.

pH

A minimum of three consecutive readings for pH within the recommended ±0.1 range was achieved for all monitoring wells prior to sampling. Groundwater samples were within the pH range of 4.83 to 5.72.

Turbidity

A minimum of three consecutive readings for turbidity were achieved within the recommended ±10% or ±2 NTUs range for monitoring wells prior to sampling, except for wells OW-6, OW-10R, OW-13, OW-18, OW-19, and OW-22. Turbidity readings varied from -7.90 (considered 0.0) to 35.20 NTUs across the site.

2.4 Surface Water Sampling

Two surface water samples were collected from Gold Creek and are identified as SW-1, the downstream sample, and SW-2, the upstream sample. SW-2 was collected approximately 15 to 20 feet north of the current survey marker where surface water flow was present.

Samples were collected for volatile organic compounds (VOCs) in accordance with the *Field Sampling and Analysis Plan* (Shield Environmental, 1998), using a disposable container provided by the laboratory to collect and transfer the sample water at each location to the VOC sample vials. The sample bottles were labeled appropriately, placed in a cooler with ice, and sent to a laboratory for analysis.

2.5 Sediment Sampling

Two sediment samples were collected from Gold Creek. The sediment sampling locations, labeled as SED-1 and SED-2, are identified in Figure 2, coinciding with surface water sample locations SW-1 and SW-2. The samples were collected at the sediment/water interface. SED-1 was collected at the current survey marker. SED-2 was collected approximately 15 to 20 feet north of the current survey marker where stream flow was present and to coincide with SW-2.

At the shoreline, a decontaminated steel shovel was used to gently lift sediment from under approximately 4 inches of water, approximately 18 inches in depth. The sediment was then collected by hand from the central mass of the sediment that had not contacted the shovel, coinciding with a depth of approximately 6 inches below the sediment surface. Sediments were transferred by the field technician wearing a clean pair of nitrile gloves into the sample jar. Free-draining water was allowed to drain from the sediments to reduce the amount of water in the samples.

Between sediment sample locations, the sampling shovel was decontaminated with a non-phosphate detergent and rinsed with distilled water.

3.0 Sampling Results

3.1 Groundwater Elevations

The groundwater elevations for this sampling round are presented in Table 2. Associated groundwater elevation contours are shown in Figure 3.

The elevations of adjacent surface water bodies have been included in the groundwater contours map shown in Figure 3. Measurements of surface water elevations were collected on the same day that the monitoring wells were gauged.

The groundwater flow direction on site is toward the southeast in the direction of Gold Creek. The groundwater gradient across the former lagoon site is approximately 0.069. The gradient transitions, to a lesser slope, at about the location of the towpath. From the towpath to Gold Creek, the gradient is very shallow, approximately 0.007. The steeper gradient on the western side of the site is due to the depth to bedrock along the valley wall. As the depth to bedrock increases towards the valley floor, the alluvial fill increases and the groundwater gradient flattens.

3.2 Groundwater Quality

Detected VOC and semivolatile organic compound (SVOC) analytes from the April 2003 sampling event are presented in Tables 3 and 4, respectively, and are included in Figure 4. Historical data of detected organic compounds have been combined with the most recent data and are presented in Appendices A (VOCs) and B (SVOCs). Complete laboratory analytical packages for this sampling episode are provided as electronic files on disk in Appendix D.

3.2.1 Volatile Organic Compounds

VOCs are the primary contaminants of concern. The concentrations of VOCs for this annual monitoring event have been compared to results from previous sampling events.

Ten VOCs were detected in various wells during this sampling event, of which six exceeded regulatory limits (Table 3). The VOCs that exceeded regulatory limits are benzene, chlorobenzene, 1,2-dichloroethene (1,2-DCE) (total), tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride. The detected compounds and concentrations are shown beside each well in Figure 4. The principal VOCs were

benzene, 1,2-DCE (total), and PCE, which is consistent with previous sampling episodes.

Figure 5 presents a graphical representation of concentration trends since January 2000 for benzene, 1,2-DCE (total), and PCE in wells where regulatory criteria have been exceeded. Although there have been variations in the detected concentrations over time, the overall trends are downward for benzene. For OW-5 (1,2-DCE and PCE) and OW-13 (1,2-DCE), the overall trends are also downward. In OW-2, downgradient of former Lagoon 2, concentrations of 1,2-DCE and PCE appear to be cyclic, and influenced by groundwater elevations. For example, as shown in Figure 6, the pattern of fluctuations in groundwater elevations in OW-2 mirrors the pattern seen for 1,2-DCE concentrations. Even though groundwater elevations fluctuate throughout the site, as shown in a comparison of hydrographs for four representative monitoring wells (Figure 7), contaminant concentrations appear to be most affected in OW-2, based on its location close to the original source of impact. It is anticipated that over time fluctuations will decrease as concentrations decline through natural attenuation.

Changes in the VOC groundwater concentrations over time are depicted graphically in Figures 8, 9, 10, and 11. Figures 8 and 9 represent the concentrations of benzene and 1,2-DCE (total) in three wells over time, OW-10/OW-10R, OW-13, and OW-18. The graphs are shown chronologically from February 1999 (pre-remediation sampling) to the most recent monitoring event in April 2003. Figures 10 and 11 indicate the relationship between benzene and 1,2-DCE (total) in these wells, with respect to distance from the source area over time.

The wells used in the graphical assessments (Figures 8, 9, 10, and 11) were chosen based on their detected VOC concentrations and position along the gradient of the contaminant plume. Monitoring well OW-10/OW-10R is at the edge of the lagoon area along the towpath. OW-13 is located approximately 150 feet downgradient from OW-10R in the direction of groundwater flow, and OW-18 is located near Gold Creek, approximately 700 feet downgradient of OW-13.

The graphs (Figures 8, 9, 10, and 11) indicate that there has been a decrease in the concentrations of both benzene and 1,2-DCE (total) at most monitoring wells over time (OW-2 continues to fluctuate) since the remediation activities were completed in 1999.

3.2.2 Semivolatile Organic Compounds

In a letter dated January 30, 2003, U.S. EPA Region 2 approved elimination of SVOCs from the analyte list for monitoring wells OW-13 and OW-18. U.S. EPA requested that OW-10R continue to be monitored for SVOCs. No SVOCs were detected in monitoring well OW-10R (Table 4). A historical summary of detected SVOC constituents in groundwater is provided in Appendix B.

3.2.3 Monitored Natural Attenuation Parameters

Field measurements and laboratory analyses were performed on all groundwater samples to evaluate natural attenuation trends. The physical and chemical parameters measured as part of this monitoring program show that natural attenuation is occurring at the site. Since wastes and contaminated soils that acted as source material have been removed, concentrations of organic constituents in the groundwater continue to decrease over time due to natural attenuation processes.

Table 5 summarizes the natural attenuation parameter results, which include:

- Alkalinity
- Chloride
- DO
- Ethane/ethene
- Ferrous iron
- Methane
- Nitrate
- Redox
- Sulfate
- Sulfide
- Total organic carbon (TOC)

The field parameters (Appendix C; Appendix E) were measured during sample collection using a multiparameter instrument. Natural attenuation analytical parameters for samples collected since February 1999 are provided in Appendix F.

General Observations

The contaminant plume at the C&D site is relatively complex, in that it shows impacts from chlorinated VOCs, nonchlorinated VOCs, and organic carbon as lagoon leachate. The general observations regarding natural attenuation data are:

- Several parameters indicate that reductive dechlorination of chlorinated VOCs is occurring (presence of chlorinated daughter products, historical presence of ethane/ethene and methane within the plume, elevated chloride concentrations downgradient of the lagoons, redox readings less than 50 mV within the plume).
- Indicators of reductive dechlorination are most consistently found in association with the former Lagoon 8 portion of the contaminant plume, which contains both benzene and chlorinated VOCs. The former Lagoons 1 and 2 portion of the plume contains mainly chlorinated VOCs.
- DO readings were less than 0.5 mg/L in most of the wells, indicating low oxygen conditions, under which reductive dechlorination can occur.

Alkalinity

Alkalinity greater than two times the background concentration may be indicative of the ultimate oxidation of chlorinated VOCs to carbon dioxide (CO_2). Alkalinity greater than or equal to 300 mg/L was found in OW-10R, OW-13, OW-18, and OW-22. The presence of elevated alkalinity concentrations indicates that highly chlorinated VOCs are being degraded to vinyl chloride and, ultimately, to CO_2.

Chloride

Elevated chloride concentrations (equal to or greater than two times the background concentration of 8.4 mg/L in MW-1) are indicative of reductive dechlorination. Chloride concentrations greater than or equal to 16.8 mg/L were found in MW-4, OW-5, and OW-21, where chlorinated VOCs and degradation products have been detected.

Dissolved Oxygen

Groundwater with DO concentrations less than 0.5 mg/L, indicating low oxygen conditions that favor degradation of chlorinated compounds, were present in most of the 14 wells sampled during this monitoring period. DO readings were between 1 and 5.5 mg/L in wells OW-2, OW-5, and OW-6, downgradient from former Lagoons 1 and 2. DO was 5.8 mg/L at OW-19, south of the former lagoon area.

Ethane/Ethene

These compounds are end degradation products of chlorinated VOCs. Ethane/ethene was nondetectable in all wells, except for 0.45 ug/L ethene in MW-13 for April 2003. (This value is J-qualified as an estimated result below the reporting limit.)

Ferrous Iron

Ferrous iron is generated when ferric iron is used as an electron acceptor under anaerobic conditions. Ferrous iron concentrations greater than 1 mg/L may indicate reductive dechlorination. Ferrous iron concentrations greater than 1 mg/L were measured in all monitoring wells except MW-1, OW-2, OW-5, OW-6, and OW-16. The elevated ferrous iron concentrations were generally found downgradient of former Lagoons 6, 7, and 8. Ferrous iron concentrations were lower than what was previously detected during other sampling events.

Methane

Methane is an ultimate reductive dechlorination daughter product, and concentrations greater than 0.1 mg/L (100 ug/L) may indicate this process. However, the presence of methane at this site could also be an indicator of impacts from septic waste disposal or the closed landfill. Methane was measured at concentrations of about 0.1 mg/L (100 ug/L) or greater in MW-4, OW-10R, OW-13, OW-18, OW-19, and OW-22.

Nitrate

Low nitrate concentrations (less than 1 mg/L) potentially indicate the occurrence of anaerobic degradation processes and reductive dechlorination in groundwater. Nitrate concentrations of 1 mg/L or less were found in all monitoring wells, except MW-4, OW-2, and OW-5 downgradient of the Lagoon 1 and 2 contaminant plume, and OW-16, a monitoring well downgradient of Lagoons 3 and 4. The relatively high nitrate concentration in OW-5 (7.0 mg/L) is most likely a result of septage wastes from former Lagoons 1 and 2.

Redox

Redox readings below approximately +750 mV indicate that anaerobic processes can occur. A reductive dechlorination pathway is possible when redox readings are +50 mV or less. Redox values for most of the wells located near and downgradient of the former lagoons exhibited redox readings less than +50 mV, indicative of conditions conducive to dechlorination. Background well MW-1 and downgradient wells OW-2, OW-5, OW-6, and OW-16, located further from the source areas, had redox values of greater than +50 mV.

Sulfate/Sulfide

Sulfate is an electron acceptor under anaerobic, strongly reducing conditions. Sulfide is produced under these conditions. Relatively low sulfate (less than 20 mg/L), combined with detectable sulfide (greater than 1 mg/L) may be indicative of this reductive dechlorination pathway. Sulfate concentrations less than 20 mg/L were measured in MW-1, OW-8, OW-15, OW-19, and OW-22, although sulfide was not detected in any of these wells.

TOC

Organic carbon, as measured by TOC, provides a carbon and energy source for biodegradation, and can drive dechlorination. TOC was not measured in any well at the rule of thumb concentration of 20 mg/L or greater. Concentrations greater than the background concentration of 0 mg/L (MW-1) were found in wells MW-4, OW-10R, OW-13, OW-15, OW-18, OW-19, OW-21, and OW-22.

3.3 Surface Water Quality

Two surface water samples were collected during this sampling event and analyzed for VOCs. VOCs were not detected in samples from surface water monitoring point SW-2 (upstream). Several VOCs and chlorinated VOCs were detected in the downstream surface water monitoring point SW-1; however, all of these values were below the reporting limit and are J-qualified as estimated values. SVOC analysis in surface water is no longer required (see letter from the U.S. EPA Region 2 dated September 3, 2002). VOCs and SVOCs that have been detected in surface water during previous episodes are shown in Table 6.

Historically, there has never been a VOC or SVOC detected above a regulatory drinking water standard in surface water, with the exception of a detection of 1,2-DCE above the NYSDEC SGV of 0.6 ug/L at 0.61 ug/L in March 2001, at a J-qualified or as an estimated value. Based on these findings, there is no evidence that surface water has been impacted by the site.

3.4 Sediment Quality

Several VOCs were detected in both the downstream (SED-1) upstream (SED-2) samples at low concentrations during this sampling period (Table 7). Detected concentrations for this period were within the range of what has been previously

reported. SVOC analysis is no longer required for sediments (see letter from the U.S. EPA Region 2 dated September 3, 2002).

3.5 Data Quality Review and Recommendations for Corrective Action

A Tier II data quality review of sample data packages was completed using U.S. EPA guidelines. The Tier II data evaluation consisted of a review of data package completeness and a quality control (QC) review, as summarized in the QC forms provided by the laboratory. The completeness review covered:

- Signed transmittal page
- Data package narrative
- Sample transmittal documentation
- Standard QC forms for:
  - Surrogate recovery
  - Matrix spike/matrix spike duplicate (MS/MSD) recovery
  - Laboratory control samples
  - Method blank summary
  - Instrument performance check
  - Internal standard summary and retention time (RT) summary
  - Form Is and raw data for field samples
  - Initial calibration data
  - Continuing calibration data
  - Form Is and raw data for blanks, laboratory control samples, MS/MSDs
  - Copies of log book pages documenting sample preparation, moisture determination, extract transfer, instruments, and sample tracking

The QC review covered the same items as in the completeness review, and:

- Holding times
- Form Is and raw data for field and QC samples
- Other data quality considerations (field procedures and sediment handling, moisture content of sediment samples, field duplicates and field blanks)

The following data concerns arose during the data validation process:

- Spike recoveries were outside stated control limits for two MS/MSD runs.
- Internal standard areas were outside acceptable limits for samples SED-2, SED-2D, SED-1 due to matrix interference.
- Sediment samples had high enough moisture to require qualification as estimated for positive results.

MS/MSDs

Sample OW-10R of SDG#3D09291 was found outside stated control limits. Six of six spike recoveries were outside QC limits. In Lot#A3D110216, laboratory MS/MSD exceeded stated control limits. Six of six spike recoveries were outside QC limits. MS/MSD deviations are often due to matrix interference. No action is taken on MS/MSD data alone, and there was no indication of other QC problems with these samples, therefore no data qualification was made.

Internal Standard Areas Outside of QC Limits

Although all three sediment samples exceeded QC limits for internal standard area counts, only one constituent, acetone in SED-1, has been qualified as estimated (J) by the data validation process. All other positive results for sediment samples were J-qualified as estimated by the laboratory because concentrations were below the quantitation limits.

Moisture Content in Sediment Samples

Samples SED-1, SED-2, and SED-2D contained 24.1% solids, 12% solids, 11.4% solids, respectively. No results were rejected because of high moisture because all samples had more than 10% solids. Positive results were already qualified as estimated (J) by the laboratory because of concentrations less than the quantitation limit, or, for acetone in SED-1 because of internal standard areas outside of QC limits. No additional qualification was required. Ordinarily, positive results for samples containing less than 30% solids but more than 10% solids are qualified as estimated.

Recommendations for Corrective Action

Although no sediment sample results were rejected because of high moisture, this continues to be an area that could be improved. Sediment sampling techniques have been modified to determine the most efficient and effective moisture-reducing method to collect these samples. A possible approach for the next sampling round is the use of a

USGS-approved streambed sampling device known as a guillotine core sampler. The guillotine essentially takes the sample in-situ and dewaters the sample with a specialized water extruder (http://ca.water.usgs.gov/pnsp/pest.rep/bs-t.html).

4.0 Summary and Recommendations

The 14 monitoring network wells were sampled between April 8 and April 10, 2003 for analysis of VOCs and natural attenuation parameters. One monitoring well (OW-10R) in the network was sampled for analysis of SVOCs. Two surface water samples and two sediment samples were collected and analyzed for VOCs. All laboratory analytical samples were analyzed by STL, North Canton, Ohio.

4.1 Summary

In summary, the sampling data show:

- In general, the concentrations of VOCs in groundwater continue to show a downward trend following the OU-1 remedial action.
- Concentrations of all VOCs in two downgradient wells (OW-8 and OW-16) dropped and have remained below maximum contaminant levels and the New York State Department of Environmental Conservation Standards and Guidance Levels for four sampling rounds.
- Fluctuations in concentrations in OW-2 appear to be related to cyclic fluctuations in groundwater elevations.
- Conditions remain favorable for natural attenuation, and the results indicate that the process is ongoing.
- VOCs were detected in the downstream (SED-1) and upstream (SED-2) sediment locations in low concentrations typical of what has been previously reported.

4.2 Recommendation

It is recommended that the groundwater monitoring program continue on an annual basis for the parameters analyzed in April 2003.

5.0 References

Blasland, Bouck, and Lee, Inc., 1992, *Preliminary Remedial Investigation Results, Carroll & Dubies Site*, Port Jervis, New York.

Remediation Technologies, Inc., 1995, *Addendum to Supplemental Hydrogeologic Remedial Investigation: Results of Field Investigation at the Carroll and Dubies Site During April, 1995.*

Shield Environmental Associates Inc., 1998, *Field Sampling and Analysis Plan Addendum, Carroll & Dubies Superfund Site*, Town of Deerpark, Orange County, New York.

Shield Environmental Associates Inc., 1998a, *Final Remedial Design Work Plan Addendum, Carroll & Dubies Superfund Site*, Town of Deerpark, Orange County, New York.

Shield Environmental Associates Inc., 1998b, *Quality Assurance Project Plan Addendum, Carroll & Dubies Superfund Site*, Town of Deerpark, Orange County, New York.

Shield Environmental Associates Inc., 1998c, *Remedial Action Work Plan, Carroll & Dubies Superfund Site*, Town of Deerpark, Orange County, New York.

United States Environmental Protection Agency, March 1983, *Methods for Chemical Analysis of Water and Wastes*, EPA-600/4-79-020, and subsequent revisions.

Tables

Table 1
Groundwater Field Parameters
April 2003
Carroll and Dubies Superfund Site
Town of Deerpark, Orange County, New York

Well ID	Date	Temperature (°C)	Dissolved Oxygen (mg/L)	Redox (mV)	Specific Conductance (uS/cm)	pH (standard units)	Turbidity[1] (NTUs)	Ferrous Iron (mg/L)
MW-1	04/09/03	9.45	0.00	126	317	5.49	-5.40	0.0
MW-4	04/09/03	11.50	0.00	-27	1,600	5.72	0.10	2.2
OW-2	04/09/03	10.75	2.29	188	285	4.87	-6.80	0.0
OW-5	04/10/03	11.61	5.32	146	575	5.26	-7.90	0.0
OW-6	04/09/03	10.43	1.23	163	114	4.83	-4.50	0.0
OW-8	04/09/03	9.94	0.00	-45	184	5.56	1.60	3.25
OW-10R	04/09/03	10.41	0.00	-55	499	5.66	15.80	2.8
OW-13	04/10/03	11.66	0.00	-44	634	5.56	-7.40	2.2
OW-15	04/08/03	9.87	0.00	-76	420	5.30	1.10	4.0
OW-16	04/10/03	9.82	0.00	128	268	5.03	-5.00	0.0
OW-18	04/08/03	10.01	0.00	-75	698	5.56	35.20	4.0
OW-19	04/08/03	9.27	5.80	-60	601	5.49	22.00	3.5
OW-21	04/09/03	10.84	0.00	-41	694	5.51	-7.90	2.8
OW-22	04/09/03	10.41	0.00	-73	822	5.50	-5.80	4.2

Notes:
[1]Negative turbidity readings due to calibration value of zero being greater than true zero; negative values are considered zero.
mg/L = milligrams per liter
mV = milliVolts
uS/cm = microsiemens per centimeter
NTU = nephelometric turbidity units

Table 2
Groundwater and Surface Water Elevation Data[1]
April 8, 2003
Carroll and Dubies Superfund Site
Town of Deerpark, Orange County, New York

Well No.	Top of Casing Elevation or Staff Gauge[2]	Screened Interval	Depth to Groundwater or Surface Water	Groundwater or Surface Water Elevation
MW-1	469.39	28.5 - 43.5	31.65	437.74
MW-4	470.13	35.3 - 50.3	37.80	432.33
OW-2	472.33	30.0 - 47.0	39.91	432.42
OW-3	472.70	30.0 - 46.5	40.65	432.05
OW-4	473.33	26.5 - 27.5	34.65	438.68
OW-5	459.85	25.5 - 45.5	27.55	432.30
OW-6	464.40	31.4 - 51.4	32.07	432.33
OW-7	459.31	24.5 - 34.5	27.15	432.16
OW-8	464.63	34.6 - 54.6	32.16	432.47
OW-9	472.91	25.3 - 35.3	20.07	452.84
OW-10R	469.27	29.0 - 39.0	27.18	442.09
OW-13	458.00	24.8 - 34.8	25.84	434.16
OW-15	472.05	22.0 - 32.0	11.65	460.40
OW-16	453.90	18.0 - 28.0	21.16	432.74
OW-17	447.18	11.0 - 21.0	15.61	431.57
OW-18	444.57	11.0 - 21.0	13.16	431.41
OW-19	438.69	5.0 - 15.0	7.70	430.99
OW-21	467.46	37.1 - 47.1	35.45	432.01
OW-22	467.10	38.0 - 48.0	35.40	431.70
OW-23	444.73	29.0 - 39.0	13.34	431.39
SW-1[3]	432.06	-	-2.28	429.79
SW-2[3]	432.03	-	-1.32	430.71
SW-3[4]	440.10	-	NA	NA

Notes:

[1]Data reported in feet; elevations relative - mean sea level; 1988 National Geodetic Vertical Datum.

[2]Top of casing and gauge staff elevations surveyed by Maser Consulting P.A.

[3]Elevation measured from to of rebar marker to water level closest to rebar (markers not in standing water).

[4]Elevation for SW-3, slurry pond, not taken; survey marker has been destroyed (no marker present during sampling round).

NA = Not available

Table 3
Summary of Detected TCL Volatile Organic Compounds in Groundwater (ug/L)
April 2003
Carroll and Dubies Superfund Site
Town of Deerpark, Orange County, New York

Compound	NYSDEC SGV	U.S. EPA MCL	MW-1 04/09/03	MW-4 04/09/03	OW-2 04/09/03	OW-5 04/10/03	OW-6 04/09/03	OW-8 04/09/03	OW-10R 04/09/03	OW-10R DUP 04/09/03	OW-13 04/10/03	OW-15 04/08/03	OW-16 04/10/03	OW-18 04/08/03	OW-19 04/08/03	OW-21 04/09/03	OW-22 04/09/03
Benzene	1 (S)	5	<1.0	2.2	<12	<1.0	<1.0	<1.0	6.8	6.7	53	1.2	<1.0	2.9	3	3.7	8.7
Chlorobenzene	5 (S)*	100	<1.0	<1.0	<12	<1.0	<1.0	<1.0	3.1	3.1	<2.5	0.67 J	<1.0	5.6	4.9	<1.0	8.5
Chloroethane	5 (S)*	NE	<2.0	<2.0	<25	<2.0	<2.0	<2.0	0.54 J	0.48 J	<5.0	<2.0	<2.0	1.2 J	0.71 J	<2.0	0.66 J
1,1-Dichloroethane	5 (S)*	NE	<1.0	<1.0	<12	<1.0	<1.0	<1.0	<1.0	<1.0	<2.5	0.33 J	<1.0	<1.0	<1.0	<1.0	<1.0
1,2-Dichloroethene (total)	5 (S)*	70	<1.0	0.84 J	290	7.8	21	<1.0	<1.0	<1.0	5.9	<1.0	<1.0	<1.0	0.81 J	<1.0	<1.0
Ethylbenzene	5 (S)*	700	<1.0	<1.0	<12	<1.0	<1.0	<1.0	<1.0	<1.0	1.6 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Tetrachloroethene	5 (S)*	5	<1.0	0.50 J	160	5.5	28	<1.0	<1.0	<1.0	<2.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Trichloroethene	5 (S)*	5	<1.0	<1.0	29	3.0	6.8	<1.0	<1.0	<1.0	<2.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Vinyl Chloride	2 (S)	2	<2.0	<2.0	<25	<2.0	<2.0	<2.0	0.92 J	0.91 J	4.9 J	1.0 J	<2.0	<2.0	0.68 J	0.88 J	0.56 J
Xylenes (total)	5 (S)*	10,000	<1.0	<1.0	<12	<1.0	<1.0	<1.0	<1.0	<1.0	<2.5	<1.0	<1.0	1.2	<1.0	<1.0	1.6

Notes:
TCL = Target Compound List
NYSDEC SGV = New York State Department of Environmental Conservation Standards (S) and Guidance (G) Values for groundwater
U.S. EPA MCL = United States Environmental Protection Agency Maximum Contaminant Level for drinking/groundwater
NE = Not established; no criteria specified
< = Analyte not detected at reporting limit
J = Estimated result; result is less than reporting limit
* = The principal organic contaminant (POC) standard for groundwater of 5 ug/L applies to this substance.
Red = Concentrations detected at or above regulatory limit
Blue = Analyte detected at less than regulatory limit, or analyte detected but no regulatory criteria specified.

Table 4
Summary of Detected TCL Semivolatile Organic Compounds in Groundwater (ug/L)
April 2003
Carroll and Dubies Superfund Site
Town of Deerpark, Orange County, New York

Compound	NYSDEC SGV	U.S. EPA MCL	OW-10R 04/09/03	OW-10R DUP 04/09/03
Diethyl phthalate	50 (G)	NE	<10	<10
2-Methylnaphthalene	NE	NE	<10	<10
Naphthalene	10 (G)	NE	<10	<10

Notes:
TCL = Target Compound List
NYSDEC SGV = New York State Department of Environmental Conservation Standards (S) and Guidance (G) Values for groundwater
U.S. EPA MCL = United States Environmental Protection Agency Maximum Contaminant Level for drinking/groundwater
NE = Not established; no criteria specified
< = Analyte not detected at reporting limit

Table 5
Natural Attenuation Parameters
April 2003
Carroll and Dubies Superfund Site
Town of Deerpark, Orange County, New York

Well ID		Alkalinity (mg/L)	Chloride (mg/L)	Dissolved Oxygen (mg/L)	Ethane (ug/L)	Ethene (ug/L)	Ferrous Iron (mg/L)*	Methane (ug/L)	Nitrate (mg/L)	Redox (mV)	Sulfate (mg/L)	Sulfide (mg/L)	TOC (mg/L)
MW-1	04/09/03	130	4.7	0.0	<0.5	<0.5	0.0	11.0	1.8	126	19.4	<1.0	<1.0
MW-4	04/09/03	180	219.0	0.0	<0.5	<0.5	2.2	99.0	0.7	-27	150.0	<1.0	2.0
OW-2	04/09/03	45	8.7	2.3	<0.5	<0.5	0.0	<0.5	4.4	188	55.8	<1.0	<1.0
OW-5	04/10/03	100	27.8	5.3	<0.5	<0.5	0.0	<0.5	7.0	146	114.0	<1.0	<1.0
OW-6	04/09/03	24	1.0	1.2	<0.5	<0.5	0.0	<0.5	0.4	163	22.3	<1.0	<1.0
OW-8	04/09/03	57	3.0	0.0	<0.5	<0.5	3.3	1.3	<0.1	-45	16.7	<1.0	<1.0
OW-10R	04/09/03	190	<1.0	0.0	<0.5	<0.5	2.8	550.0	<0.1	-55	36.1	<1.0	2.0
OW-13	04/10/03	290	2.9	0.0	<0.5	0.45 J	2.2	210.0	<0.1	-44	31.5	<1.0	4.0
OW-15	04/08/03	170	4.5	0.0	<0.5	<0.5	4.0	<0.5	<0.1	-76	14.8	<1.0	1.0
OW-16	04/10/03	73	10.4	0.0	<0.5	<0.5	0.0	<0.5	4.2	128	21.4	NA	<1.0
OW-18	04/08/03	270	8.4	0.0	<0.5	<0.5	4.0	170.0	0.1	-75	25.7	<1.0	8.0
OW-19	04/08/03	250	10.2	5.8	<0.5	<0.5	3.5	320.0	<0.1	-60	13.6	<1.0	7.0
OW-21	04/09/03	240	21.1	0.0	<0.5	<0.5	2.8	72.0	<1.0	-41	62.4	<1.0	3.0
OW-22	04/09/03	330	19.3	0.0	<0.5	<0.5	4.2	680.0	<0.1	-73	7.1	<1.0	9.0

Notes:
mg/L = milligrams per liter
ug/L = micrograms per liter
mV = milliVolts
TOC = total organic carbon
" < " = Analyte not detected at method reporting limit.
B = Method blank contamination. The associated method blank contains the target analyte at a reportable level.
D = Result was obtained from the analysis of a dilution.
J = Estimated result; result is less than the reporting limit.
*Ferrous Iron was measured in the field (Hach kit)
NA = Not Available

Table 6
Detected TCL Volatile and Semivolatile Organic Compounds in Surface Water (ug/L)
April 2003
Carroll and Dubies Superfund Site
Town of Deerpark, Orange County, New York

Analyte		Acetone	Benzene	2-Butanone	Chloroethane	1,2-Dichloroethane	1,2-Dichloroethene (total)	Methylene Chloride	Toluene	Vinyl Chloride	Di-n-butyl phthalate
NYSDEC SGV		50 (G)	1 (S)	NE	5 (S)*	0.6 (S)	5 (S)*	5 (S)*	5 (S)*	2 (S)	50 (S)
U.S. EPA MCL		NE	5	NE	NE	5	70	5	1,000	2	NE
Sample ID	Date	*VOCs*									*SVOC*
SW-1	02/18/99	<10	<1.0	<10	<2.0	<1.0	<1.0	<1.0	<1.0	<2.0	<10
	01/04/00	<10	0.19 J,B	<10	0.85 J	<1.0	<1.0	0.15 J,B	<1.0	0.99 J	<10
	06/08/00	<10	<1.0	<10	<2.0	<1.0	<1.0	<1.0	<1.0	<2.0	<10
	03/15/01	<10	<1.0	<10	0.97 J	0.61J	0.39 J	<1.0	<1.0	0.52 J	<10
	08/28/01	<10	<1.0	<10	<2.0	<1.0	<1.0	<1.0	<1.0	<2.0	<10
	04/23/02	<10	<1.0	0.60 J	<2.0	<1.0	<1.0	1.5 U	1.0 U	<2.0	LA
	09/17/02	<10	<1.0	<10	<2.0	<1.0	<1.0	<1.0	<1.0	<2.0	NA
	04/08/03	<10	<1.0	<10	<2.0	<1.0	<1.0	<1.0	<1.0	<2.0	NA
SW-2	02/18/99	<10	<1.0	<10	<2.0	<1.0	<1.0	<1.0	<1.0	<2.0	<10
	01/04/00	<10	<1.0	<10	<2.0	<1.0	<1.0	<1.0	<1.0	<2.0	<10
	06/08/00	<10	<1.0	<10	<2.0	<1.0	<1.0	<1.0	<1.0	<2.0	<10
	03/15/01	<10	<1.0	<10	<2.0	<1.0	<1.0	<1.0	<1.0	<2.0	<10
SW-2 / Duplicate	08/28/01	<10 / <10	<1.0 / <1.0	<10 / <10	<2.0 / <2.0	<1.0 / <1.0	<1.0 / <1.0	<1.0 / <1.0	<1.0 / <1.0	<2.0 / <2.0	<10
	04/23/02	10 U / 10 U	<1.0 / <1.0	<10 / <10	<2.0 / <2.0	<1.0 / <1.0	<1.0 / <1.0	1.2 U / 1.0 U	<1.0 / <1.0	<2.0 / <2.0	0.77 J / <10
	09/17/02	<10 / <10	<1.0 / <1.0	<10 / <10	<2.0 / <2.0	<1.0 / <1.0	<1.0 / <1.0	<1.0 / <1.0	<1.0 / <1.0	<2.0 / <2.0	NA
	04/08/03	1.3 J / 2.0 J	<1.0 / <1.0	<10 / <10	<2.0 / <2.0	<1.0 / <1.0	<1.0 / <1.0	<1.0 / <1.0	<1.0 / <1.0	<2.0 / <2.0	NA

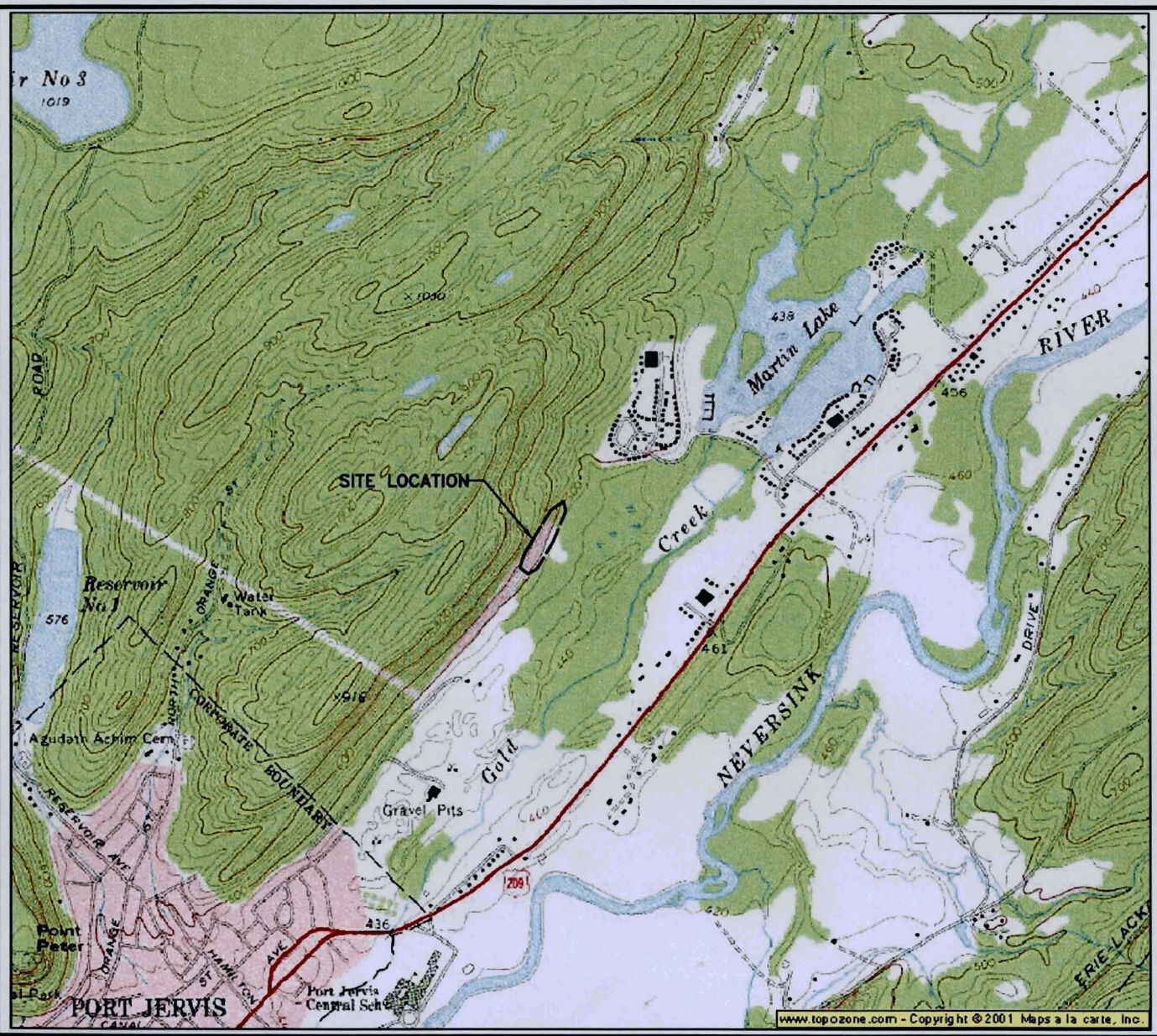
Notes:
TCL = Target Compound List
NYSDEC SGV = New York State Department of Environmental Conservation Standards (S) and Guidance (G) values for groundwater.
* = The principal organic contaminant (POC) standard for groundwater of 5 ug/L applies to this substance.
U.S. EPA MCL = United States Environmental Protection Agency Maximum Contaminant Level for drinking/groundwater.
NE = Not established; no criteria specified.
< = Analyte not detected at reporting limit.
J = Estimated result; result is less than reporting limit.
B = Method blank contamination. The associated method blank contains the target analyte at a reportable level.
U (DATA VALIDATION QUALIFIER) = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
LA = Lab accident; during the concentration process, sample was inadvertently concentrated to dryness due to analyst error. Insufficient sample volume was received to re-extract; sample could not be analyzed.
NA = Not analyzed
Blue = Analyte detected at less than regulatory limit, or analyte detected but no regulatory criteria specified.
Red = Analyte detected at or above SGV or MCL.

Table 7
Detected TCL Volatile and Semivolatile Organic Compounds in Sediment (ug/kg)
April 2003
Carroll and Dubies Superfund Site
Town of Deerpark, Orange County, New York

Analyte		Acetone	Benzene	2-Butanone	Carbon Disulfide	1,2-Dichloro-ethene (total)	Toluene	Vinyl Chloride	bis(2-Ethylhexyl) phthalate	Di-n-butylphthalate	4-Methylphenol
Sample ID	**Date**	***VOCs***							***SVOCs***		
SED 1	09/27/94	58	ND	<20	NR	ND	ND	<20	ND	190 J,B	ND
	02/18/99	<28	<6.9	<28	<6.9	<6.9	<6.9	<14	<450	77 J	<450
	01/04/00	370	<31	82 J	<31	<31	<31	6.9 J	<2,000	<2,000	<2,000
	06/08/00	60 J,B	<13	17 J	<13	<13	<13	<27	590 J	<880	<880
	03/15/01	55 J	<16	<62	<16	<16	<16	<31	<1,000	<1,000	<1,000
	08/28/01	27 J	2.1 J	9.4 J	<12	4.6 J	1.3 J	<24	<790	<790	<790
	04/23/02	1,100 R	<57 R	260 R	<57 R	<57 R	28 JR	<110 R	<3,800 R	<3,800 R	<3,800 R
	09/17/02	180 B,J	2.7 J	58 J	3.5 J	2.1 J	54 J	34 UJ	NA	NA	NA
	04/08/03	110 J	3.4 J	34 J	<21	5.7 J	<21	3.0 J	NA	NA	NA
SED-2	09/27/97	76	ND	<23	NR	ND	ND	<23	ND	220 J,B	ND
	02/18/99	140 J,B	<44	50 J	<44	<44	<44	<88	<2,900	370 J	<2,900
SED-2 / Duplicate	01/04/00	180 J / <190	<55 / <47	<220 / <190	<55 / <47	<55 / <47	<55 / <47	<110 / <94	<3,600 / <3,100	<3,600 / <3,100	<3,600 / <3,100
	06/08/00	150 J / <160	<46 / <41	49 J / <160	<46 / <41	<46 / <41	13 J / <41	<91 / <81	2,900 J / 1,500 J	<3,000 / <2,700	480 J,# / <2,700
	03/15/01	36 UJ / 69 UJ	17 UJ / 17 UJ	70 UJ / 69 UJ	<17 / <17	17 UJ / 17 UJ	17 UJ / 17 UJ	35 UJ / 35 UJ	<1,200 / <1,100	<1,200 / <1,100	<1,200 / <1,100
	08/28/01	44 J / 22 J	<16 / <13	14 J / 7.6 J	<16 / <13	<16 / <13	<16 / <13	<32 / <25	<1,100 / <830	<1,100 / <830	<1,100 / <830
	04/23/02	63 J / 85 UJ	30 UJ / 21 UJ	21 J / 85 UJ	30 UJ / 21 UJ	30 UJ / 21 UJ	30 UJ / 21 UJ	59 UJ / 42 UJ	2,000 UJ / 1,400 UJ	2,000 UJ / 1,400 UJ	2,000 UJ / 1,400 UJ
	09/17/02	40 B / 29 J,B	<9.6 / <9.3	17 J / 9.3 J	<9.6 / <9.3	<9.6 / <9.3	1.0 J / 0.91 J	<19 / <19	NA	NA	NA
	04/08/03	79 J / 27 J	<41 / <44	21 J / <180	<41 / <44	<41 / <44	<41 / <44	<83 / <88	NA	NA	NA

Notes:
TCL = Target Compound List
ND = Not detected at reporting limit prior to 06/08/00.
< = Not detected at the method detection limit.
NR = Analyte not reported
J = Estimated result; result is less than method reporting limit
B = Method blank contamination. The associated method blank contains the analyte at a reportable level.
R (DATA VALIDATION QUALIFIER) = The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte cannot be verified.
NA = Not analyzed
# = This value represents a probable combination of 3-methylphenol (m-cresol) and 6-methylphenol (p-cresol).
UJ (DATA VALIDATION QUALIFIER) = Analyte not detected above the reporting limit; however, the reporting limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Figures



N

0 500 1000 1500 2000

SCALE

LEGEND:

APPROXIMATE SITE BOUNDARY

SOURCE: USGS TOPOGRAPHIC QUADRANGLE MAP
PORT JERVIS NORTH QUADRANGLE – 1991

SHIELD
ENVIRONMENTAL ASSOCIATES, INC.
MONROEVILLE, PENNSYLVANIA

CARROLL AND DUBIES SUPERFUND SITE
TOWN OF DEERPARK, ORANGE COUNTY, NEW YORK

698-0110

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
1							
0							

FIGURE 1
SITE LOCATION MAP
APRIL 2003

CADD FILE	80110-22	CURRENT DATE:	06/02/03
DRAWING NO.	FIGURE 1	REVISION	

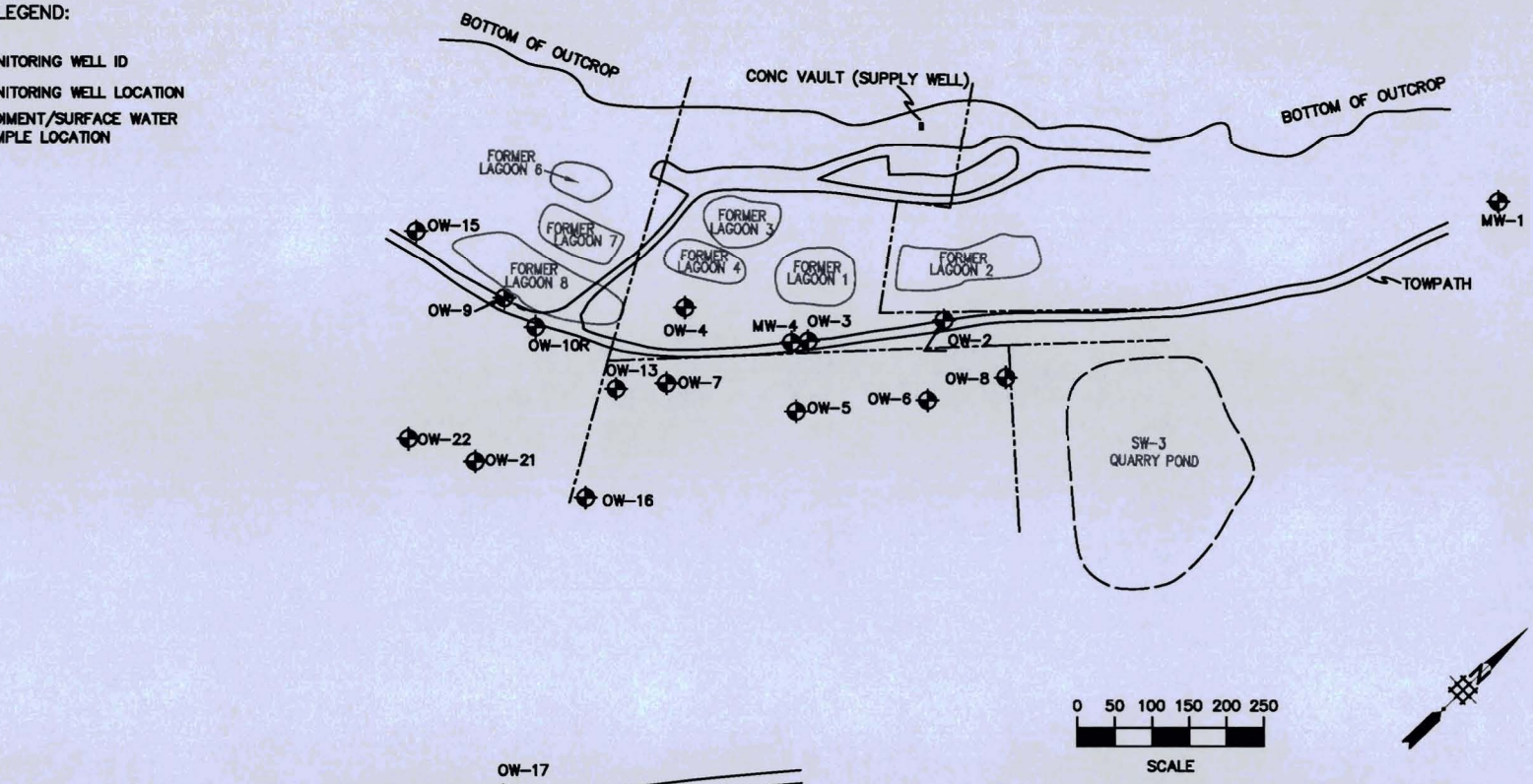
P:\Shield Projects (Non-UST)\698-0110 Carroll & Dubies\Drawings\April_03\060203_site location map.dwg, 7/25/2003 11:01:25 AM, BruceG

LEGEND:

OW-15 MONITORING WELL ID

MONITORING WELL LOCATION

SEDIMENT/SURFACE WATER SAMPLE LOCATION



SED-1/SW-1

SED-2/SW-2

INFORMATION OF FACT

1. THE MONITORING/RECOVERY WELLS AND LIMITED SITE LOCATION OF PHYSICAL FEATURES SHOWN HEREON ARE BASED ON A FIELD SURVEY MADE FOR PROPER ORIENTATION WITH A FULL SITE PLAN BEING PREPARED BY SHIELD ENVIRONMENTAL ASSOC., INC.
2. THE HORIZONTAL POSITION OF THE HEREIN SURVEYED "CARROLL AND DUBIES" SUPERFUND SITE IS BASED ON NEW YORK GEODETIC CONTROL MONUMENTS PID # LY2611 (LAUREL) AND PID # AB3870 (DIANNE).

ADJUSTED TO NAD 1983 WITHIN THE NEW YORK STATE PLANE COORDINATE SYSTEM

NOTE: THE OUTLINES OF THE FORMER LAGOONS ARE APPROXIMATE BASED ON THE ACTUAL EXCAVATION.

SOURCE: MASER CONSULTING P.A., MONITORING WELL LOCATION PLAN. INDEX N). SU00Q9, MARCH 3, 1999.

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
MONROEVILLE, PENNSYLVANIA

CARROLL AND DUBIES SUPERFUND SITE
TOWN OF DEERPARK, ORANGE COUNTY, NEW YORK
698-0110

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
1							
0							

FIGURE 2
SITE PLAN/MONITORING WELL LOCATIONS
APRIL 2003

CADD FILE	80110-22	CURRENT DATE:	06/02/03
DRAWING NO.	FIGURE 2	REVISION	

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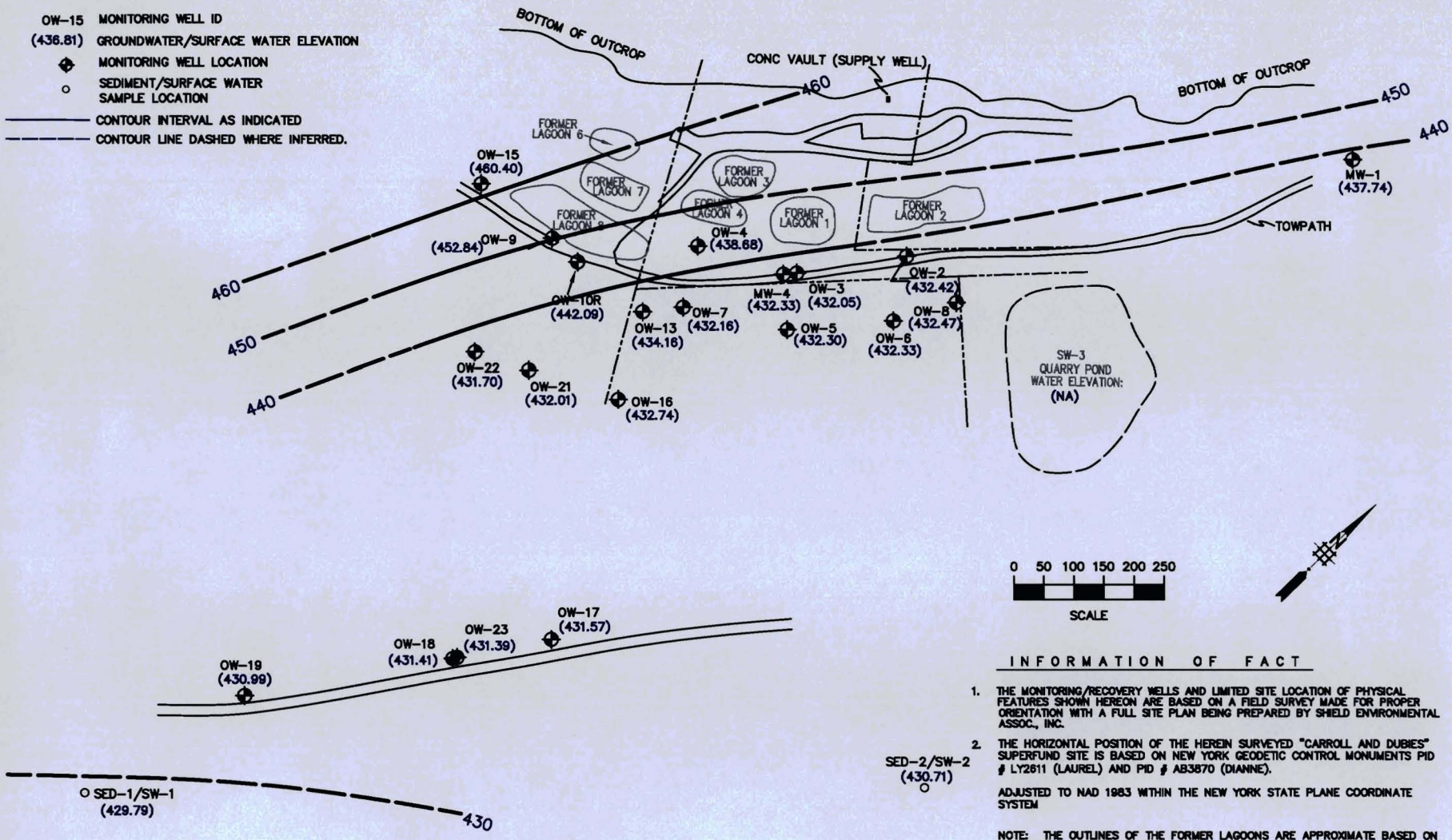


INFORMATION OF FACT

1. THE MONITORING/RECOVERY WELLS AND LIMITED SITE LOCATION OF PHYSICAL FEATURES SHOWN HEREON ARE BASED ON A FIELD SURVEY MADE FOR PROPER ORIENTATION WITH A FULL SITE PLAN BEING PREPARED BY SHIELD ENVIRONMENTAL ASSOC., INC.
2. THE HORIZONTAL POSITION OF THE HEREIN SURVEYED "CARROLL AND DUBIES" SUPERFUND SITE IS BASED ON NEW YORK GEODETIC CONTROL MONUMENTS PID # LY2611 (LAUREL) AND PID # AB3870 (DIANNE).

ADJUSTED TO NAD 1983 WITHIN THE NEW YORK STATE PLANE COORDINATE SYSTEM

NOTE: THE OUTLINES OF THE FORMER LAGOONS ARE APPROXIMATE BASED ON THE ACTUAL EXCAVATION.

SOURCE: MASER CONSULTING P.A., MONITORING WELL LOCATION PLAN. INDEX N). SU000Q9, MARCH 3, 1999.

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
MONROEVILLE, PENNSYLVANIA

CARROLL AND DUBIES SUPERFUND SITE
TOWN OF DEERPARK, ORANGE COUNTY, NEW YORK

698-0110

FIGURE 3
GROUNDWATER CONTOUR MAP
APRIL 2003

NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
1							
0							

CADD FILE	80110-22	CURRENT DATE:	06/02/03
DRAWING NO.	FIGURE 3	REVISION	

P:\Shield Projects (Non-UST)\698-0110 Carroll & Dubies\Drawings\April_03\060203_gw contours.dwg, 7/25/2003 11:00:31 AM, BruceG

LEGEND:

OW-15 MONITORING WELL ID

MONITORING WELL LOCATION

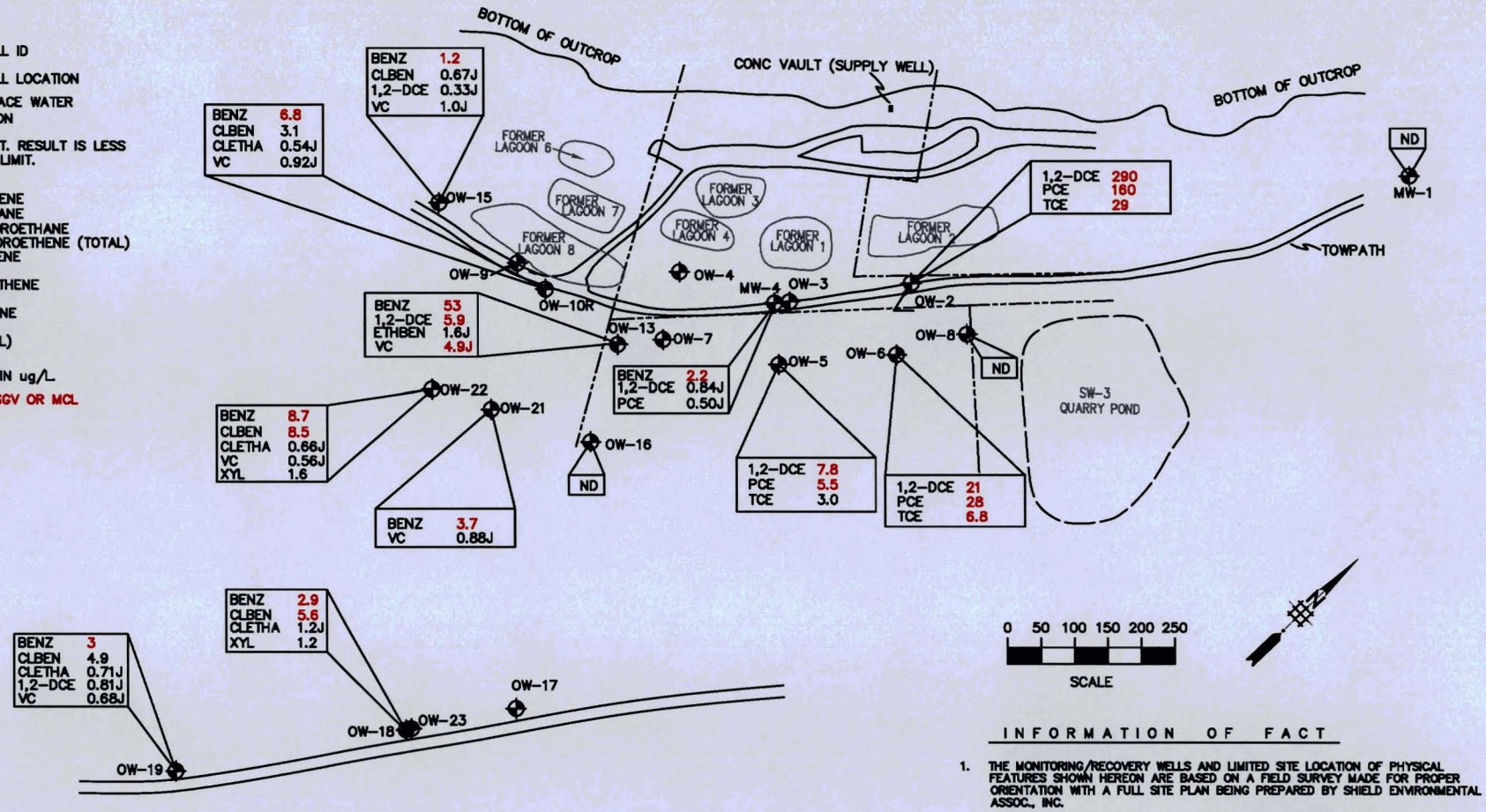
SEDIMENT/SURFACE WATER SAMPLE LOCATION

J – ESTIMATED RESULT. RESULT IS LESS THAN REPORTING LIMIT.

BENZ – BENZENE
CLBEN – CHLOROBENZENE
CLETHA – CHLOROETHANE
1,1-DCA – 1,1-DICHLOROETHANE
1,2-DCE – 1,2-DICHLOROETHENE (TOTAL)
ETHBEN – ETHYLBENZENE
MBK – 2-HEXANONE
PCE – TETRACHLOROETHENE
TOL – TOLUENE
TCE – TRICHLOROETHENE
VC – VINYL CHLORIDE
XYL – XYLENES (TOTAL)
ND– NO DETECTIONS

ALL CONCENTRATIONS IN ug/L.

RED VALUES EXCEED SGV OR MCL



INFORMATION OF FACT

1. THE MONITORING/RECOVERY WELLS AND LIMITED SITE LOCATION OF PHYSICAL FEATURES SHOWN HEREON ARE BASED ON A FIELD SURVEY MADE FOR PROPER ORIENTATION WITH A FULL SITE PLAN BEING PREPARED BY SHIELD ENVIRONMENTAL ASSOC., INC.
2. THE HORIZONTAL POSITION OF THE HEREIN SURVEYED "CARROLL AND DUBIES" SUPERFUND SITE IS BASED ON NEW YORK GEODETIC CONTROL MONUMENTS PID # LY2611 (LAUREL) AND PID # AB3870 (DIANNE).

ADJUSTED TO NAD 1983 WITHIN THE NEW YORK STATE PLANE COORDINATE SYSTEM

NOTE: THE OUTLINES OF THE FORMER LAGOONS ARE APPROXIMATE BASED ON THE ACTUAL EXCAVATION.

SOURCE: MASER CONSULTING P.A., MONITORING WELL LOCATION PLAN. INDEX N). SU00Q9, MARCH 3, 1999.

SHIELD ENVIRONMENTAL ASSOCIATES, INC.
MONROEVILLE, PENNSYLVANIA

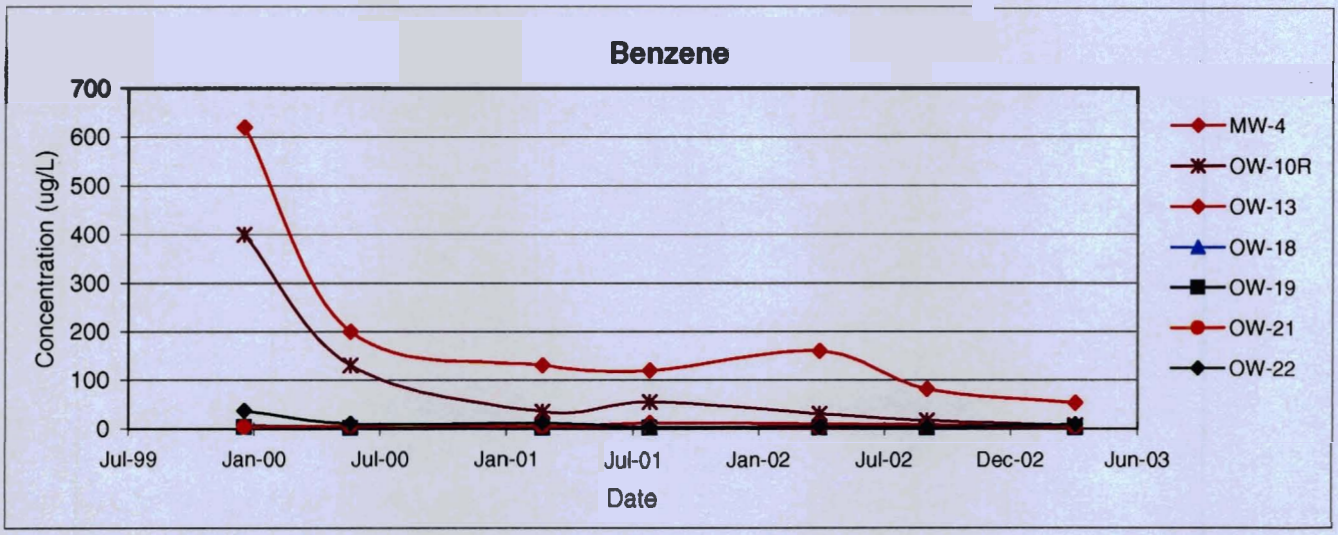
CARROLL AND DUBIES SUPERFUND SITE
TOWN OF DEERPARK, ORANGE COUNTY, NEW YORK
698-0110

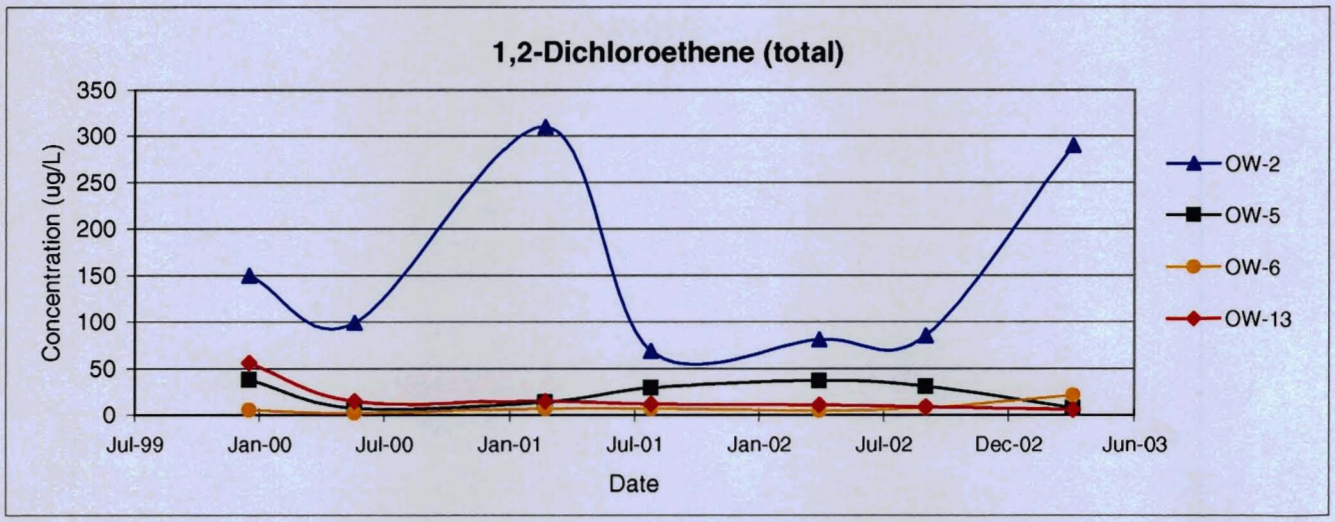
NO	DRWN	DATE	REVISION	CHKD	DATE	APPVD	DATE
1							
0							

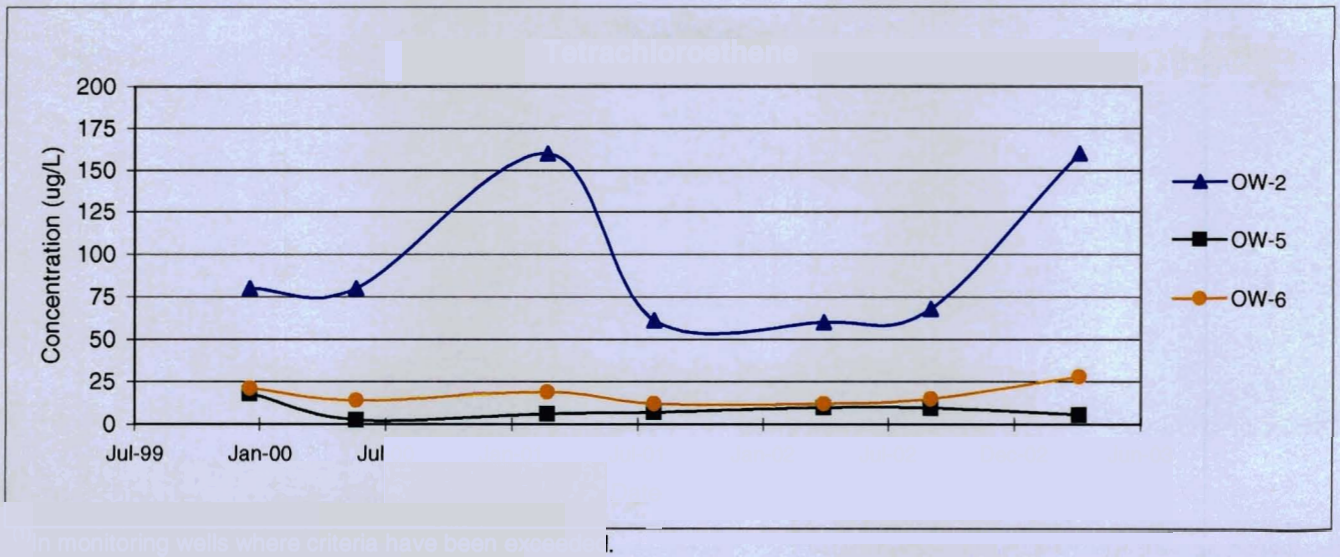
FIGURE 4
DETECTED VOLATILE ORGANIC COMPOUNDS IN GROUNDWATER APRIL 2003

CADD FILE	80110-22	CURRENT DATE:	06/02/03
DRAWING NO.	FIGURE 4	REVISION	

Figure 5
Concentration Trends for Principal VOCs in Groundwater[(1)]
Carroll and Dubies Superfund Site
Town of Deerpark, Orange County, New York







(1) In monitoring wells where criteria have been exceeded.

Figure 6
Relationship Between Groundwater Elevations and 1,2-Dichloroethene Concentrations in OW-2

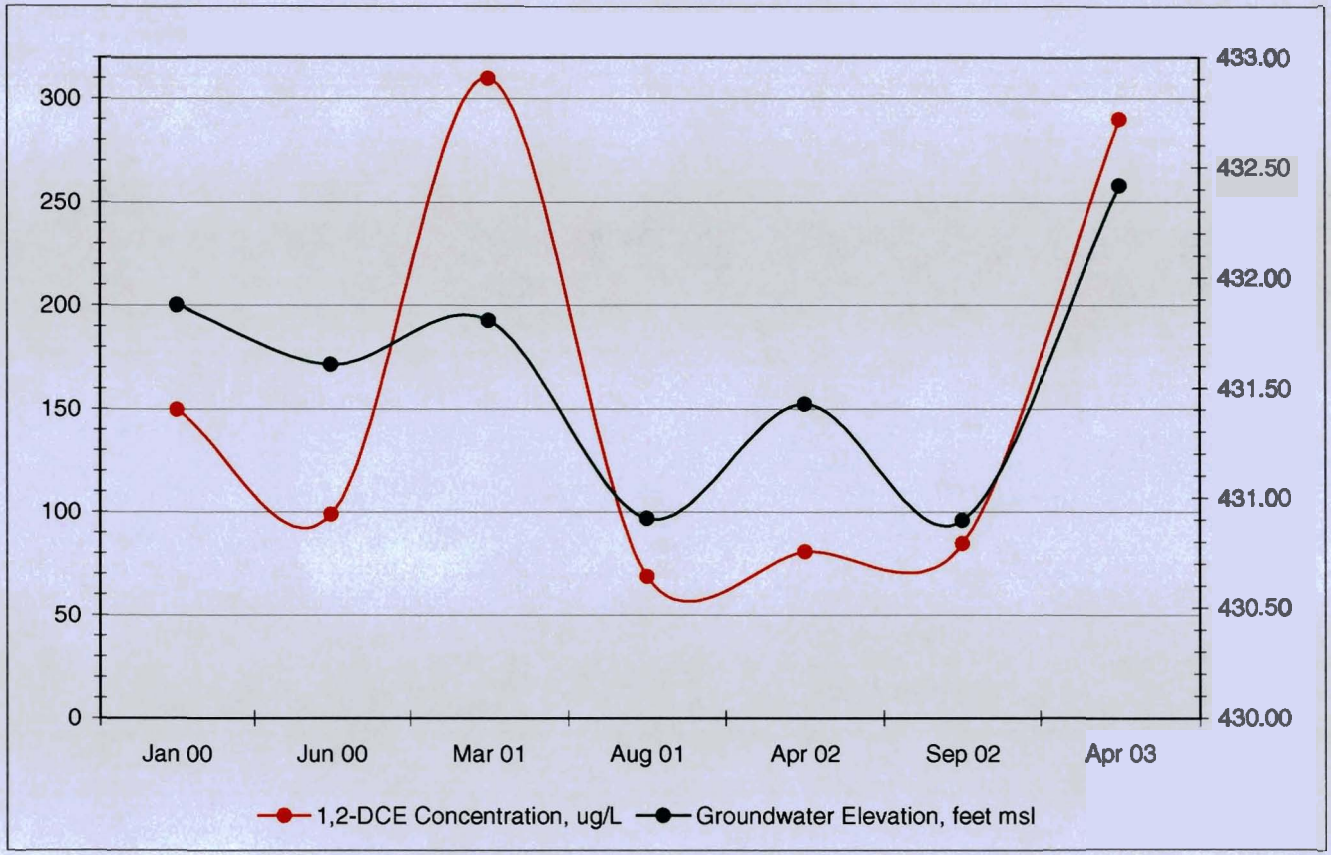


Figure 7
Hydrographs for Representative Monitoring Wells

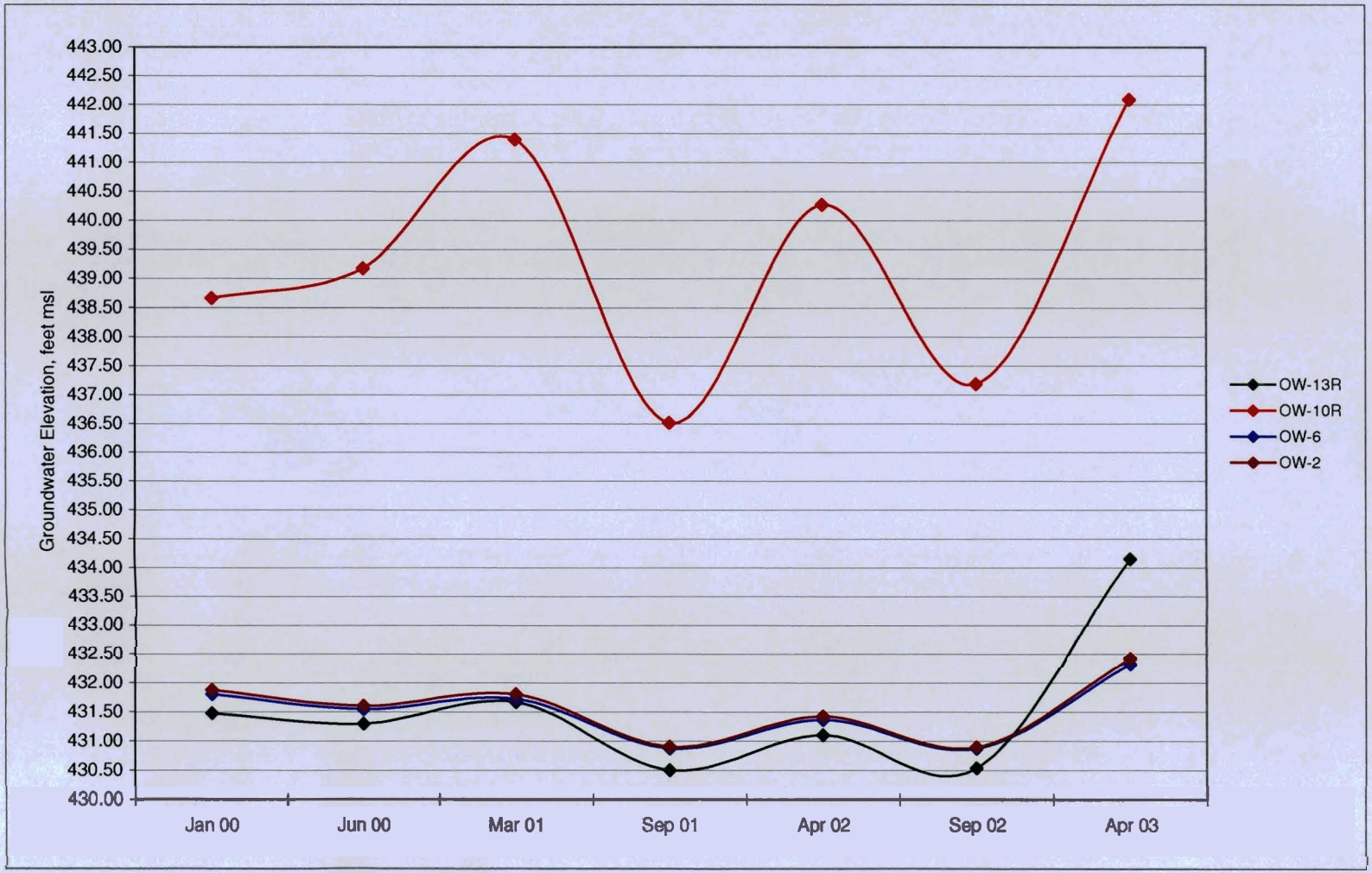


Figure 8
Concentration Trends Across Plume for Benzene in Groundwater
Carroll and Dubies Superfund Site
Town of Deerpark, Orange County, New York

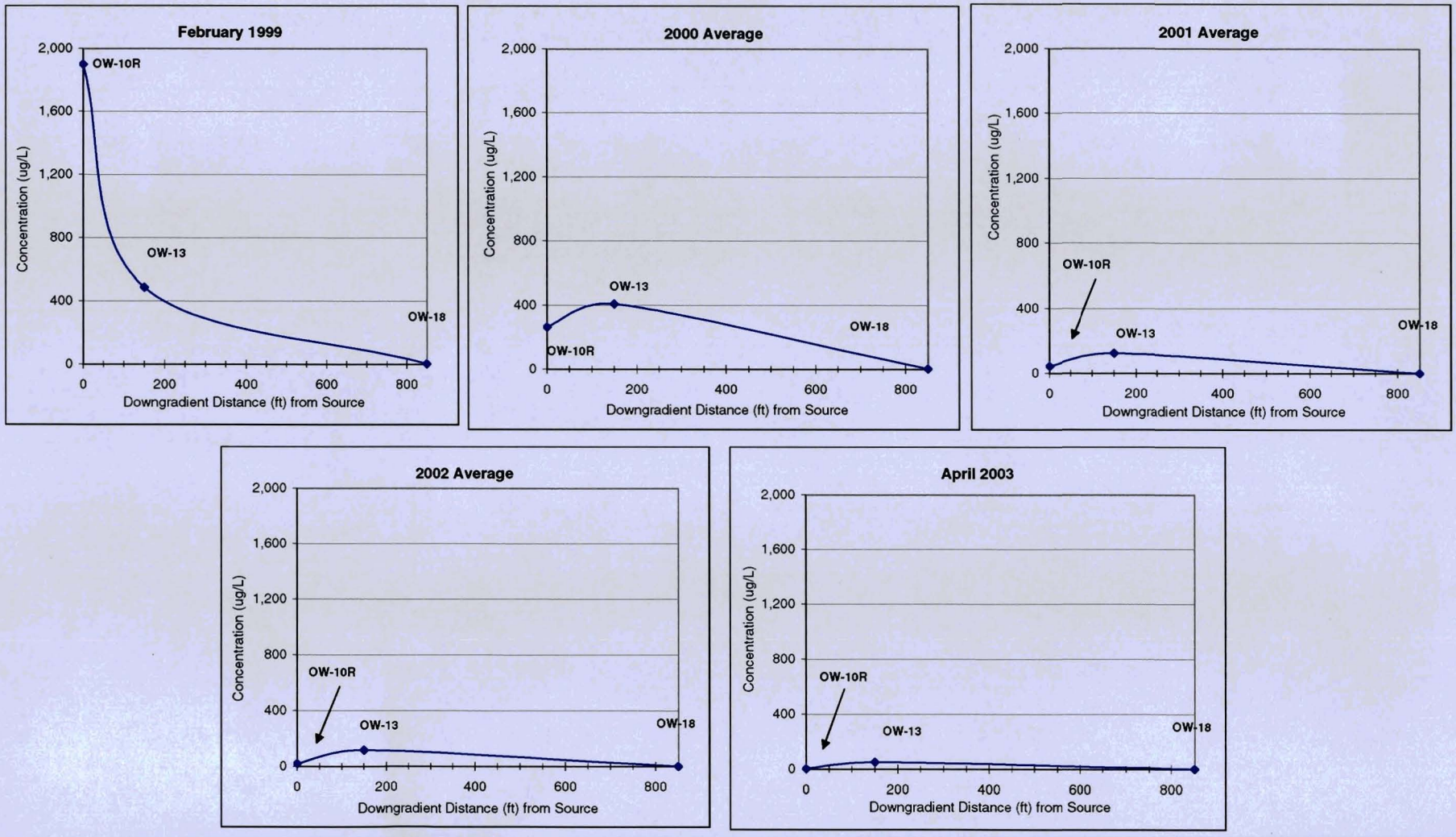


Figure 9
Concentration Trends Across Plume for 1,2-DCE (total) in Groundwater
Carroll and Dubies Superfund Site
Town of Deerpark, Orange County, New York

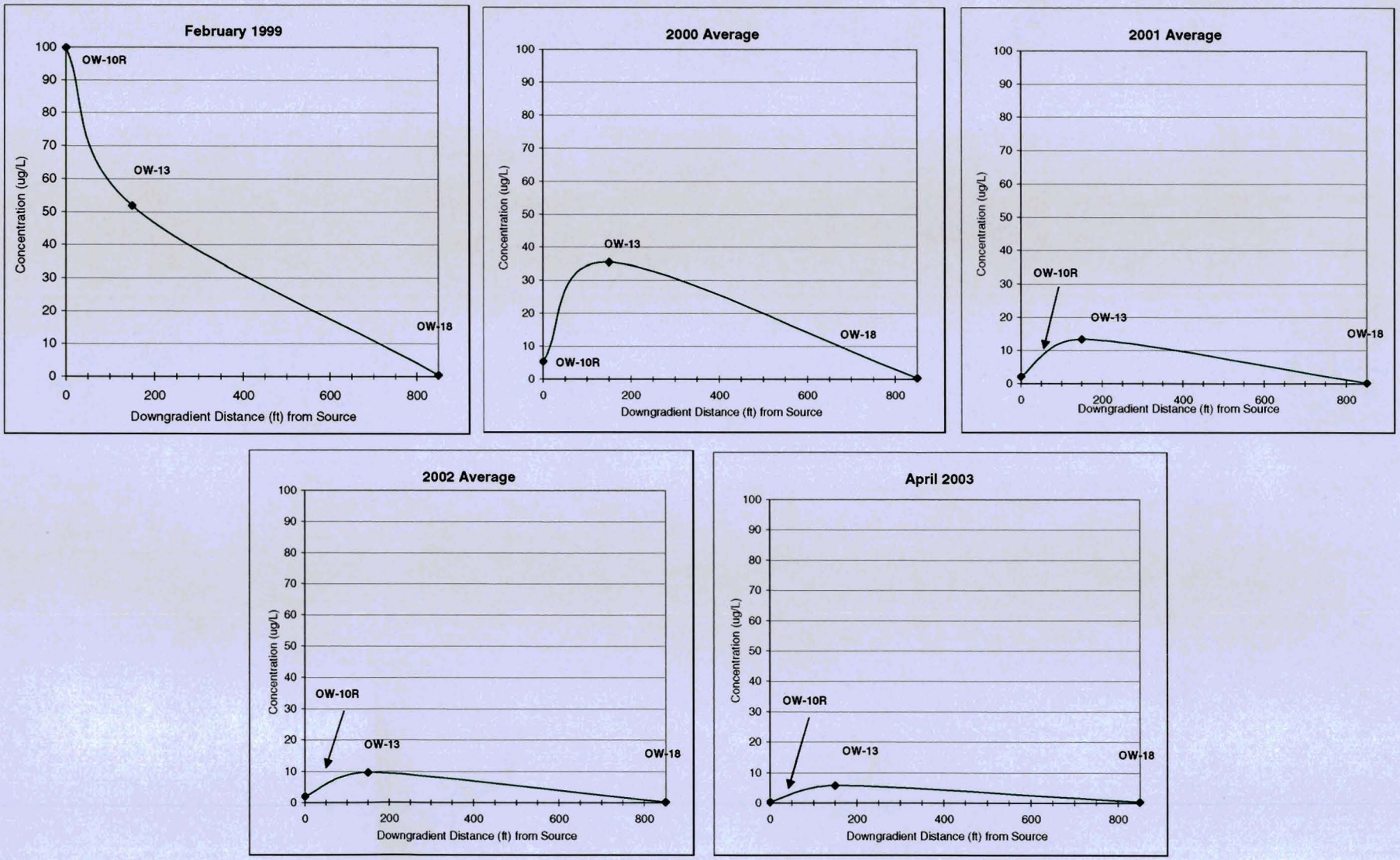


Figure 10
Benzene Concentration in Groundwater Over Duration of the Monitoring Period
Carroll and Dubies Superfund Site
Town of Deerpark, Orange County, New York

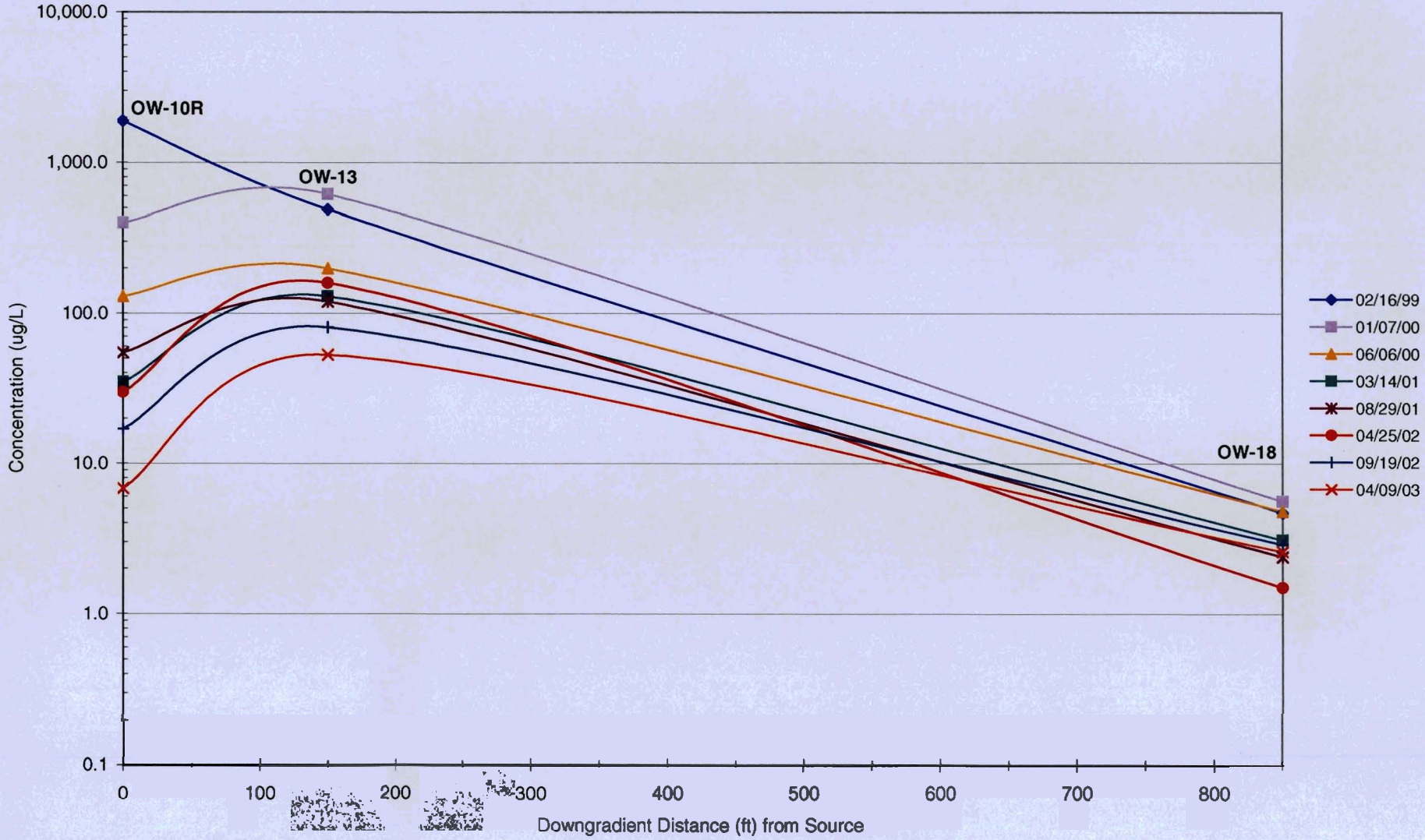


Figure 11
1,2-DCE (total) Concentration in Groundwater Over Duration of the Monitoring Period
Carroll and Dubies Superfund Site
Town of Deerpark, Orange County, New York