REMEDIAL ASSESSMENT REPORT
XEROX CORPORATION
BLAUVELT, NEW YORK
(NYSDEC SITE NUMBER 3-44-021)

by

Haley & Aldrich of New York
Rochester, New York

for

Xerox Corporation
Webster, New York

File No. 70302-111
February 2003

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Xerox Corporation
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Attention: Mr. Eliott N. Duffney

Subject: **Remedial Assessment Report**
Blauvelt, New York Facility
NYSDEC Site No. 3-44-021

Gentlemen:

This report presents the findings of a Remedial Assessment performed for Xerox Corporation's Blauvelt, New York Site (NYSDEC Site Number 3-44-021). We have structured our assessment similar to a five-year policy review utilized by NYSDEC to evaluate the installed remedy with respect to achieving site clean up objectives. This approach is similar to what was presented in a 19 October 2001 project review meeting with NYSDEC and provides a basis for the goals of the Remedial Assessment Report as listed below:

- Summarize the remediation performed to date,
- Review the current status of the remedial program,
- Identify the proposed risk assessment process,
- Present a strategy to modify the remedial program based on the results and findings

The media contaminated at the Blauvelt site includes on-site soils, on-site groundwater, and off-site groundwater. On-site soils, which acted as a continuing source of contamination to groundwater, have been the primary focus of remedial efforts. This assessment focuses on determining the need for further reduction of contaminant levels relative to the residual risks associated with soil and groundwater at the site, and in the off-site area.

PROJECT OVERVIEW

Environmental investigations began at this site in 1980 subsequent to the removal of two underground solvent storage tanks. These investigations determined that groundwater at the site was impacted by chlorinated solvents previously stored in these tanks and resulted in the development of additional programs to evaluate the subsurface conditions. A Remedial Investigation (RI) and Feasibility Study (FS) were subsequently completed through Consent Orders with NYSDEC to define the extent of the contamination and to identify the best alternative to mitigate the impacts to the affected media at the site.

Based on the results of the RI/FS, a Record of Decision (ROD) was issued in March 1993 selecting 2-PHASE Extraction for contaminants in soil and groundwater in the source area.

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Conventional pumping systems were also employed north of the source area for migration control. A significant volume of contaminant mass has been removed from the site (over 50,000 pounds of VOCs), and as a result groundwater concentrations of VOCs have been substantially reduced.

However, the current remedial program has reached its practical and technically feasible limits for attaining further site environmental improvement, as evidenced by asymptotic mass removal conditions and subsequent limited improvement to groundwater quality over the past 2+ years. Life to date remedial program spending is approaching $10 M. Given the limited improvements in site conditions over the last few years, a review of the remedial program strategy and current site conditions versus risk assessment based criteria was deemed to be appropriate at this time.

SITE DESCRIPTION

The Xerox Blauvelt site is located on Bradley Hill Road near the intersection of Route 303 in Blauvelt, Rockland County, New York. The Xerox facility (now Advanced Distribution Systems) is located between the west side of Route 303 and an active CSX freight rail line. A small, unnamed tributary that discharges into the Hackensack River runs along the western perimeter of the Xerox facility to the north into a light industrial park. The site is located in a valley that slopes downward to the north.

Beginning in 1970, operations at the site included the refurbishing of electrostatic copiers and copier parts using a variety of chlorinated solvent blends. Two underground storage tanks located at the north end of the property stored both virgin and spent solvents used in the refurbishing process. In addition to the underground storage tanks, other areas investigated included former paint booths, a former solvent storage room, and the CRC area. Operations that resulted in the contamination at the site are no longer present.

As documented in the Record of Decision, the overall "Site" can be thought of as consisting of "on-site" and "off-site" components. The on-site refers to the property leased by Xerox and the off-site refers to other properties influenced by the migration of groundwater from the facility primarily north of Bradley Hill Road.

NATURE AND EXTENT OF CONTAMINATION

As determined during the RI process, the media contaminated at the Blauvelt site include on-site soils, on-site groundwater, and off-site groundwater. The site compounds of concern primarily include tetrachloroethene, 1,1,1-trichloroethane, trichloroethene, 1,1-dichloroethene, and 1,2-dichloroethene. With respect to soils, some areas remain with elevated chlorinated solvents and mineral spirits as indicated by the confirmation soil-sampling event completed in 2000.

The investigative programs completed at the site identified three distinct water-bearing zones: overburden soils, shallow bedrock, and deep bedrock. While the three zones are distinct, they are hydraulically connected except for areas of low permeability lenses. Groundwater in the overburden, shallow bedrock, and deep bedrock zones all flow generally in a north-northwest direction under moderate to low flow gradients. Groundwater is typically located 10 to 20 feet below ground surface.

The highest concentrations of VOCs in groundwater are found on-site in the area of the former underground storage tanks (Figure 2C). Investigations performed in the early 1980s also observed non-aqueous phase liquids (NAPLs) up to two feet thick in some monitoring wells. The concentrations of VOCs in the off-site groundwater decline rapidly north of Bradley Hill Road (Figure 2B).

The majority of the contaminated soils are limited to two distinct areas: one located in a small area beneath the building associated with former plant activities and a second, larger area coinciding with the former location of the underground storage tanks at the site.

DESCRIPTION OF REMEDIATION SYSTEM AND UPGRADES

As an Interim Remedial Measure, Xerox implemented edge of property groundwater recovery with a series of wells in October 1989. These ten conventional pumping wells were located just south of Bradley Hill Road and are operated to prevent further migration of contaminated groundwater to the north, Figure 2. During this period, Xerox also tested in-situ vacuum extraction in the source area that allowed for the simultaneous recovery of both groundwater and soil vapor from a single extraction well. The knowledge gained from these and other evaluations eventually led to the development of the patented 2-PHASE Extraction technology and its subsequent full-scale implementation at the Blauvelt site.

The installed remedial system consists of two 2-PHASE Extraction systems that operate in parallel, associated vapor carbon treatment system, eight conventional pumping wells, and an on-site groundwater treatment system. Approximately thirty-five 2-PHASE Extraction wells were installed and operated throughout the operational timeframe of the system (Figure 2C). The groundwater treatment system uses an air stripper to achieve desired contaminant removal prior to discharge to a nearby stream. Off-site interim remedial measures consisting of two edge of plume migration control recovery wells and one intermediate plume recovery well were also engaged in 1993 as part of this remedial program, for a total of eleven conventional pumping wells (Figure 2B). Xerox subsequently received approval from NYSDEC to cease operation of the edge of plume migration control wells in 2001. The most recent remedial system configuration continues to involve the operation of four conventional pumping wells (three edge of property wells and R-3) and rotating operation of approximately twelve of the thirty-five total 2-PHASE wells present.

As shown on Figure 4, the remediation systems have removed more than 50,000 pounds of contaminants from source area soil and groundwater since full-scale system implementation. Since that time, Xerox implemented numerous system upgrades designed to increase the zone of remediation and mass removal rates. These system upgrades included:

- Expansion of the 2-PHASE extraction network and installed a low permeability surface membrane in the source area (1993);
- Installation of a remote data acquisition system for the groundwater treatment plant (1994);
- Installation of two additional source area 2-PHASE Extraction wells (1994);
- Installation of sixteen piezometers to be used as additional 2-PHASE Extraction wells (1995);

- Installation of five 8-in. diameter bedrock-pumping in the source area to dewater the overburden soils and increase the effectiveness of the source area 2-PHASE Extraction wells (1995);

- Upgrades to the groundwater treatment plant which eliminated the need for GAC, increased process flows to 150 GPM, and added a second air stripper (1996 –97)

REBOUND TESTING RESULTS

Two rebound tests have been performed at the Blauvelt site since system start-up in June 1993. The initial rebound test showed continued impacts to groundwater and resulted in the well expansion program listed above in 1995. A more substantial rebound test was performed when low mass removal rates approaching asymptotic conditions warranted a six-month shutdown from April to October 2000 to assess the progress of source area remediation and to assess post-shutdown groundwater concentrations. The key findings of the rebound study were provided to NYSDEC in Quarterly Report #28 and are summarized below for your information:

- VOC concentrations in soil and groundwater have been significantly reduced in the primary source area.

- Residual VOC mass in soil is an on-going source of contamination to groundwater.

- Soil and groundwater concentrations have reached an asymptotic condition, and a further significant reduction in concentrations will not occur. Continued extraction is unlikely to result in the attainment of background levels prescribed in the ROD for the Blauvelt site.

- Wells W-1 PW-2, and MW-13 located immediately downgradient of the former solvent storage tank area exhibited the most rebound in concentrations during the six-month system shutdown and monitoring period.

- Observed VOC concentrations in off-site groundwater monitoring wells did not increase during or after the 2000 shutdown period.

UPDATED SOIL INVESTIGATIONS

Soil sampling was conducted at 36 locations during system shutdown in June 2000 to measure current soil conditions in the source area. The results from this program which were submitted to NYSDEC with previous site updates, are provided in Appendix C for your information.

OBSERVED IMPROVEMENTS IN GROUNDWATER QUALITY

On average, VOC concentrations in groundwater have been reduced by over 90%, and the lateral extent of groundwater contamination has been substantially reduced from the maximum observed extent. Time series graphs for selected on-site monitoring wells have been included to demonstrate the level of improvement attained with the installed remedy. Pictorial representations of the areal extent of total VOCs in groundwater contamination in 1992, 1996, and 2001 are included in Figure 3. Individual isopleths for the primary constituents of concern are provided in Figures 3a through 3l for your information.

The 2001 map shown in Figure 3 shows an area where VOC concentrations in groundwater are above 100 ppb. During the rebound-testing period, some wells did exhibit concentrations of VOCs that exceeded 100 ppb and in some cases were as high as 43,000 ppb. However, upon restart of the 2-PHASE Extraction system a corresponding increase in mass removal was not realized and continues to be marginal. This indicates that although isolated pockets of elevated VOCs remain in soils north of the former UST locations, they do not represent significant recoverable solvent mass.

MONITORED NATURAL ATTENUATION

Monitored natural attenuation (MNA) is a remedial approach that relies on natural processes to reduce contaminant concentrations to acceptable levels. Natural attenuation includes a variety of physical, biological and chemical processes. These processes which work to reduce the mass, toxicity, mobility and concentration of contaminants in the soil or water, include the following:

- Biodegradation
- Chemical Stabilization
- Dispersion
- Sorption
- Volatilization
- Dilution

The majority of the contaminants present in the subsurface at the Blauvelt facility are chlorinated solvents, with a lesser amount of mineral spirits. The contaminants present at the highest concentrations are tetrachloroethene (PCE), trichloroethene (TCE) and 1,1,1-trichloroethane (1,1,1-TCA) and their associated breakdown products (including cis-1,2-dichloroethene (cis-1,2-DCE), vinyl chloride, 1,1-dichloroethane (1,1-DCA), and chloroethane.

The chlorinated solvents present degrade most readily via reductive dechlorination, a step-wise process that involves successive replacement of chlorine atoms with hydrogen atoms. This process is most effective under oxygen-poor conditions as it represents an anaerobic pathway. A simplified representation of the reductive dechlorination pathway for PCE is as follows:

PCE ➔ TCE ➔ cis-1,2-DCE ➔ Vinyl Chloride➔ Ethene

A similar breakdown pathway exists for 1,1,1-TCA which involves production of 1,1,-DCA, chloroethane, and ethane, respectively.

Note that operation of extractive remedial approaches such as the 2-PHASE system tend to oxygenate the subsurface, thereby inhibiting the anaerobic biodegradation of the chlorinated solvents present. In addition, the persistence of vinyl chloride in groundwater can be limited by the operation of the 2-PHASE system as this compound is quite volatile and is readily removed from the subsurface during extraction. This is the probable reason why historic vinyl chloride concentrations are somewhat depressed compared with the concentrations of other biodegradation breakdown products.

In 2002, operational issues with the groundwater treatment plant necessitated a 2.5 month-long shut-down of the 2-PHASE system. During this time period, a round of MNA parameters was obtained (June 2002) to gather data that would be more indicative of non-extraction steady-state conditions. Data collected during this event have been evaluated in conjunction with historical groundwater data to develop a preliminary conceptual model of the MNA processes occurring at the site. Summaries of these data can be found in Table 6 and Figure 5. Review of these data, in conjunction with historical data, indicates that natural attenuation of contaminants is occurring at the Blauvelt site. The main lines of this evidence are:

- Substantial decreases in contaminant concentrations. Both temporal decreases (historic, over time) and spatial decreases (as one moves downgradient in the plume away from the source area) have been observed.

- Presence of biodegradation breakdown products such as cis-1,2-DCE, vinyl chloride, and 1,1-dichloroethane.

- Presence of conditions conducive to biodegradation of site contaminants (ranging from reducing to mildly reducing conditions) which should be enhanced now that the 2-PHASE system has been shut-down. These conditions are indicated by depressed dissolved oxygen and oxidation-reduction potential (ORP) readings.

Appendix D contains time series plots for several site wells, depicting both source area (onsite) and downgradient (offsite) plume conditions. The plots depict historic data for a subset of wells which were chosen based on the following factors: presence of historical data, location in plume (representative of source area, mid-plume, and downgradient conditions), and presence of daughter products such as vinyl chloride. Two plots were prepared for each of the wells, one for the chlorinated ethene biodegradation series and the other for the chlorinated ethane biodegradation series. The plots depict the above-mentioned reductions in groundwater concentrations over time and downgradient of the source area and the presence of biodegradation breakdown products.

The results of the 2002 MNA data set, when reviewed in conjunction with the historic decreases in lateral extent and concentrations of site contaminants, as well as the historic production of biodegradation breakdown products indicate that MNA processes are active at the Blauvelt site and should be integrated into the long-term site remedy.

Because the majority of useful information for evaluating MNA processes at the Blauvelt site came from evaluation of the concentrations of the various VOCs (parent and biodegradation products) and the dissolved oxygen/ORP measurements, collection of this data is recommended to continue. In addition, collection of dissolved (ferrous) iron, carbon dioxide, and alkalinity measurements will be obtained at the wellhead using Hach colorimetric kits. Collection of additional laboratory MNA geochemical parameters do not appear to be warranted and was not included in the proposed program.

SAMPLING & ANALYTICAL PLAN

A proposed revised sampling and analysis plan for the Blauvelt site is included as Table 7. This program consists of wells in the overburden, shallow bedrock, and deep bedrock zones across the on-site and off-site portions of the plume. This includes wells located upgradient, within the source area, and in near and far downgradient areas. The sampling frequency from quarterly to semi-annual has been proposed given the extensive groundwater database for this site (>10 years) and stable nature of the plume as demonstrated during previous rebound test events. The sampling and analysis plan does include the collection of MNA parameters such as ORP, dissolved iron, carbon dioxide, and alkalinity as appropriate.

PROPOSED RISK ASSESSMENT PROCESS

It is recommended that Xerox conduct an assessment of risks to human health resulting from the remaining residual levels of contamination at the Xerox Blauvelt site. This risk assessment would update the baseline risk assessment that was performed during the RI/FS process in and would assist Xerox with evaluating the need of additional corrective measures.
It is recommended that the risk assessment be performed in accordance with USEPA guidance, "USEPA Risk Assessment Guidance Series (RAGS), Human Health Evaluation Manual, Part B", published in 1994, following the following five-step process:

- **Hazard Identification** – identification of the Compounds of Concern (COCs) and identification of media affected by the COCs. Recent groundwater and soil analytical data will be utilized to perform this identification.
- **Dose Response Assessment** – evaluates the potential non-carcinogenic and carcinogenic effects of the identified COCs based on inhalation, ingestion, or dermal application of a specific dose of COC.
- **Exposure Assessment** – identifies potential receptors and estimates the frequency and duration of exposure based on both current and reasonably foreseeable future facility activities and uses.
- **Risk Characterization** - integrates the results of the hazard identification, dose response assessment and exposure assessment to quantify the potential risk to human health posed by potential exposures to the COCs. Compares the non-carcinogenic risk (hazard index) to the EPA Acceptable Total Site Risk Limit of 1.0. Compares the carcinogenic risk (Excess Lifetime Cancer Risk—ELCR) with the EPA Total Site Acceptable ELCR of 1 in 1,000,000 (1E-06).
- **Determination of Risk Based PRGs** – establishes threshold concentrations for each identified COC where unacceptable risks of potential adverse health effects may exist.

As stated above, it is recommended that Preliminary Remediation Goals (PRGs) be calculated for the site. As defined by the USEPA RAGS document, PRGs are:

- "Initial clean-up goals that (1) are protective of human health and the environment and (2) comply with applicable relevant and appropriate requirements (ARARs). They are based on readily available information; are modified to reflect the findings of the baseline risk assessment, and are used during the analysis of remedial alternatives."

Comparison of the PRGs to remaining residual concentrations will allow for identification of specific areas of the site where additional remedial measures may provide the maximum benefit.

CONCLUSIONS

The current remedy implemented at the Blauvelt site has removed over 50,000 pounds of contaminant mass from the subsurface, resulting in the elimination of the former free product layer on the water table in the former UST area, and achieving a substantial reduction in the magnitude and extent of the concentration of VOCs in groundwater. Based on our assessment, it is apparent that the continued operation of the 2-PHASE Extraction System will not provide any further significant remedial benefit. The asymptotically low mass removal rates observed since 4th Quarter 1999 have yielded only marginal improvements to the site groundwater quality despite Xerox's efforts to maximize contaminant recovery.

We understand that Xerox desires to achieve the remedial objectives that are protective of human health and the environment at the Blauvelt site, however, the installed remedy has reached its practical limit of success. Data collected to date indicate that the current rate of mass removal will likely continue without promoting a further significant reduction in source area groundwater concentrations. Furthermore, the reduction in off-site concentrations appears to be more attributable to natural attenuation processes than continued source area remediation efforts. If the NYSDEC approves shutdown of the 2-PHASE Extraction Systems, we recommend continued operation of pumping well R-3 for on-site migration control until groundwater concentrations in the source area have stabilized.

Preliminary assessment indicates that natural attenuation processes are acting to further reduce VOC concentrations and reduce the overall size of the plume in the bedrock groundwater system. Accordingly, natural attenuation via biochemical and dilution/dispersion/diffusion processes should be utilized as an intrinsic component to the overall site remedy and future remedial efforts.

Based on the findings of this remedial assessment, we recommend Xerox:

- Seek final approval from NYSDEC to shutdown the 2-PHASE Extraction systems while maintaining operation of R-3 for source area migration control.
- Perform a risk assessment of the potential threat posed by the residual contamination in soils. Should elevated risks be present, evaluate potential additional source area reductions.
- Seek site reclassification under the Part 375 regulations (to be submitted under separate cover)

We trust that the information provided in this report is responsive to your needs and meets your requirements. If you have any questions or require additional information please contact me at (585) 321-4244.

Sincerely yours,
HALEY & ALDRICH OF NEW YORK

Steven E. Schalabba
Senior Scientist

Lawrence P. Smith, P.E.
Senior Vice President

TABLES
FIGURES
APPENDIX A – Monitored Natural Attenuation Program
APPENDIX B – NYSDEC Record of Decision
APPENDIX C - Soil Sampling Results – June 2000 Rebound Program
APPENDIX D – Time Series Plots

TABLE 1

XEROX BLAUVELT REMEDIATION PROGRAM
PERFORMANCE SUMMARY BY REMEDIAL SYSTEM

Remedial System	1994	1995	1996	1997	1998	1999	2000	2001	Jan-Mar 2002
2-PHASE Extraction									
VES-1 Uptime	81.1	73.8	75.5	82.9	87.0	96.8	96.9	84.6	68.9
VES-2 Uptime	79.5	77.4	77.6	79.4	90	89.2	96.9	92.1	65.2
Groundwater Recovery (gallons)	4,889,179	2,219,307	2,531,556	818,550	911,687	746,562	431,439	802,753	63,157
Vapor Phase Mass Removal (pounds)	7345	2358	4092	10667	11933	6884	169	570	89
Cumulative Mass Removal (pounds)	13772	16130	20222	30889	42822	49706	49875	50445	50534
Groundwater Treatment Plant									
System Uptime	87.5	93.8	91.4	86.3	94.9	98.4	98.5	98.5	70.2
Groundwater Recovery (million gallons)	14.43	11.73	31.88	41.68	57.03	54.6	23.70	37.27	5.52
Mass Extracted in Water	109.8	84.2	72.7	80.6	33.65	9.78	12.59	8.19	0.46
Off-site Carbon Treatment									
System Uptime	100	99.2	95.1	100	99.4	92	100	80.6	System
Groundwater Recovery (million gallons)	10.5	9.15	8.39	7.62	9.68	8.82	5.21	5.89	Shutdown With
Mass Extracted in Water	3.29	2.09	1.16	0.79	1.24	1.48	0.70	0.91	NYSDEC Approval

Note:
1. Approximately 6,427 pounds of contaminants were recovered in 1993 from the period June through December.

TABLE 2

XEROX BLAUVELT REMEDIATION PROGRAM
COMPARISON OF ON-SITE GROUNDWATER LEVELS TO REGULATORY STANDARDS
BASED ON DATA ANALYZED DURING REBOUND TESTING (10/24/2000)

ON-SITE WELLS	1,1,1-TCA	1,1-DCA	1,1-DCE	PCE	TCE	CIS 1,2-DCE	VINYL CHLORIDE
MW-10	BDL	3.1	BDL	12	3.8	19	BDL
MW-11	260	BDL	BDL	490	410	600	BDL
MW-12	20	10	BDL	9.5	3.2	360	33
MW-13	1800	2900	BDL	BDL	BDL	35000	3400
MW-14	BDL	BDL	BDL	BDL	BDL	BDL	BDL
MW-15	BDL	BDL	BDL	46	1.7	6.9	BDL
MW-16	BDL	BDL	BDL	160	35	1900	BDL
PW-2	53	BDL	BDL	280	73	2100	190
RI-10	BDL	BDL	BDL	3.1	BDL	BDL	BDL
RI-11	BDL	BDL	BDL	5.1	BDL	BDL	BDL
RI-3	BDL	BDL	BDL	2.7	BDL	BDL	BDL
RI-8	BDL	BDL	BDL	12	1	4.6	BDL
U-6	BDL	BDL	BDL	BDL	1.6	BDL	BDL
U-6D	BDL	BDL	BDL	BDL	BDL	BDL	BDL
W-1	69	BDL	BDL	91	120	5100	BDL
W-2	BDL	BDL	BDL	200	21	760	BDL
W-3	BDL	BDL	BDL	BDL	BDL	BDL	BDL
W-7D	53	19	BDL	55	17	540	BDL
W-9D	11	BDL	12	240	56	510	BDL
Groundwater Cleanup Goal as listed in the ROD	5	5	5	5	5	5	2

Notes:

1. These wells were monitored during the rebound program. This timeframe was selected as it most closely represents recent maximum observed concentrations.
2. All data shown in parts per billion
3. BDL = Below Detection Limit

TABLE 3

XEROX BLAUVELT REMEDIATION PROGRAM
COMPARISON OF OFF-SITE GROUNDWATER LEVELS TO REGULATORY STANDARDS
BASED ON DATA ANALYZED DURING REBOUND TESTING (10/24/2000)

ON-SITE WELLS	1,1,1-TCA	1,1-DCA	1,1-DCE	PCE	TCE	CIS 1,2-DCE	VINYL CHLORIDE
OS-2R	5.4	BDL	1.6	22	8.4	64	BDL
OS-4	BDL	BDL	BDL	BDL	BDL	BDL	BDL
OS-4R	BDL	BDL	BDL	6.2	BDL	BDL	BDL
OS-6	1.7	BDL	BDL	20	13	12	BDL
OS-6R	11	1.5	16	55	55	67	BDL
OS-7R	BDL	BDL	BDL	2.1	2.2	4.5	BDL
OS-8R	BDL	BDL	BDL	3.2	3	BDL	BDL
Groundwater Cleanup Goal as listed in the ROD	5	5	5	5	5	5	2

Notes:

1. These wells were monitored during the rebound program. This timeframe was selected as it most closely represents recent maximum observed concentrations.
2. All data shown in parts per billion
3. BDL = Below Detection Limit

TABLE 4

XEROX BLAUVELT REMEDIATION PROGRAM
ACTUAL IMPACT OF REMEDIATION ON GROUNDWATER QUALITY
OFF-SITE MONITORING WELLS

Well	Monitoring Zone	Maximum Total VOCs Date Sampled	Maximum Total VOCs Concentration (ug/L)	Recent Total VOCs Date Sampled	Recent Total VOCs Concentration (ug/L)	Percent Reduction
OS-4	Overburden	10/21/1992	19.4	1/23/2002	5	74.2%
OS-5	Overburden	7/16/1992	1426.7	1/23/2002	80.5	94.4%
OS-6	Overburden	10/21/1992	688.2	1/23/2002	81.5	88.2%
OS-7	Overburden	10/21/1992	247.1	1/23/2002	5.5	97.8%
0S-9	Overburden	10/25/1993	168.1	1/23/2002	18.1	89.2%
OS-10	Overburden	1/26/1994	4.1	1/23/2002	ND	<DWS
OS-11	Overburden	10/21/1992	238	1/23/2002	29.2	87.7%
OS-12	Overburden	7/16/1992	65	1/23/2002	ND	<DWS
OS-15	Overburden	1/20/1993	3.4	1/23/2002	ND	<DWS
OS-2R	Bedrock	7/16/1992	774.1	1/23/2002	41.2	94.7%
OS-5R	Bedrock	7/16/1992	773.6	1/23/2002	49.1	93.7%
OS-6R	Bedrock	7/16/1992	1697.1	1/23/2002	242.8	85.7%
OS-7R	Bedrock	7/20/1993	366.3	1/23/2002	12	96.7%
OS-8R	Bedrock	7/16/1992	46.6	1/23/2002	2.5	<DWS
OS-9R	Bedrock	1/20/1993	421.8	1/23/2002	9	97.9%
OS-10R	Bedrock	1/20/1993	6.9	1/23/2002	ND	<DWS
OS-11R	Bedrock	7/16/1992	937.5	1/23/2002	72.4	92.3%
OS-12R	Bedrock	1/20/1993	36.4	1/23/2002	11.5	68.4%
OS-13R	Bedrock	1/26/1994	10.5	1/23/2002	1	<DWS
OS-14R	Bedrock	1/26/1994	5.3	1/23/2002	ND	<DWS
OS-15R	Bedrock	1/20/1993	24.4	1/23/2002	9.5	61.1%
OS-5D	D. Bedrock	10/19/1992	568.2	1/23/2002	11.5	98.0%
OS-7D	D. Bedrock	10/19/1992	18.1	1/23/2002	1.7	<DWS
OS-11D	D. Bedrock	10/20/1992	598.5	1/23/2002	12.2	98.0%
OS-15D	D. Bedrock	7/20/1993	27.9	1/23/2002	16.9	39.4%

Notes:
1. ND = Non-Detect
2. <DWS = Less than NYS Drinking Water Standards

TABLE 5

XEROX BLAUVELT REMEDIATION PROGRAM
COMPARISON OF SOILS DATA TO REGULATORY STANDARDS
BASED ON DATA ANALYZED DURING REBOUND TESTING IN 2000

PARAMETER	Regulatory Standard	Method Detection Limit	B301 S4 6-8'	B306 S5 8-10'	B307 S4 6-8'	B307 S7 12-14'	B307 S9	B313 S2 2-4'	B313 S4 6-8'	B314 S3 4-6'	B314 S5 8-10'	B316 S5 8-10'	B317 S2 2-4'	B317 S7
Dilution Factor			1	1	2500	1	1	500	250	1	125	125	1	1
1,1,1-TRICHLOROETHANE	380	5	BDL	BDL	320000	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
CIS-1,2-DICHLOROETHENE	122	5	BDL	BDL	160000	31	4600	BDL	BDL	BDL	BDL	BDL	10	16
TETRACHLOROETHENE	910	5	BDL	BDL	1100000	BDL	BDL	28000	18000	ND	88000	3600	BDL	BDL
TRICHLOROETHENE	315	5	BDL	BDL	510000	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
VINYL CHLORIDE	57	5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	7.9
MINERAL SPIRITS	NA	100	BDL	BDL	7700000	2900	320	730000	290000	230	2200000	100000	BDL	1300

PARAMETER	Regulatory Standard	Method Detection Limit	B318 S4 6-8'	B318 S6 10-12'	B320 S3 4-6'	B320 S4 6-8'	B321 S5 8-10'	B323 S6 10-12'	B326 S2 2-4'	B326 S5 8-10'	B326 S7 12-14'	B327 S3 4-6'	B327 S6 10-12'	B329 S4 6-8'
Dilution Factor			1	1	1	1	1	1	5000	500	250	1	1	1
1,1,1-TRICHLOROETHANE	380	5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
CIS-1,2-DICHLOROETHENE	122	5	BDL	BDL	BDL	BDL	BDL	6.6	BDL	BDL	BDL	BDL	58	BDL
TETRACHLOROETHENE	910	5	BDL	38	BDL	BDL	BDL	BDL	BDL	27000	17000	BDL	39	6.4
TRICHLOROETHENE	315	5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
VINYL CHLORIDE	57	5	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
MINERAL SPIRITS	NA	100	120	BDL	BDL	BDL	1300	BDL	6300000	850000	460000	390	1100	BDL

PARAMETER	Regulatory Standard	Method Detection Limit	B329 S7 12-14'	B331 S4 6-8'	B332 S10 18-20'	B332 S8 14-16'	B333 S8 14-16'	B334 S8 14-16'
Dilution Factor			1	1	5	125	1	1
1,1,1-TRICHLOROETHANE	380	5	BDL	BDL	BDL	BDL	BDL	BDL
CIS-1,2-DICHLOROETHENE	122	5	BDL	BDL	BDL	BDL	BDL	BDL
TETRACHLOROETHENE	910	5	16	BDL	230	3400	15	7.9
TRICHLOROETHENE	315	5	BDL	BDL	BDL	BDL	BDL	BDL
VINYL CHLORIDE	57	5	BDL	BDL	BDL	BDL	BDL	BDL
MINERAL SPIRITS	NA	100	BDL	BDL	1500	230000	BDL	BDL

NOTES:
1. All results shown in parts per billion
2. BDL = Below Detection Limit

Prepared by Haley Aldrich

TABLE 6

XEROX CORPORATIO - BLAUVELT SITE
JUNE 2002 MNA DATA ANALYTICAL SUMMARY

Sample ID	U6D	OW-1	OW-2	OS-2R	OS-5R	OS-6R	OS-9R	OS-12R
Analyte	6/20/2002	6/20/2002	6/20/2002	6/20/2002	6/20/2002	6/20/2002	6/20/2002	6/20/2002
VOLATILE ORGANICS								
Tetrachloroethene	ND	ND	18	8.6	12	86	ND	ND
Trichloroethene	ND	ND	9.2	ND	ND	77	ND	ND
Cis-1,2-Dichloroethene	ND	ND	71	14	22	76	5	ND
1,1,1-Trichloroethane	ND	ND	8.2	ND	ND	8.6	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	25	ND	ND
DISSOLVED GASES								
Ethane	ND	ND	ND	ND	ND	ND	ND	ND
Ethylene	ND	ND	ND	ND	ND	ND	ND	ND
Methane	ND	ND	ND	ND	ND	ND	ND	ND
BIODEGRADATION INDICATORS								
Ammonia	ND	ND	ND	ND	ND	ND	0.593	ND
Chloride	38.4	104	96.1	117	135	119	98.4	40.7
Dissolved Organic Carbon	1	1.03	1.03	1.74	1.49	ND	1.39	1.41
Nitrate Nitrogen	1.8	3.26	2.98	2.58	0.953	1.92	0.362	1.32
Nitrate+Nitrite	1.8	3.29	2.98	2.58	0.953	1.92	1.19	1.32
Nitrite Nitrogen	ND	0.0263	ND	ND	ND	ND	0.828	ND
Sulfate	15.3	21.2	17.5	22.2	23.9	19.4	6.24	16.5
Total Iron	1.57	0.825	0.699	1.52	3.11	0.727	ND	1.22
Total Manganese	0.0108	ND	0.0105	0.046	0.746	ND	ND	0.204
FIELD PARAMETERS								
Dissolved Oxygen (mg/L)	1.89	0.49	3.93	4.93	0.43	3.93	6.77	0.86
Redox (mV)	260.7	3.5	54.2	40.1	160.7	271.3	40.1	238.6
Conductivity (mS)	546	718	673	187.3	697	699	1821	356
Iron, dissolved (mg/L)	ND	ND	ND	ND	0.4	ND	ND	ND
Alkalinity (mg/L)	238	1200	990	180	156	148	369	420
Carbon Dioxide (mg/L)	77.1	33.5	49	52	86.5	49.6	ND	26.9

Notes:

1) All results expressed in mg/L unless otherwise noted.
2) Standard Inorganic Data Qualifiers have been applied.
3) Detection limits for dissolved gases: Ethane 1.0, Ethylene 1.0, Methane 2.0, and Propane 1.0
4) ND - Not Detected

TABLE 7
XEROX CORPORATION - BLAUVELT SITE
SAMPLING & ANALYSIS PLAN

Well	Location	Monitoring Interval	Current Sampling Frequency--VOCs	Proposed Sampling Frequency--VOCs
U-6D	Upgradient--background	Shallow Bedrock	Q	SA
OW-1	Source	Shallow Bedrock	SA	SA
OW-2	Source	Shallow Bedrock	SA	SA
MW-12	Source	Overburden	SA	SA
MW-13	Source	Overburden	SA	SA
PW-2	Source	Overburden	Q	SA
W-2	Source	Overburden	SA	SA
RI-6	Source2	Shallow Bedrock	SA	SA
OS-2R	Downgradient--near	Shallow Bedrock	SA	SA
OS-5R	Downgradient--mid	Shallow Bedrock	SA	SA
OS-5D	Downgradient--mid	Deep Bedrock	SA	SA
OS-6	Downgradient--mid	Overburden	Q	SA
OS-6R	Downgradient--mid	Shallow Bedrock	Q	SA
OS-7R	Downgradient--mid	Shallow Bedrock	Q	SA
OS-7D	Downgradient--mid	Deep Bedrock	Q	SA
OS-9	Downgradient--far	Overburden	SA	SA
OS-9R	Downgradient--far	Shallow Bedrock	SA	SA
OS-11R	Downgradient--far	Shallow Bedrock	Q	SA
OS-11D	Downgradient--far	Deep Bedrock	Q	SA
OS-12R	Downgradient--far	Shallow Bedrock	SA	SA
OS-15R	Downgradient--far	Shallow Bedrock	Q	SA
OS-15D	Downgradient--far	Deep Bedrock	Q	SA

Q	Quarterly sampling - currently January, April, July, October
SA	Semi Annual sampling - proposed as January and July
A	Annual sampling - currently January

Notes:

1. Groundwater samples will be obtained by low-flow collection techniques, per EPA-approved procedures.

2. Dissolved oxygen, oxidation-reduction potential (ORP), dissolved iron, carbon dioxide, and alkalinity measurements will be obtained at the wellhead via either probe measurements in a flow-through cell or via Hach colorimetric kits, as applicable.

U.S.G.S. QUADRANGLE: NYACK, NY

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NYSDEC SITE NO. 3-044-021

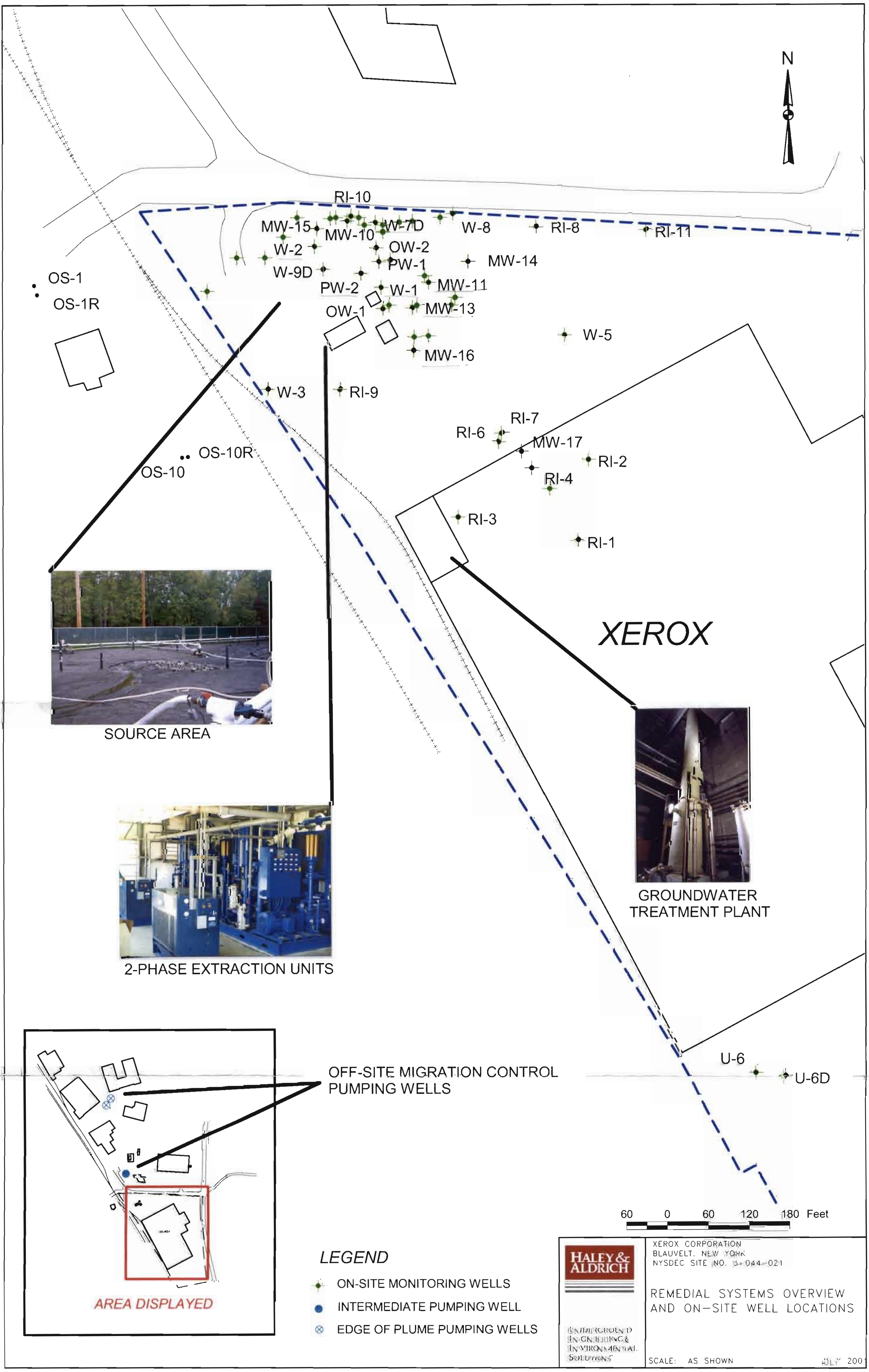
PROJECT LOCUS

APPROXIMATE SCALE: 1:24,000

JUNE 2002

FIGURE 1

70302\111\CLOSURE\LOCUS.DWG



N
RI-10
MW-15
W-7D
W-8
RI-8
RI-11
MW-10
W-2
OW-2
PW-1
MW-14
W-9D
PW-2
W-1
MW-11
OS-1
OS-1R
OW-1
MW-13
W-5
MW-16
W-3
RI-9
RI-7
RI-6
MW-17
RI-2
OS-10R
OS-10
RI-4
RI-3
RI-1
XEROX
SOURCE AREA
GROUNDWATER
TREATMENT PLANT
2-PHASE EXTRACTION UNITS
U-6
U-6D
OFF-SITE MIGRATION CONTROL
PUMPING WELLS
AREA DISPLAYED
LEGEND
ON-SITE MONITORING WELLS
INTERMEDIATE PUMPING WELL
EDGE OF PLUME PUMPING WELLS
60 0 60 120 180 Feet
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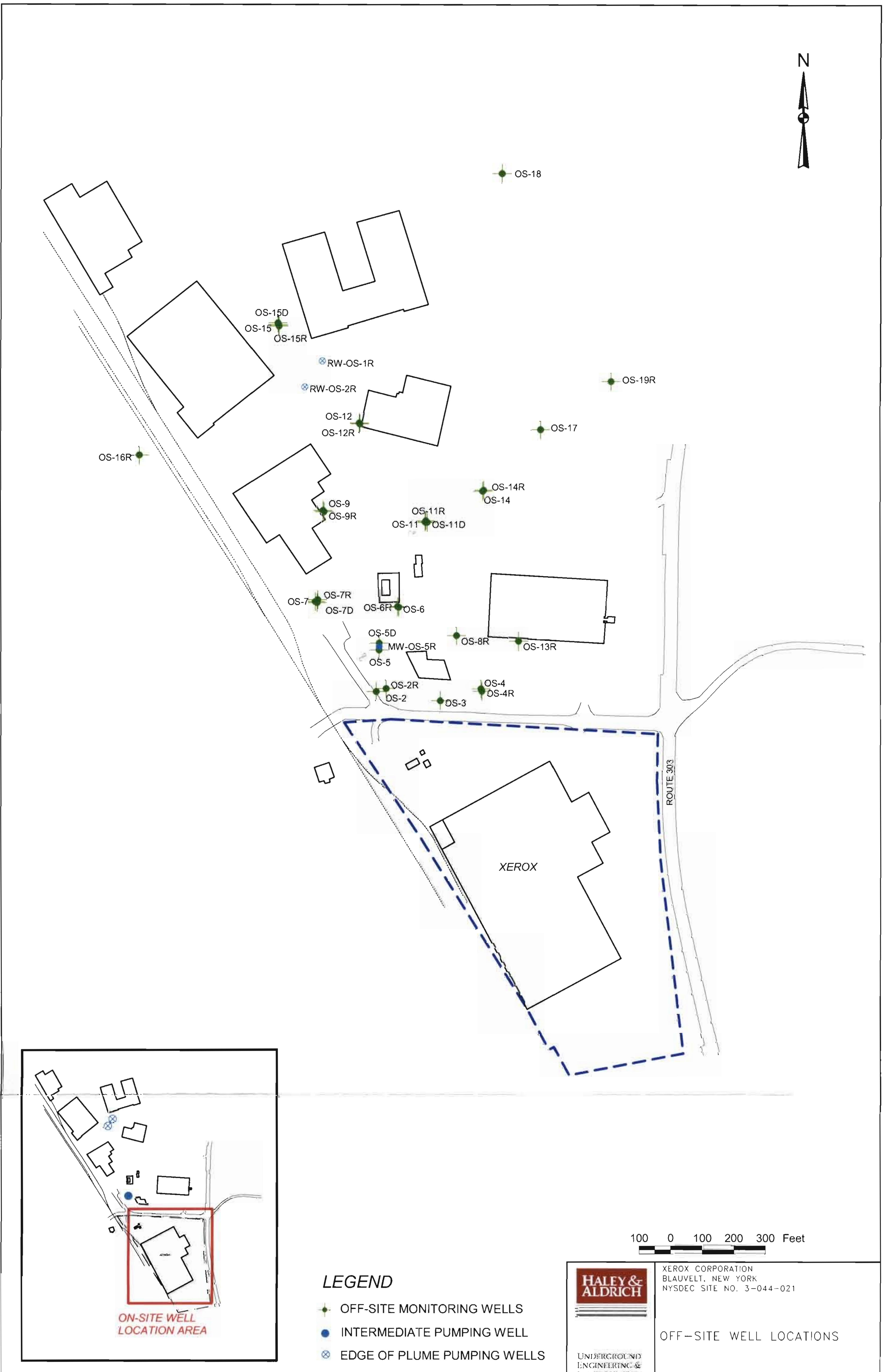
XEROX CORPORATION
BLAUVELT, NEW YORK
NYSDEC SITE NO. 3-044-021
REMEDIAL SYSTEMS OVERVIEW
AND ON-SITE WELL LOCATIONS
SCALE: AS SHOWN
JULY 2001

FIGURE 2



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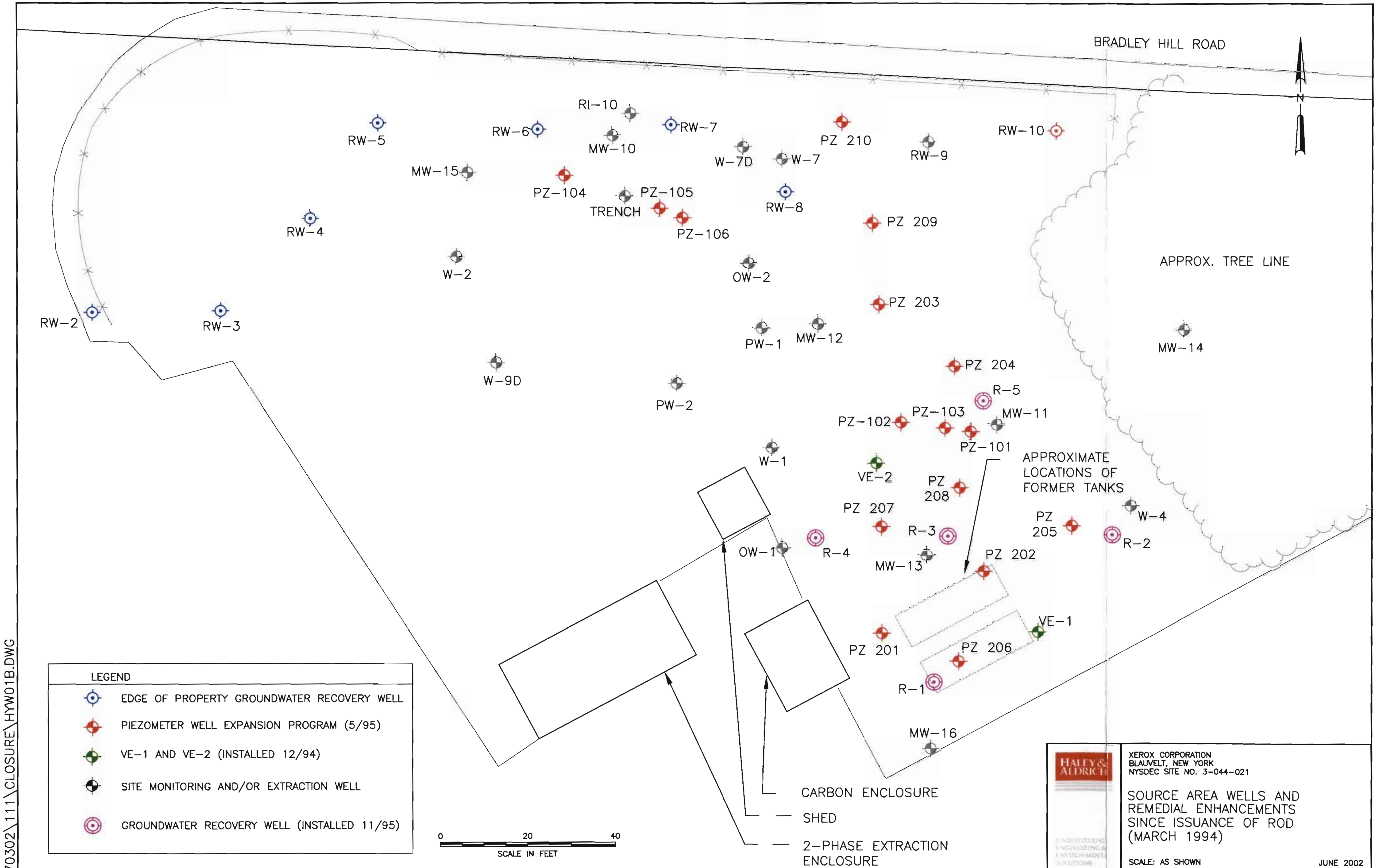
NYSDEC SITE NO. 3-044-021

OFF-SITE WELL LOCATIONS

SCALE: AS SHOWN

200

FIGURE 2B



70302\111\CLOSURE\HYW01B.DWG

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NYSDEC SITE NO. 3-044-021

SOURCE AREA WELLS AND REMEDIAL ENHANCEMENTS SINCE ISSUANCE OF ROD (MARCH 1994)

SCALE: AS SHOWN

JUNE 2002

FIGURE 2C

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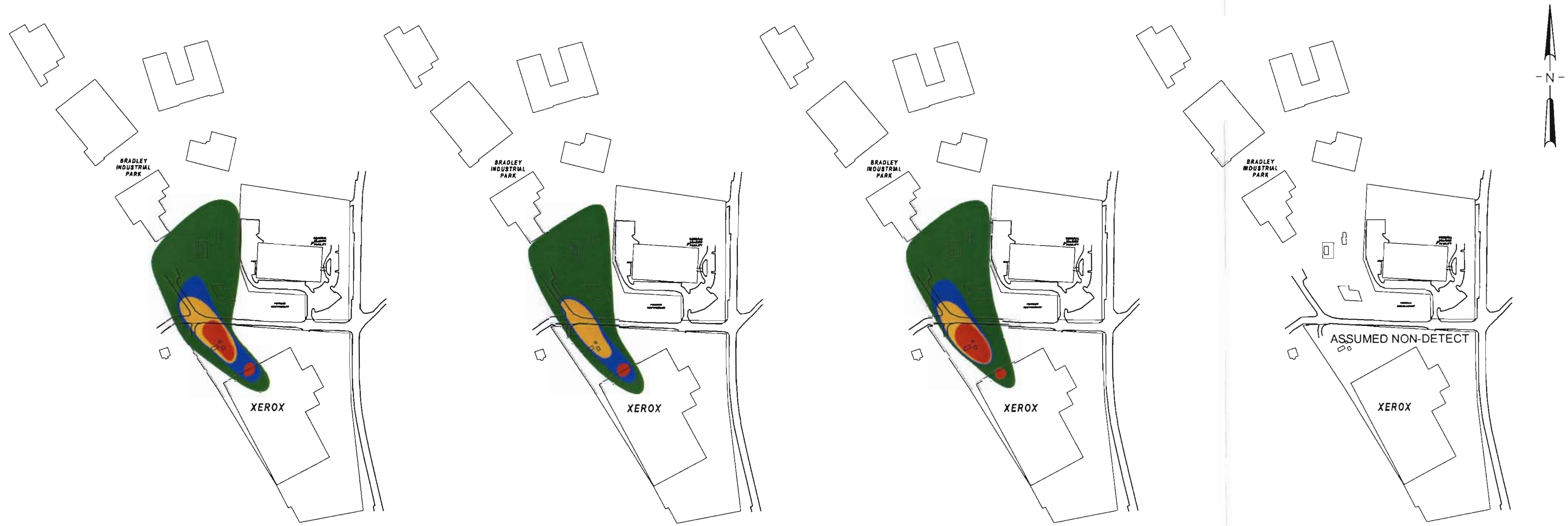
APPROXIMATE EXTENT OF TOTAL VOCS IN GROUDWATER

SCALE: AS SHOWN

FIGURE 3

CVOC ISOPLETH BOUNDARIES ARE APPROXIMATE ONLY AND INFERRED BETWEEN WELL LOCATIONS. ACTUAL CVOC CONCENTRATIONS FOR SAMPLED WELLS ARE PROVIDED IN APPENDIX D. CVOC CONCENTRATIONS BETWEEN WELL LOCATIONS MAY VARY FROM THE INFERRED VALUES DEPICTED BELOW.



TETRACHLOROETHENE

TRICHLOROETHENE

CIS-1,2-DICHLOROETHENE

VINYL CHLORIDE

LEGEND:

- >=10 AND <=99.99
- >=100 AND <=999.99
- >=1000 AND <=9999.99
- >=10000

ABOVE RESULTS ARE IN ug/L.

NOTES:

1. PLUME EXTENTS BASED ON 2nd QUARTER 1993 SAMPLING.
2. NON-DETECT DATA WAS NOT READILY AVAILABLE FOR 1993. NON-DETECT RESULTS ARE NOT SHOWN.

0 600 1200

SCALE IN FEET

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BLAUVELT, NY

CHLORINATED ETHENE DEGRADATION SERIES OVERBURDEN ZONE, 1993

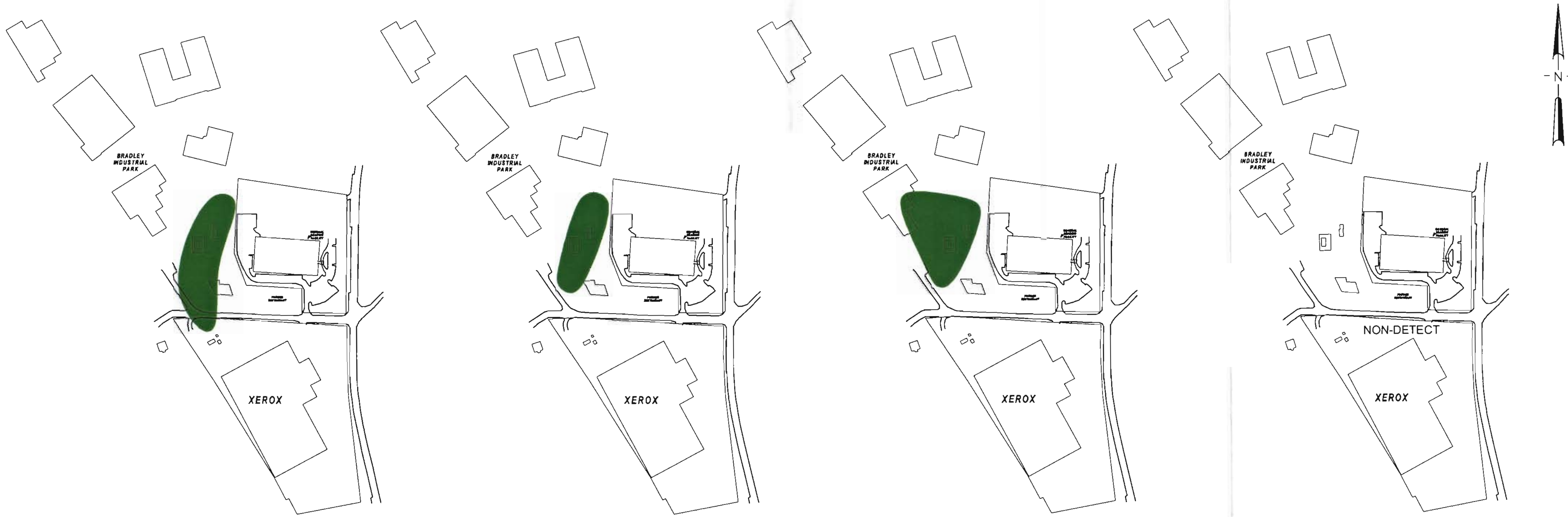
SCALE: AS SHOWN

JANUARY 2003

FIGURE 3a

70302-113 DEGRADATION93_01.DWG

CVOC ISOPLETH BOUNDARIES ARE APPROXIMATE ONLY AND INFERRED BETWEEN WELL LOCATIONS. ACTUAL CVOC CONCENTRATIONS FOR SAMPLED WELLS ARE PROVIDED IN APPENDIX D. CVOC CONCENTRATIONS BETWEEN WELL LOCATIONS MAY VARY FROM THE INFERRED VALUES DEPICTED BELOW.



TETRACHLOROETHENE | TRICHLOROETHENE | CIS-1,2-DICHLOROETHENE | VINYL CHLORIDE

LEGEND:

- >=10 AND <=99.99
- >=100 AND <=999.99
- >=1000 AND <=9999.99
- >=10000

ABOVE RESULTS ARE IN ug/L.

NOTES:

1. PLUME EXTENTS BASED ON 1st QUARTER 2001 SAMPLING.
2. VINYL CHLORIDE WAS NOT DETECTED ABOVE THE PRACTICAL QUANTITATION LIMIT (PQL)

0 600 1200
SCALE IN FEET

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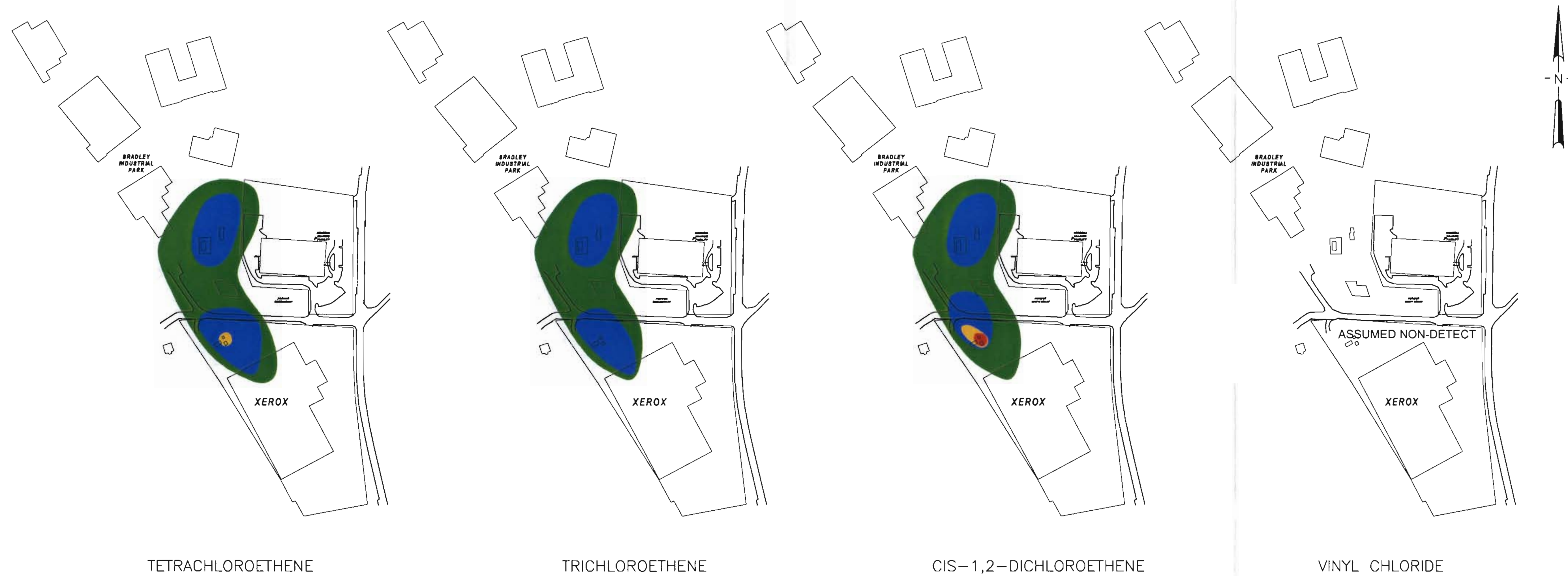
SCALE: AS SHOWN

JANUARY 2003

FIGURE 3b

70302-113 DEGRADATION93_01.DWG

CVOC ISOPLETH BOUNDARIES ARE APPROXIMATE ONLY AND INFERRED BETWEEN WELL LOCATIONS. ACTUAL CVOC CONCENTRATIONS FOR SAMPLED WELLS ARE PROVIDED IN APPENDIX D. CVOC CONCENTRATIONS BETWEEN WELL LOCATIONS MAY VARY FROM THE INFERRED VALUES DEPICTED BELOW.



LEGEND:

- >=10 AND <=99.99
- >=100 AND <=999.99
- >=1000 AND <=9999.99
- >=10000

ABOVE RESULTS ARE IN ug/L.

NOTES:

1. PLUME EXTENTS BASED ON 2nd QUARTER 1993 SAMPLING.
2. NON-DETECT DATA WAS NOT READILY AVAILABLE FOR 1993. NON-DETECT RESULTS ARE NOT SHOWN.

0 600 1200
SCALE IN FEET

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CHLORINATED ETHENE DEGRADATION SERIES SHALLOW BEDROCK ZONE, 1993

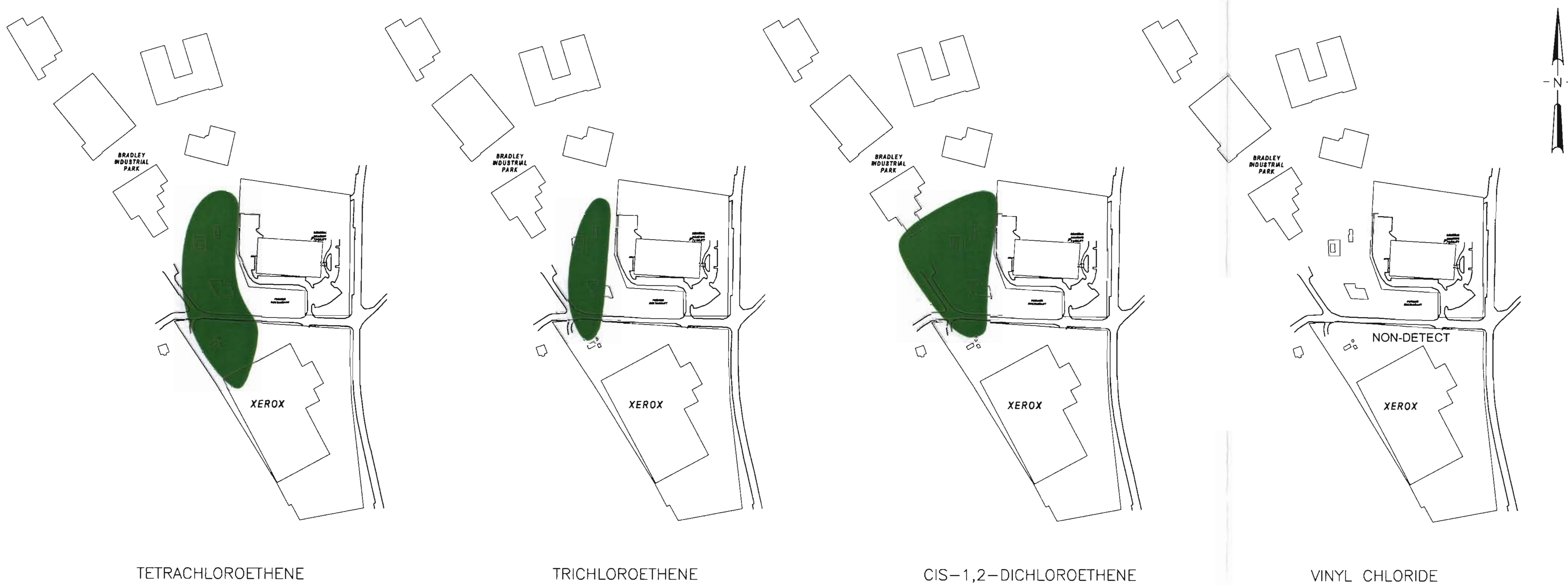
SCALE: AS SHOWN

JANUARY 2003

FIGURE 3c

70302-113 DEGRADATION93_01.DWG

CVOC ISOPLETH BOUNDARIES ARE APPROXIMATE ONLY AND INFERRED BETWEEN WELL LOCATIONS. ACTUAL CVOC CONCENTRATIONS FOR SAMPLED WELLS ARE PROVIDED IN APPENDIX D. CVOC CONCENTRATIONS BETWEEN WELL LOCATIONS MAY VARY FROM THE INFERRED VALUES DEPICTED BELOW.



LEGEND:

(dark green)	>=10 AND <=99.99
(blue)	>=100 AND <=999.99
(orange)	>=1000 AND <=9999.99
(red)	>=10000

ABOVE RESULTS ARE IN ug/L.

NOTES:

1. PLUME EXTENTS BASED ON 1st QUARTER 2001 SAMPLING.
2. VINYL CHLORIDE WAS NOT DETECTED ABOVE THE PRACTICAL QUANTITATION LIMIT (PQL)

0 600 1200
SCALE IN FEET

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SCALE: AS SHOWN

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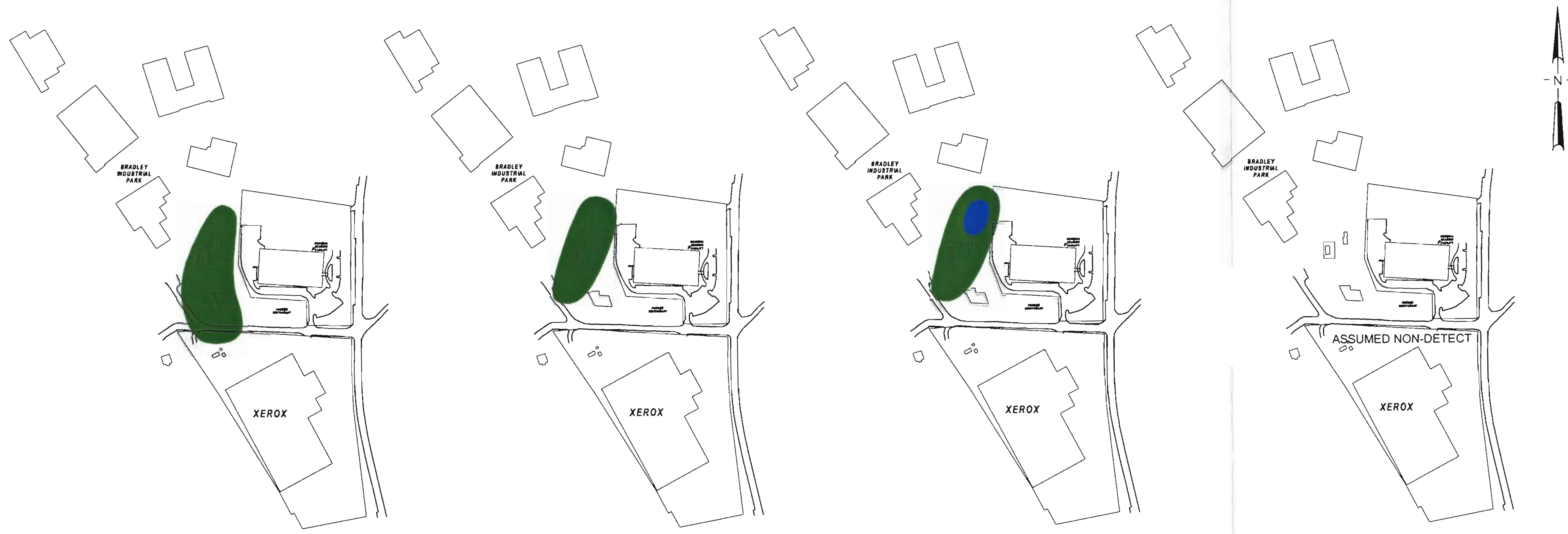
FIGURE 3d

70302–113 DEGRADATION93_01.DWG

CVOC ISOPLETH BOUNDARIES ARE APPROXIMATE ONLY AND INFERRED BETWEEN WELL LOCATIONS. ACTUAL CVOC CONCENTRATIONS FOR SAMPLED WELLS ARE PROVIDED IN APPENDIX D. CVOC CONCENTRATIONS BETWEEN WELL LOCATIONS MAY VARY FROM THE INFERRED VALUES DEPICTED BELOW.



TETRACHLOROETHENE | TRICHLOROETHENE | CIS-1,2-DICHLOROETHENE | VINYL CHLORIDE

LEGEND:

- (green) >=10 AND <=99.99
- (blue) >=100 AND <=999.99
- (orange) >=1000 AND <=9999.99
- (red) >=10000

ABOVE RESULTS ARE IN ug/L.

NOTES:

1. PLUME EXTENTS BASED ON 2nd QUARTER 1993 SAMPLING.
2. NON-DETECT DATA WAS NOT READILY AVAILABLE FOR 1993. NON-DETECT RESULTS ARE NOT SHOWN.

0 600 1200
SCALE IN FEET

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CHLORINATED ETHENE DEGRADATION SERIES DEEP BEDROCK ZONE, 1993

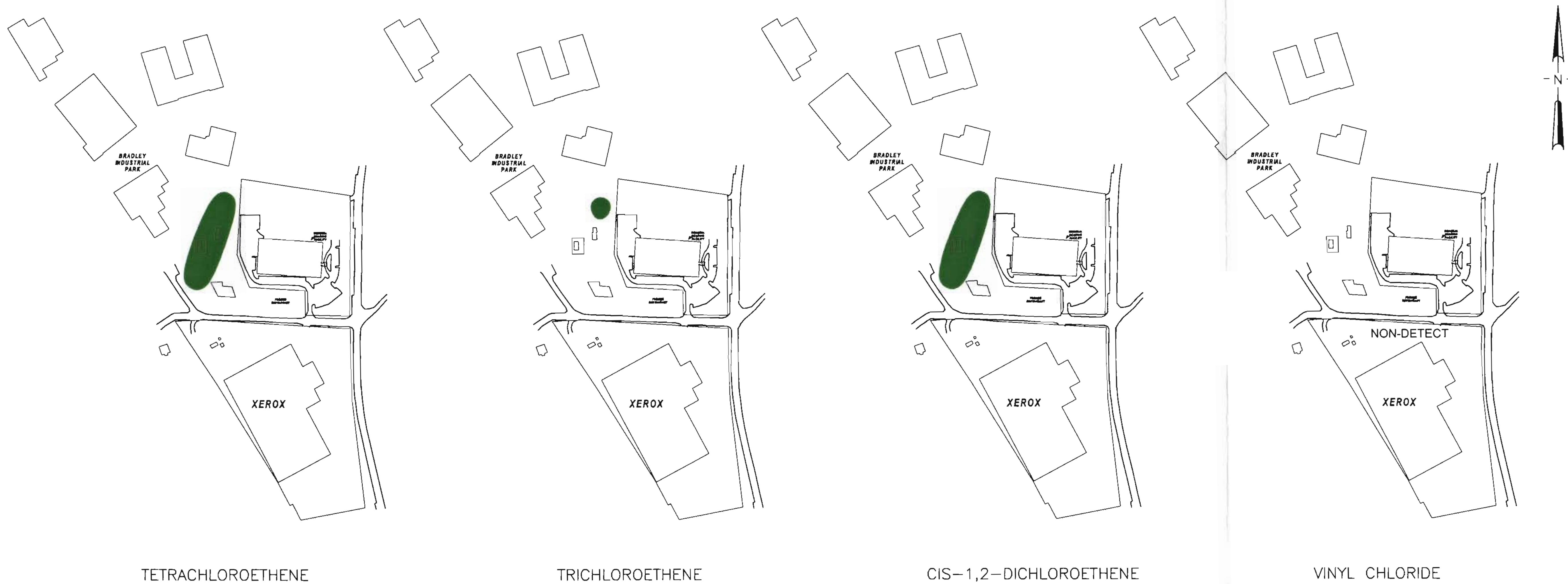
SCALE: AS SHOWN

JANUARY 2003

FIGURE 3e

70302-113 DEGRADATION93_01.DWG

CVOC ISOPLETH BOUNDARIES ARE APPROXIMATE ONLY AND INFERRED BETWEEN WELL LOCATIONS. ACTUAL CVOC CONCENTRATIONS FOR SAMPLED WELLS ARE PROVIDED IN APPENDIX D. CVOC CONCENTRATIONS BETWEEN WELL LOCATIONS MAY VARY FROM THE INFERRED VALUES DEPICTED BELOW.



LEGEND:

Green	>=10 AND <=99.99
Blue	>=100 AND <=999.99
Orange	>=1000 AND <=9999.99
Red	>=10000

ABOVE RESULTS ARE IN ug/L.

NOTES:

1. PLUME EXTENTS BASED ON 1st QUARTER 2001 SAMPLING.
2. VINYL CHLORIDE WAS NOT DETECTED ABOVE THE PRACTICAL QUANTITATION LIMIT (PQL)

0 600 1200
SCALE IN FEET

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CHLORINATED ETHENE
DEGRADATION SERIES
DEEP BEDROCK ZONE, 2001

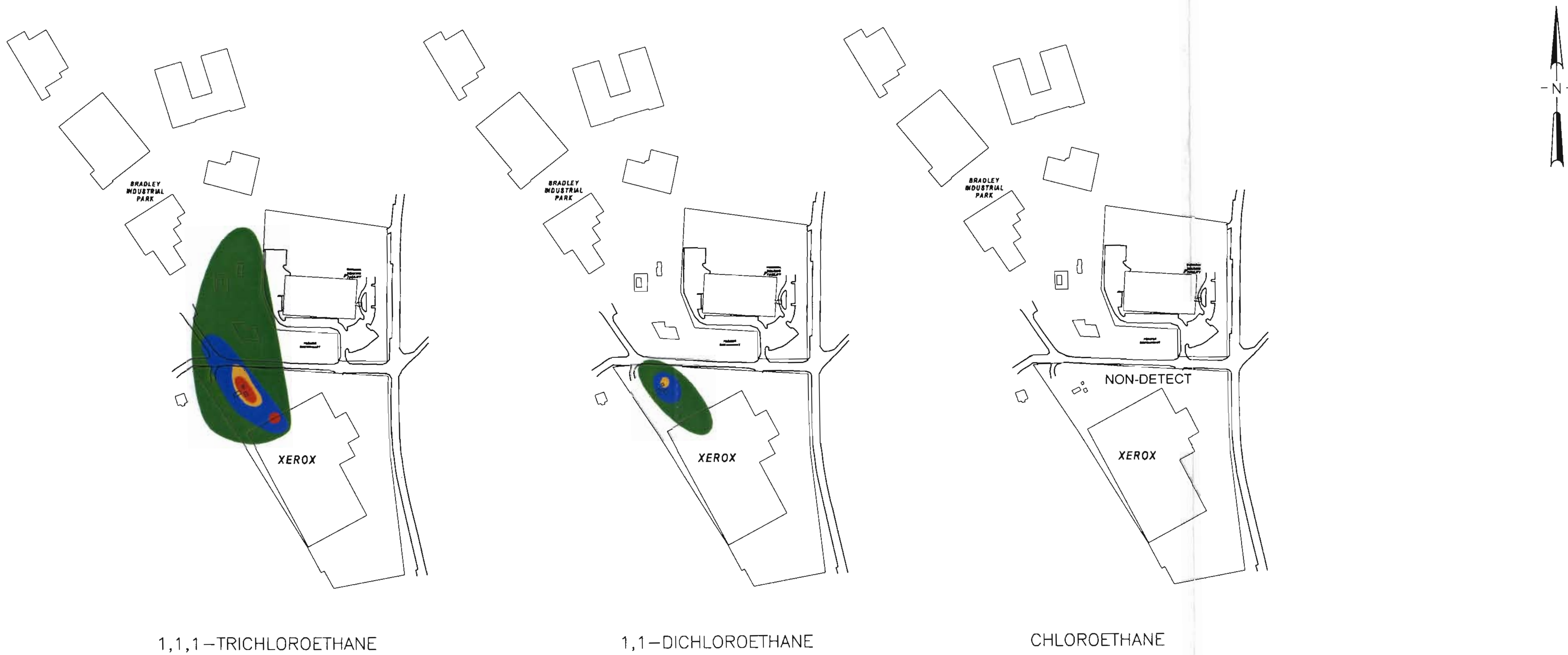
SCALE: AS SHOWN

JANUARY 2003

FIGURE 3f

70302-113 DEGRADATION93_01.DWG

CVOC ISOPLETH BOUNDARIES ARE APPROXIMATE ONLY AND INFERRED BETWEEN WELL LOCATIONS. ACTUAL CVOC CONCENTRATIONS FOR SAMPLED WELLS ARE PROVIDED IN APPENDIX D. CVOC CONCENTRATIONS BETWEEN WELL LOCATIONS MAY VARY FROM THE INFERRED VALUES DEPICTED BELOW.



LEGEND:

- >=10 AND <=99.99
- >=100 AND <=999.99
- >=1000 AND <=9999.99
- >=10000

ABOVE RESULTS ARE IN ug/L.

NOTES:

1. PLUME EXTENTS BASED ON 2nd QUARTER 1993 SAMPLING.
2. NON-DETECT DATA WAS NOT READILY AVAILABLE FOR 1993. NON-DETECT RESULTS ARE NOT SHOWN.

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CHLORINATED ETHANE DEGRADATION SERIES OVERBURDEN ZONE, 1993

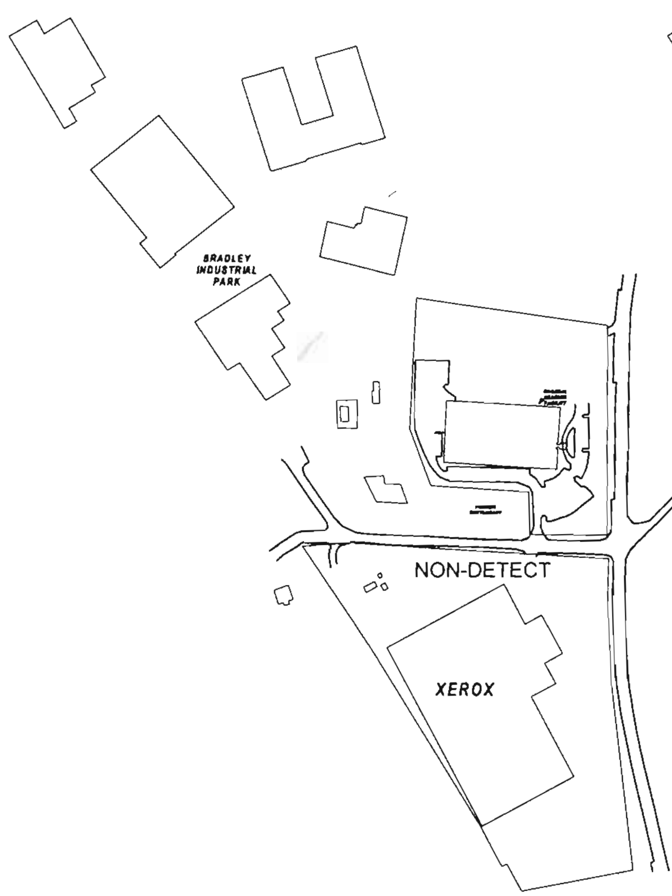
SCALE: AS SHOWN

JANUARY 2003

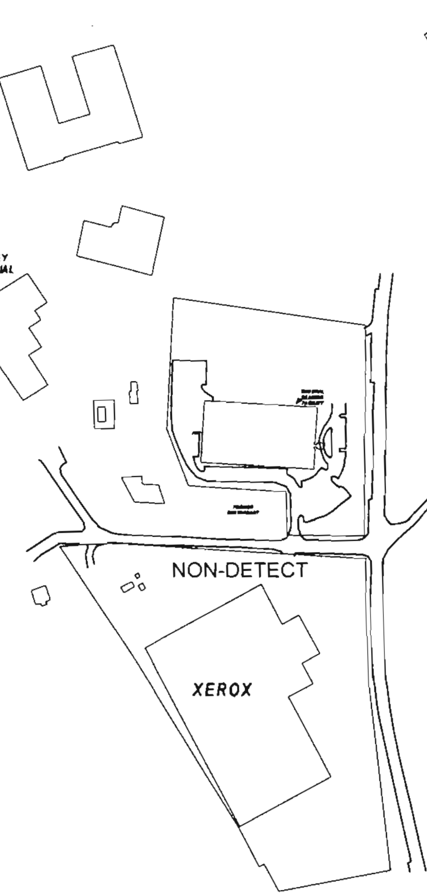
FIGURE 3g

70302-113 ETHANEDEGRADATION93_01.DWG

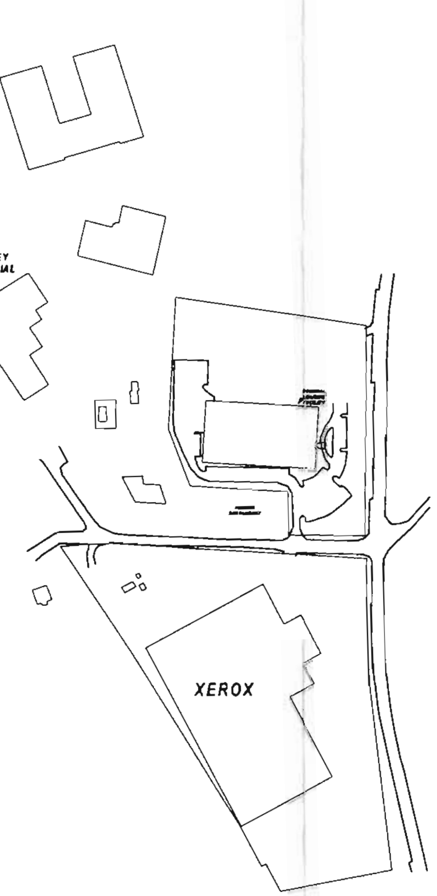
CVOC ISOPLETH BOUNDARIES ARE APPROXIMATE ONLY AND INFERRED BETWEEN WELL LOCATIONS. ACTUAL CVOC CONCENTRATIONS FOR SAMPLED WELLS ARE PROVIDED IN APPENDIX D. CVOC CONCENTRATIONS BETWEEN WELL LOCATIONS MAY VARY FROM THE INFERRED VALUES DEPICTED BELOW.



1,1,1-TRICHLOROETHANE



1,1-DICHLOROETHANE



CHLOROETHANE

LEGEND:

- >=10 AND <=99.99
- >=100 AND <=999.99
- >=1000 AND <=9999.99
- >=10000

ABOVE RESULTS ARE IN ug/L

NOTES:

1. PLUME EXTENTS BASED ON 1st QUARTER 2001 SAMPLING.

0 600 1200
SCALE IN FEET

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CHLORINATED ETHANE DEGRADATION SERIES OVERBURDEN ZONE, 2001

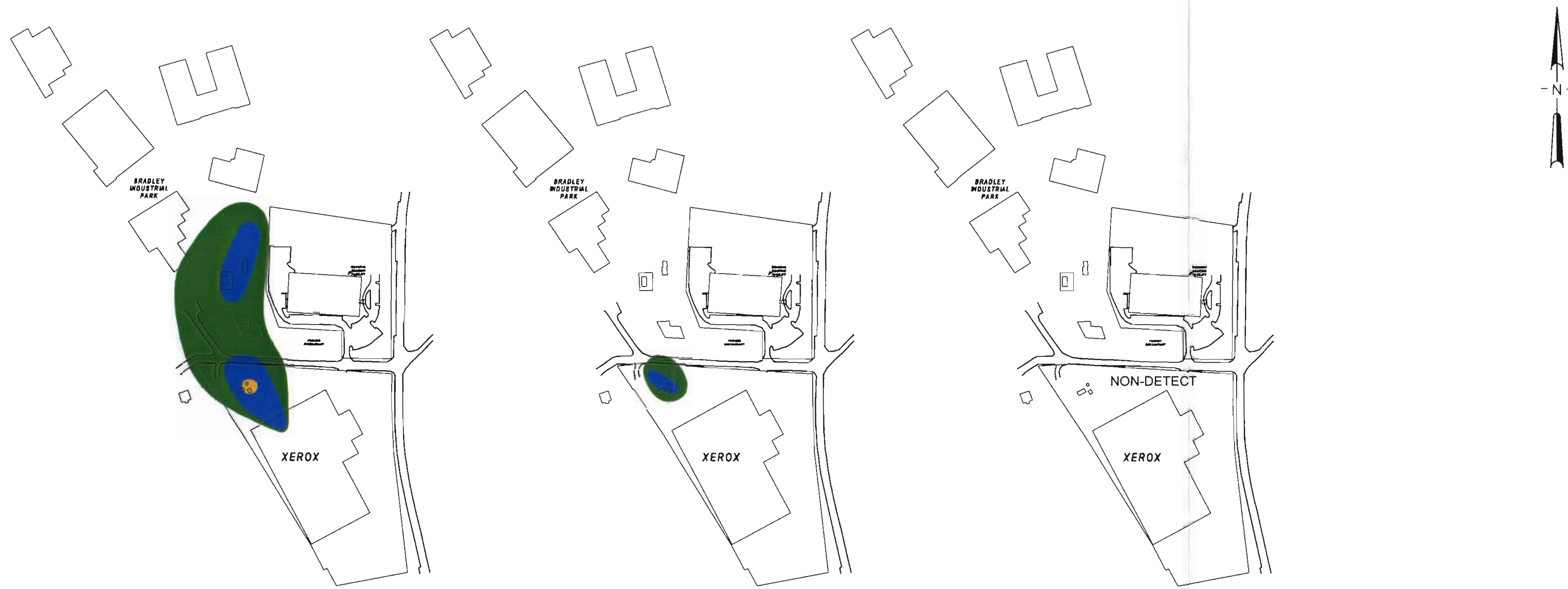
SCALE: AS SHOWN

JANUARY 2003

FIGURE 3h

70302-113 DEGRADATION93_01.DWG

CVOC ISOPLETH BOUNDARIES ARE APPROXIMATE ONLY AND INFERRED BETWEEN WELL LOCATIONS. ACTUAL CVOC CONCENTRATIONS FOR SAMPLED WELLS ARE PROVIDED IN APPENDIX D. CVOC CONCENTRATIONS BETWEEN WELL LOCATIONS MAY VARY FROM THE INFERRED VALUES DEPICTED BELOW.



1,1,1-TRICHLOROETHANE

1,1-DICHLOROETHANE

CHLOROETHANE

LEGEND:

- >=10 AND <=99.99
- >=100 AND <=999.99
- >=1000 AND <=9999.99
- >=10000

ABOVE RESULTS ARE IN ug/L.

NOTES:

1. PLUME EXTENTS BASED ON 2nd QUARTER 1993 SAMPLING.
2. NON-DETECT DATA WAS NOT READILY AVAILABLE FOR 1993. NON-DETECT RESULTS ARE NOT SHOWN.

0 600 1200
SCALE IN FEET

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XEROX BLAUVELT
REMEDIAL ASSESSMENT REPORT
BLAUVELT, NY

CHLORINATED ETHANE DEGRADATION SERIES SHALLOW BEDROCK ZONE, 1993

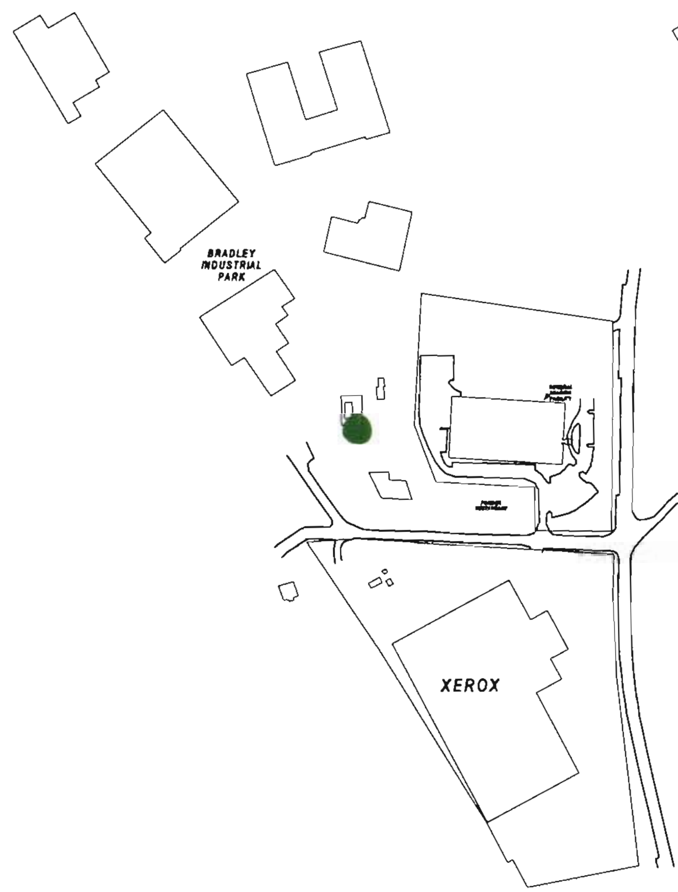
SCALE: AS SHOWN

JANUARY 2003

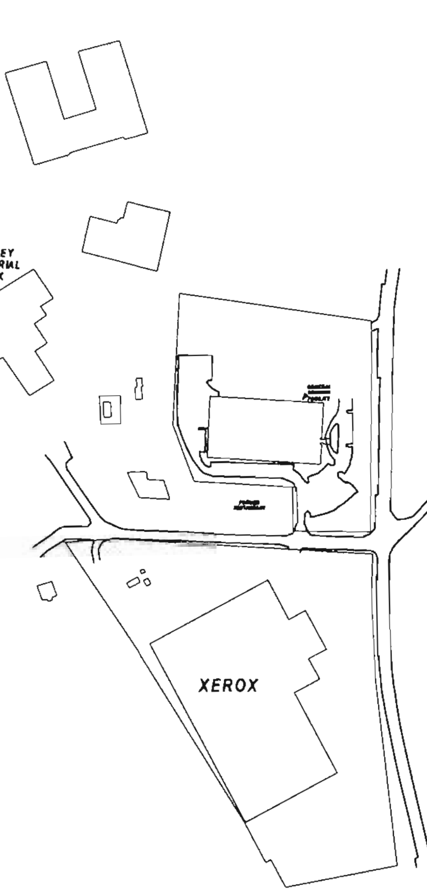
FIGURE 3i

70302-113 DEGRADATION93_01.DWG

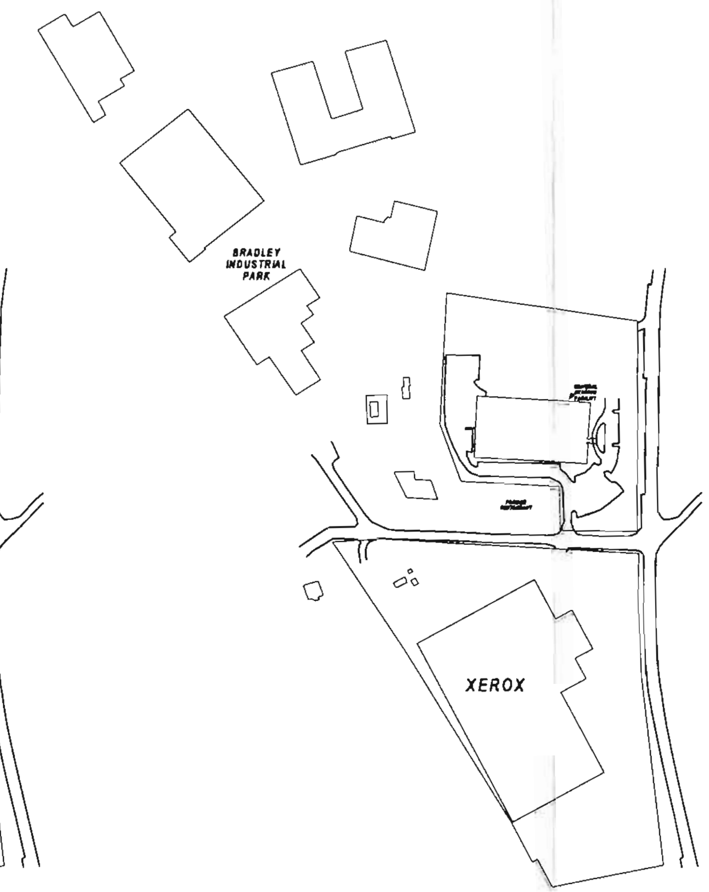
CVOC ISOPLETH BOUNDARIES ARE APPROXIMATE ONLY AND INFERRED BETWEEN WELL LOCATIONS. ACTUAL CVOC CONCENTRATIONS FOR SAMPLED WELLS ARE PROVIDED IN APPENDIX D. CVOC CONCENTRATIONS BETWEEN WELL LOCATIONS MAY VARY FROM THE INFERRED VALUES DEPICTED BELOW.



1,1,1-TRICHLOROETHANE



1,1-DICHLOROETHANE



CHLOROETHANE

LEGEND:

- >=10 AND <=99.99
- >=100 AND <=999.99
- >=1000 AND <=9999.99
- >=10000

ABOVE RESULTS ARE IN ug/L.

NOTES:

1. PLUME EXTENTS BASED ON 1st QUARTER 2001 SAMPLING.

0 600 1200
SCALE IN FEET

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

XEROX BLAUVELT
REMEDIAL ASSESSMENT REPORT
BLAUVELT, NY

CHLORINATED ETHANE
DEGRADATION SERIES
SHALLOW BEDROCK ZONE, 2001

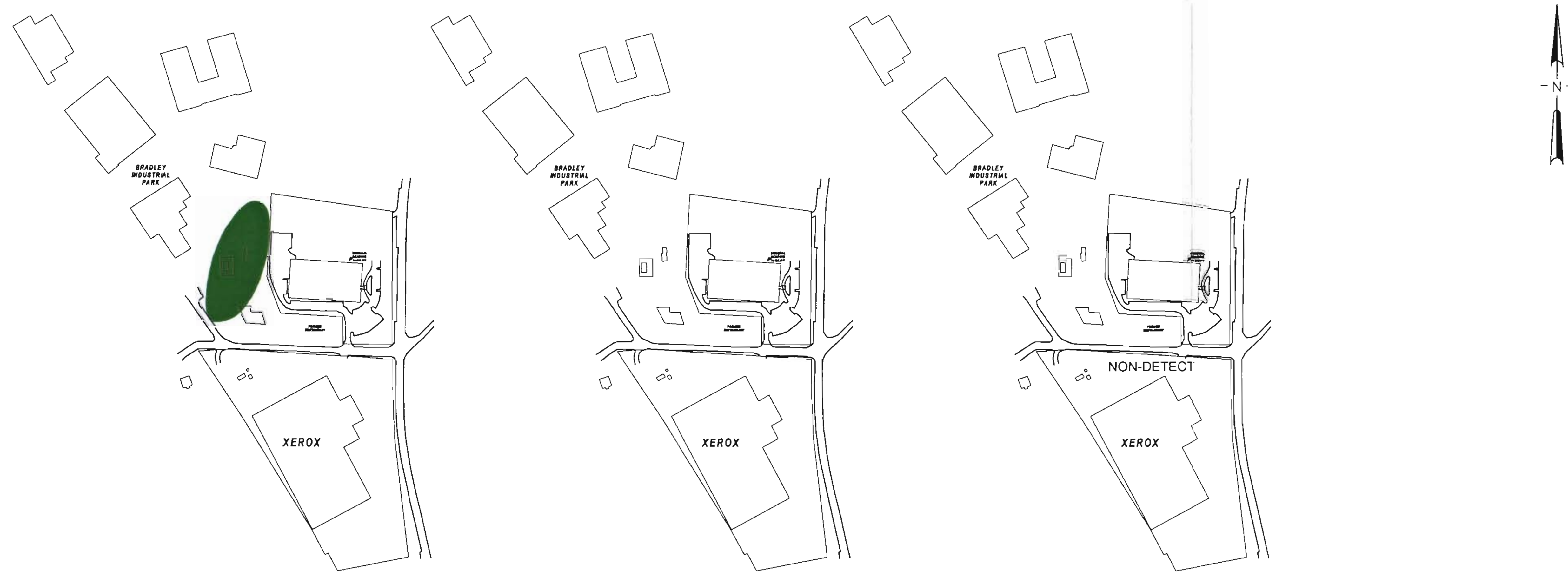
SCALE: AS SHOWN

JANUARY 2003

FIGURE 3j

70302-113 DEGRADATION93_01.DWG

CVOC ISOPLETH BOUNDARIES ARE APPROXIMATE ONLY AND INFERRED BETWEEN WELL LOCATIONS. ACTUAL CVOC CONCENTRATIONS FOR SAMPLED WELLS ARE PROVIDED IN APPENDIX D. CVOC CONCENTRATIONS BETWEEN WELL LOCATIONS MAY VARY FROM THE INFERRED VALUES DEPICTED BELOW.



1,1,1-TRICHLOROETHANE

1,1-DICHLOROETHANE

CHLOROETHANE

LEGEND:

- >=10 AND <=99.99
- >=100 AND <=999.99
- >=1000 AND <=9999.99
- >=10000

ABOVE RESULTS ARE IN ug/L.

NOTES:

1. PLUME EXTENTS BASED ON 2nd QUARTER 1993 SAMPLING.
2. NON-DETECT DATA WAS NOT READILY AVAILABLE FOR 1993. NON-DETECT RESULTS ARE NOT SHOWN.

0 600 1200

SCALE IN FEET

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

XEROX BLAUVELT
REMEDIAL ASSESSMENT REPORT
BLAUVELT, NY

CHLORINATED ETHANE DEGRADATION SERIES DEEP BEDROCK ZONE, 1993

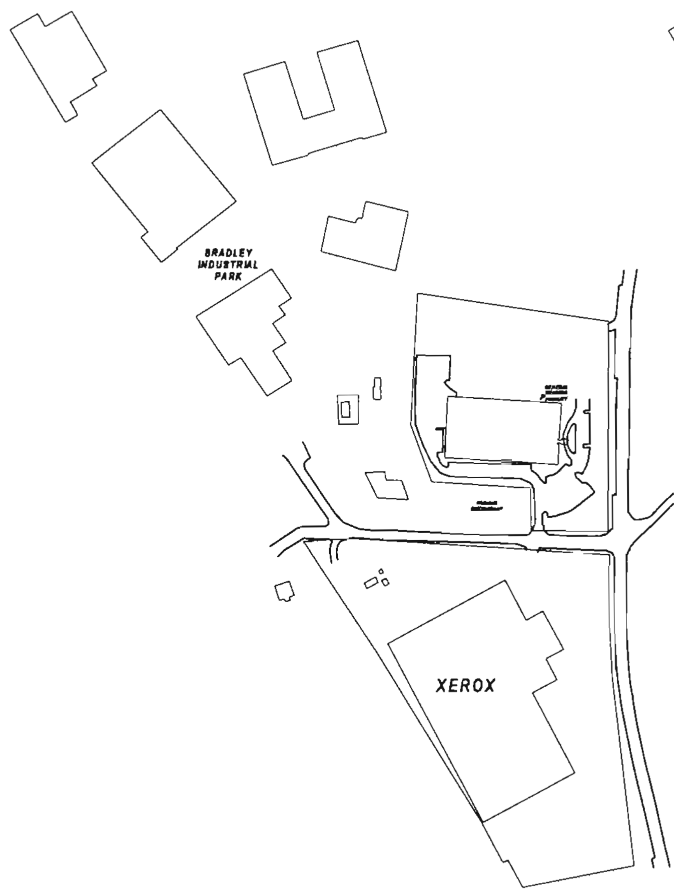
SCALE: AS SHOWN

JANUARY 2003

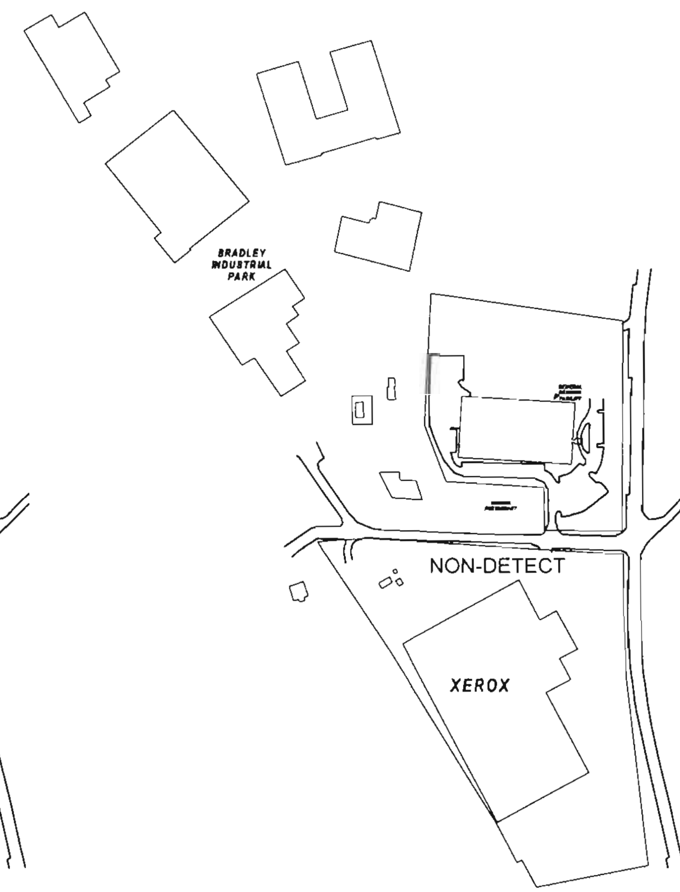
FIGURE 3k

70302-113 DEGRADATION93_01.DWG

CVOC ISOPLETH BOUNDARIES ARE APPROXIMATE ONLY AND INFERRED BETWEEN WELL LOCATIONS. ACTUAL CVOC CONCENTRATIONS FOR SAMPLED WELLS ARE PROVIDED IN APPENDIX D. CVOC CONCENTRATIONS BETWEEN WELL LOCATIONS MAY VARY FROM THE INFERRED VALUES DEPICTED BELOW.



1,1,1-TRICHLOROETHANE



1,1-DICHLOROETHANE

CHLOROETHANE

-N-

LEGEND:

- >=10 AND <=99.99 (green)
- >=100 AND <=999.99 (blue)
- >=1000 AND <=9999.99 (orange)
- >=10000 (red)

ABOVE RESULTS ARE IN ug/L.

NOTES:

1. PLUME EXTENTS BASED ON 1st QUARTER 2001 SAMPLING.

0 600 1200
SCALE IN FEET

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

XEROX BLAUVELT
REMEDIAL ASSESSMENT REPORT
BLAUVELT, NY

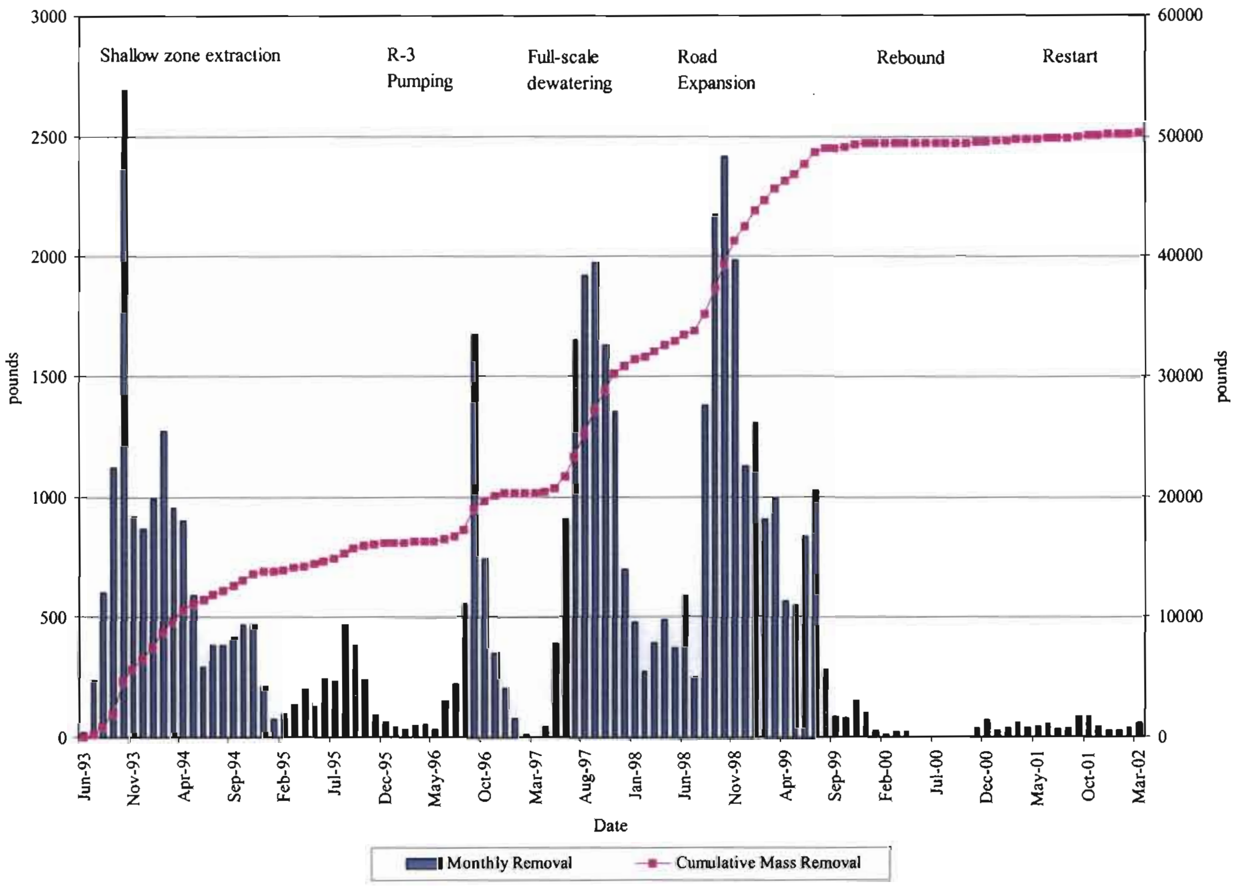
CHLORINATED ETHANE
DEGRADATION SERIES
DEEP BEDROCK ZONE, 2001

SCALE: AS SHOWN

JANUARY 2003

FIGURE 3I

70302-113 DEGRADATION93_01.DWG



70302\111\CLOSURE\CHART.DWG

HALEY & ALDRICH

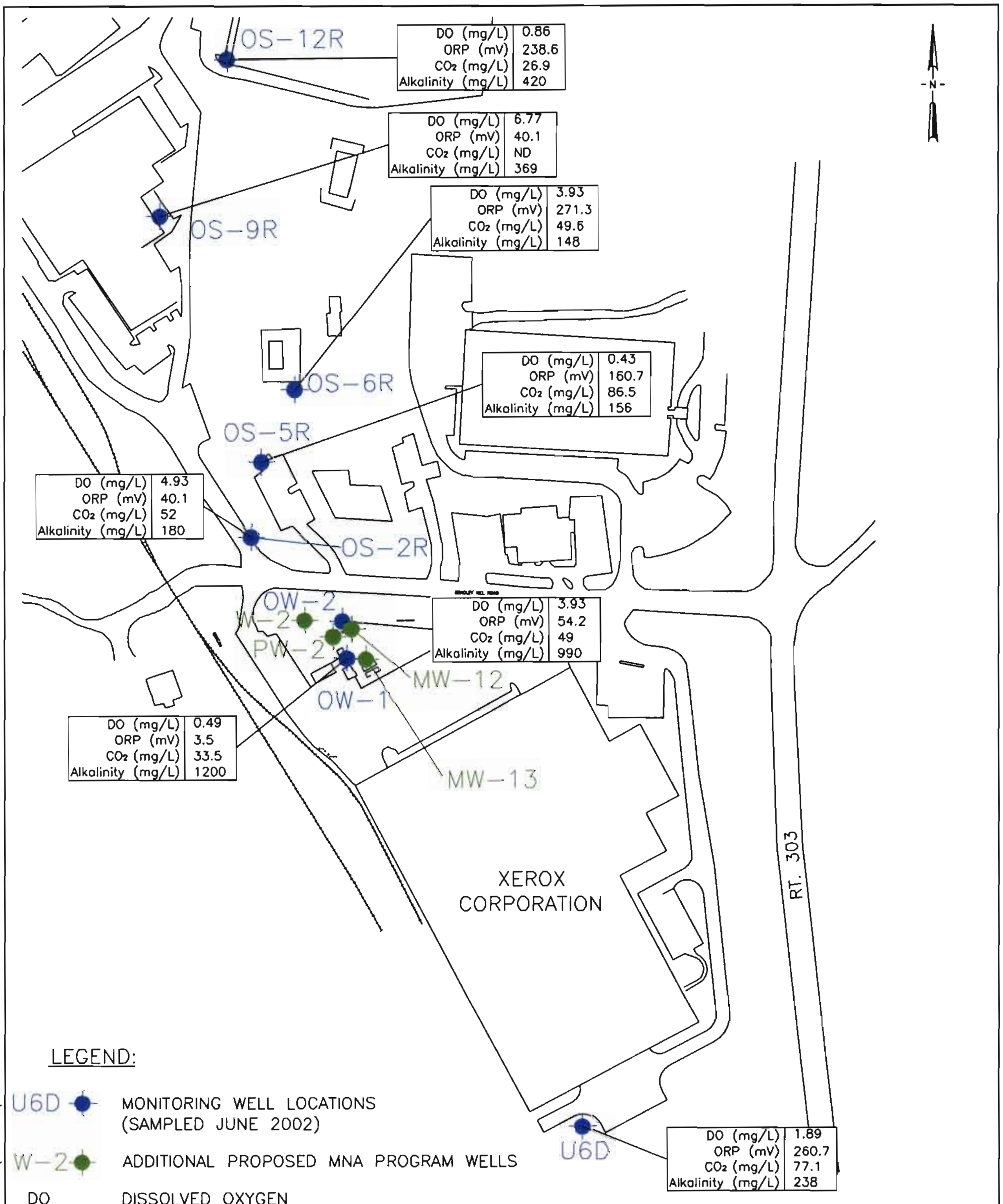
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

XEROX CORPORATION
BLAUVELT, NEW YORK
NYSDEC SITE NO. 3-044-021

SUMMARY OF VAPOR PHASE MASS REMOVAL

JULY 2002

FIGURE 4



LEGEND:

U6D	MONITORING WELL LOCATIONS (SAMPLED JUNE 2002)
W-2	ADDITIONAL PROPOSED MNA PROGRAM WELLS
DO	DISSOLVED OXYGEN
ORP	OXIDATION/REDUCTION POTENTIAL
CO_2	CARBON DIOXIDE

0 250 500
SCALE IN FEET

70302-111 \CLOSURE\MAN\PROPMNA.DWG

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

XEROX CORPORATION
BLAUVELT, NEW YORK
RTN 3-15784

MONITORED NATURAL ATTENUATION WELLHEAD MEASUREMENTS DATA SUMMARY

NOT TO SCALE

FIGURE 5

APPENDIX A

QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

HALEY & ALDRICH

XEROX CORPORATION BLAUVELT, NEW YORK
QUALITATIVE HUMAN HEALTH EXPOSURE ASSESSMENT

INTRODUCTION

The purpose of this qualitative human health exposure assessment (QHHEA) is to evaluate source area residual contamination remaining in the subsurface soil at the Xerox facility located in Blauvelt, New York with respect to unacceptable risk. Several constituents were detected during the laboratory analysis of the soil sampled during the exploration program conducted by Haley & Aldrich. The results of these analyses were presented in Quarterly Monitoring Report #27 and submitted to the NYSDEC on 26 October 2000.

To evaluate the significance of these data, this QHHEA was performed in accordance with guidance provided by the New York State Department of Conservation, Division of Environmental Remediation (NYSDEC DER). This evaluation has been conducted to determine the potential impact to current and future on-site workers and personnel on adjacent properties from the constituents detected in the subsurface soils at the facility.

EXPOSURE ASSESSMENT

In accordance with NYSDEC DER guidance, the potential for human health risk is based on the assumption that a pathway for human exposure to the identified environmental conditions exists in a specific area or facility. A complete exposure pathway is defined by the existence of five (5) elements; an identified contaminant source, a contaminant transport mechanism, a route of exposure, an identified receptor population, and a point of exposure to the contaminants either currently or in the future.

The following sections describe the evaluation of human health risk to the current and future workers based on the site conditions indicated by the September 2000 soil-sampling event at the Xerox Corporation, Blauvelt, New York facility. This evaluation does not take into account the 679 pounds of additional mass removed by the 2-PHASE vacuum extraction system operated at the facility from September 2000 through September 2002.

Contaminant Source

The QHHEA includes the selection of the constituents of concern (COCs) from the list of constituents identified by laboratory analysis of the subsurface soils. This process includes the elimination of constituents that have been determined to be artifacts of the sampling and analysis process and/or are not known to exhibit toxic effects. COCs are defined as those compounds that are potentially site-related and whose data have met the quality control criteria of the analytical methods performed. Compounds determined to be laboratory contaminants or do not exceed background levels were not considered further in the QHHEA.

After the identification of the COCs, a site conceptual model was developed to determine the likely route of exposure that receptors could be exposed to the COCs. The site conceptual model includes the COCs selected, the location of the affected media, the physical properties of the COCs, and the likely location of the receptors.

The contaminant source at the facility includes subsurface soils to a depth of twelve (12) feet as presented in Appendix C on the Remedial Assessment Report (Haley & Aldrich 2002). The following sections discuss the data used in the QHHEA, the identification of the COCs and the potential for current and future impacts to human receptors at the facility.

Identification of COCs

Soil quality data for this evaluation was collected during the Geoprobe® soil-boring program conducted at the facility in September 2000. Each constituent detected above laboratory reporting limits was considered for potential exposure to current and future facility workers. A summary of the soil quality data used in this assessment is provided as Attachment A to this report. The constituents frequently detected in subsurface soils include:

- tetrachloroethene,
- 1,1,1-trichloroethane,
- trichloroethene,
- 1,1-dichloroethene,
- 1,1-dichloroethane,
- 1,2-dichloroethene (cis and trans), and
- vinyl chloride.

The detection of these constituents in the site soils is consistent with the documented release of chlorinated hydrocarbons at the facility. These constituents are not known to occur naturally, thus, the anticipated background level was assumed to be levels present in upgradient monitoring wells (U-6 and U-6D). Therefore, each constituent detected above laboratory reporting limits was selected as a COC and considered further in the QHHEA.

COC Release and Transport Mechanism

To characterize the risk of potential for exposure to the COCs, a site conceptual model was developed to identify potential receptors and to determine if a point of exposure exists currently or is likely in the future. Consistent with NYSDEC DER guidance, the conceptual model considered both current and reasonably foreseeable future facility activities and uses.

Current exposure is based upon existing property conditions, the physical characteristics of the COCs and likely transport mechanisms for the COCs to the point of exposure. These transport mechanisms are used to provide an understanding of potential health risks associated with likely future facility uses. Since each of the COCs are known to be volatile and thus, present in vapor form at standard temperature and pressure, the most likely transport mechanism for each COC from the source (subsurface soils) to the human receptor is through volatilization into ambient air above the impacted soils.

Current Potential Receptor Population

The Source Area is located to the northwest of the facility. This area of the property is covered with geomembrane and was treated using a 2-PHASE Extraction system. Based on the results of the 2000 soil sampling program, soils containing site-related COCs were determined to be located from 2-10 feet below ground surface (BGS) in the Source Area.

The human receptors associated with current and foreseeable future site conditions include facility workers who may conduct landscape activities in this area; and/or personnel assigned to this area of the facility (Parking Lot Security Guard).

Route of Exposure

The assumed route of exposure for these potential receptors included inhalation of contaminated soil vapor air released from the subsurface soils through evaporation/volatilization. The frequency and duration of exposure for receptors under current and foreseeable future facility operation are approximately 8 hours per day, 250 day per year, for 30 years. These values are default assumptions for a commercial workers provided by current USEPA guidance, "Standard Default Exposure Factors" OSWER Directive 9285.6-03, 1991. Receptor-specific inhalation rate is equivalent to a daily inhalation rate of 20 m^3 /day based on this USEPA guidance. Since the COCs are only present in subsurface below 2 feet BGS, direct ingestion and particulate inhalation pathways are not complete.

Point of Exposure

The point of exposure is the location where potential receptors may be exposed to a COC. Depending on the exposure pathway, the point of exposure may consist of an area or zone of potential exposure, or a single exposure point. The soil concentrations determined for each COC during the September 2000 sampling event were evaluated to determine the most likely point of exposure. Based on the prevailing wind direction and the location of the impacted soils, the potential for maximum ambient air impact exists in the northwest corner of the facility parking lot adjacent to the 2-PHASE remediation system.

RESULTS

The results of the QHHEA for the Xerox Blauvelt facility indicates that the current exposure pathway to the COCs identified in the subsurface soils are incomplete. The identified source area of the site is currently covered with an impermeable barrier (geomembrane) liner installed by Xerox in 1995. The liner was installed to enhance the performance of the 2-PHASE vacuum extraction system. Conversely, the liner also serves as an effective barrier to the volatilization of the COCs from the subsurface soils in this area and prevents migration of the COCs to the point of exposure for the current receptor population. Thus, under current site conditions, there are no complete exposure pathways to the identified COCs.

However, the maximum soil concentrations detected during the September 2000 soil-sampling event indicate that COCs are present in isolated areas above accepted risk based values. Since the level of COCs present exceed these levels, additional remedial measures may be warranted to address these areas. If these remedial actions include the removal of the liner, engineering controls through the application of a site-specific health and safety plan (HASP) and Community Air Monitoring Plan (CAMP) should be employed to mitigate potential exposure to the identified COCs by a future receptor population.

ATTACHMENT A

SUMMARY OF SOIL SAMPLE ANALYSIS DATA

HALEY & ALDRICH

ATTACHMENT A

XEROX BLAUVELT REMEDIATION PROGRAM
SUMMARY OF SOILS DATA
SEPTEMBER 2000

PARAMETER	Laboratory Reporting Limit	B301 S4 6-8'	B306 S5 8-10'	B307 S4 6-8'	B307 S7 12-14'	B307 S9	B313 S2 2-4'	B313 S4 6-8'	B314 S3 4-6'	B314 S5 8-10'	B316 S5 8-10'	B317 S2 2-4'	B317 S7
1,1,1-TRICHLOROETHANE	0.005	BDL	BDL	320	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
CIS-1,2-DICHLOROETHENE	0.005	BDL	BDL	160	0.031	4.6	BDL	BDL	BDL	BDL	BDL	10	0.016
TETRACHLOROETHENE	0.005	BDL	BDL	1100	BDL	BDL	28	18	BDL	88	3.6	BDL	BDL
TRICHLOROETHENE	0.005	BDL	BDL	510	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
VINYL CHLORIDE	0.005	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.008

PARAMETER	Laboratory Reporting Limit	B318 S4 6-8'	B318 S6 10-12'	B320 S3 4-6'	B320 S4 6-8'	B321 S5 8-10'	B323 S6 10-12'	B326 S2 2-4'	B326 S5 8-10'	B326 S7 12-14'	B327 S3 4-6'	B327 S6 10-12'	B329 S4 6-8'
1,1,1-TRICHLOROETHANE	0.005	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
CIS-1,2-DICHLOROETHENE	0.005	BDL	BDL	BDL	BDL	BDL	0.006	BDL	BDL	BDL	BDL	0.058	BDL
TETRACHLOROETHENE	0.005	BDL	0.038	BDL	BDL	BDL	BDL	BDL	27	17	BDL	0.039	0.006
TRICHLOROETHENE	0.005	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
VINYL CHLORIDE	0.005	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

PARAMETER	Laboratory Reporting Limit	B329 S7 12-14'	B331 S4 6-8'	B332 S10 18-20'	B332 S8 14-16'	B333 S8 14-16'	B334 S8 14-16'
1,1,1-TRICHLOROETHANE	0.005	BDL	BDL	BDL	BDL	BDL	BDL
CIS-1,2-DICHLOROETHENE	0.005	BDL	BDL	BDL	BDL	BDL	BDL
TETRACHLOROETHENE	0.005	0.016	BDL	0.23	3.4	0.015	0.008
TRICHLOROETHENE	0.005	BDL	BDL	BDL	BDL	BDL	BDL
VINYL CHLORIDE	0.005	BDL	BDL	BDL	BDL	BDL	BDL

NOTES:
1. All results shown in parts per million (PPM)
2. BDL = Below Detection Limit
3. S4 6-8' = Sample #4 from 6-8 feet below ground surface.

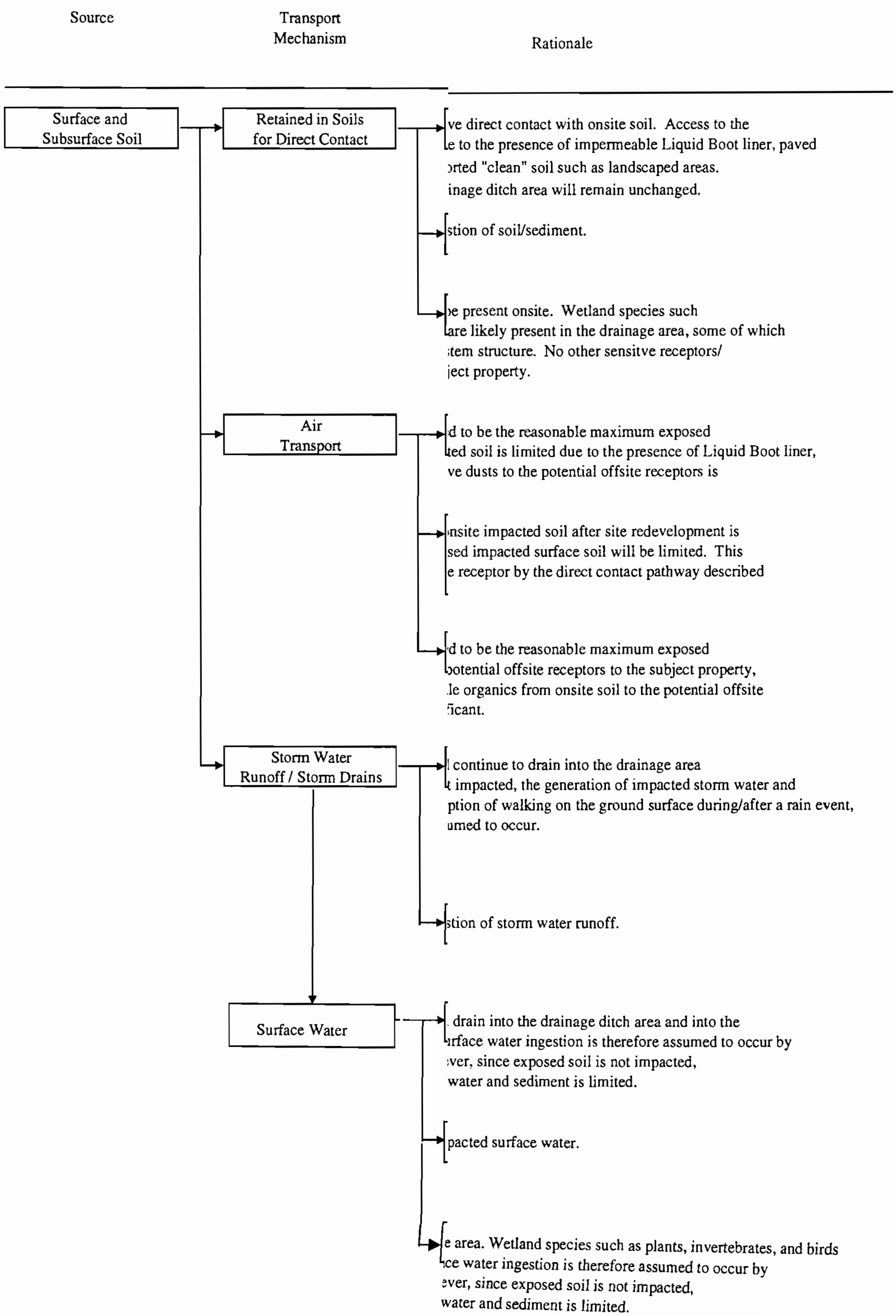
Prepared by Haley Aldrich

ATTACHMENT B

SITE CONCEPTUAL EXPOSURE MODEL
CURRENT CONDITIONS

HALEY & ALDRICH

SOIL PATHWAYS:



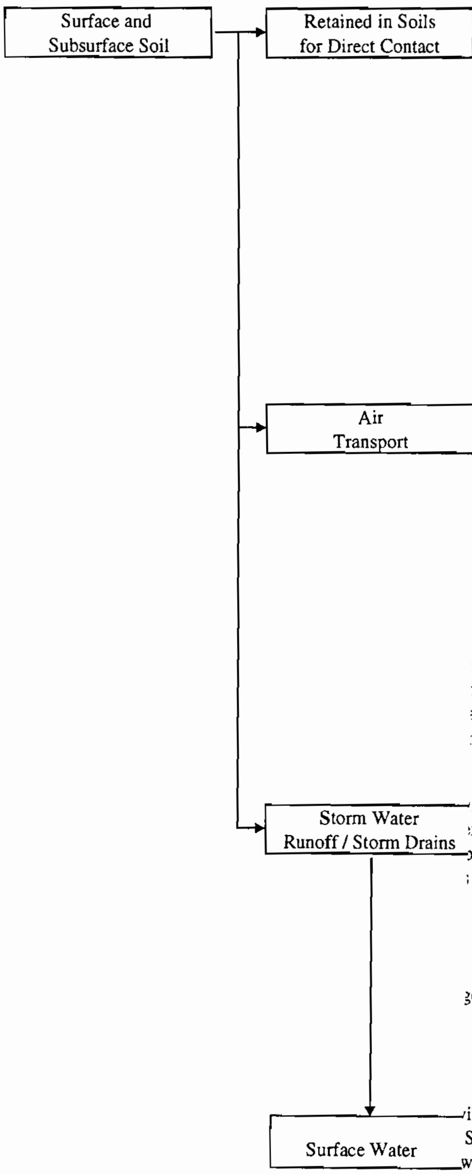
ATTACHMENT C

SITE CONCEPTUAL EXPOSURE MODEL
FUTURE CONDITIONS

HALEY & ALDRICH

EXPOSURE PATHWAY ANALYSIS

Source	Transport Mechanism	Rationale



: direct contact to the area of impacted soil
-oot surface liner. Development of the impacted area
ı appropriate engineering controls.
ɔorted "clean" soil to mitigate exposure and the
ıitoring Plan and Health and Safety Plan (HASP).

estion of soil/sediment.

be present onsite. Wetland species such
s are likely present in the drainage area, some of which
ystem structure. No other sensitve receptors/
bject property.

posed from removal of the Liquid Boot liner,
tive dusts to the potential receptors can
ıentation of a Community Air Montoring Plan.
P.

. onsite impacted soil during site redevelopment is
ɔosed impacted surface soil will be limited. This
ite receptor by the direct contact pathway described

red to be the reasonable maximum exposed
f potential offsite receptors to the subject property,
ıtile organics from onsite soil to the potential offsite
ıificant.

ill continue to drain into the drainage area
xposed, the generation of impacted storm water and sediment \
ɔe accomplished through the implementation of a
; part of a project specific HASP.

ʒestion of storm water runoff.

/ill drain into the drainage ditch area and into the
Surface water ingestion is therefore assumed to occur by
wever, since exposed soil is not impacted,
m water and sediment is limited.

impacted surface water.

age area. Wetland species such as plants, invertebrates, and bir
rface water ingestion is therefore assumed to occur by
ɔwever, since exposed soil is not impacted,
m water and sediment is limited.

APPENDIX B

NYSDEC RECORD OF DECISION, 1993

HALEY & ALDRICH

Department of Environmental Conservation

Division of Hazardous Waste Remediation

Xerox-Blauvelt Site

I.D. Number 344021

Record of Decision

March 1993

New York State Department of Environmental Conservation
MARIO M. CUOMO, *Governor* THOMAS C. JORLING, *Commissioner*

RECORD OF DECISION

XEROX-BLAUVELT SITE

ROCKLAND COUNTY, NEW YORK

ID NO. 344021

PREPARED BY

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

DIVISION OF HAZARDOUS WASTE REMEDIATION

MARCH 1993

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Xerox-Blauvelt Site
Blauvelt
Rockland County, New York
Site Code: 344021
Funding Source: Xerox Corporation

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Xerox-Blauvelt Site in Rockland County, New York. The selection was made in accordance with the New York State Environmental Conservation Law (ECL), and is consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"). This decision document summarizes the factual and legal basis for selecting the remedy for this site.

Exhibit A identifies the documents that comprise the Administrative Record for the site. The documents in the Administrative Record are the basis for the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision ("ROD") may present a substantial threat to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The major elements of the selected remedy include:

- o A **remedial design program** to verify the components of the conceptual design and provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Uncertainties identified during the remedial investigation and feasibility study will be resolved (especially the vertical extent of contamination in the deep bedrock).

- o **Preventing the further spread of contaminated groundwater** by installing groundwater extraction wells at the leading edges of the plume. Operation of the existing containment wells on the Xerox property where groundwater is most contaminated will be continued.

- o **Active remediation of groundwater** by collecting and treating groundwater from under the Xerox building, from the former tank storage area, and from properties to the north. Groundwater collection will be enhanced by using a two phase (groundwater + soil vapor) high vacuum extraction process patented by Xerox Corporation (2 Phase™ Process). Groundwater will be treated by a combination of technologies (e.g. air stripping, UV light catalyzed oxidation, and adsorption onto activated carbon). Areas to be disturbed by the installation of the groundwater collection system will be surveyed by a competent biologist prior to installation to ensure that important faunal or floral species are not destroyed.

- o Active remediation of contaminated soils by extracting contaminants from the soil under high vacuum using the 2 Phase™ Process wells installed beneath the Xerox building and in the former tank storage area. The contaminated vapors collected by this process will be treated using activated carbon or other suitable technologies before release to the atmosphere. Remediation of the soils will prevent groundwater from becoming recontaminated.

- o Indirect remediation of surface water, sediments, and ambient air by treating the sources of contaminants to these media, namely the contaminated groundwater and soil. Since the degree of contamination of the nearby stream (surface water and its sediments) and the air is low, directly treating the sources of the contamination will result in the cleanup of the stream and air.

- o An environmental monitoring program to evaluate the performance of the remedial program and to ensure that carrying out the remedy does not create additional problems such as adverse air emissions or impacts to surface water. This will also include the monitoring of the fish and invertebrates in the nearby stream by a competent biologist.

DECLARATION

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. This remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because this remedy will not allow for unlimited use and unrestricted exposure within five years after commencement of remedial action, a five year policy review will be conducted. This evaluation will be conducted within five years after the components of the remedy have been constructed to ensure that the remedy continues to provide adequate protection of human health and the environment.

March 29, 1993
Date

Ann Hill DeBarbieri
Ann Hill DeBarbieri
Deputy Commissioner
Office of Environmental Remediation
New York State Department of Environmental Conservation

TABLE OF CONTENTS

Glossary of Acronyms

CERCLA: Comprehensive Environmental Response, Compensation and Liability Act
DCE: Dichloroethene
ECL: Environmental Conservation Law
FWIA: Fish and Wildlife Impact Analysis
IRM: Interim Remedial Measure
NAPL: Non-Aqueous Phase Liquid
NCP: National Contingency Plan
ND: Not Detected
NYCRR: N.Y. Codes, Rules, and Regulations
NYSDEC: N.Y. State Department of Environmental Conservation
NYSDOH: N.Y. State Department of Health
O&M: Operation and Maintenance
PCE: Perchloroethene
ppb: parts per billion
ppm: parts per million
PRAP: Proposed Remedial Action Plan
RI/FS: Remedial Investigation and Feasibility Study
ROD: Record of Decision
SARA: Superfund Amendments and Reauthorization Act
SCG: Ständards, Criteria, and Guidance
SPDES: State Pollution Discharge Elimination System
TCE: Trichloroethene
VOC: Volatile Organic Compound
ug/kg: microgram per kilogram
mg/kg: milligram per kilogram
ug/l: microgram per liter

Notice

The mention of any trade names or commercial products in this document does not constitute any endorsement or recommendation for use by the the New York State Department of Environmental Conservation.

RECORD OF DECISION
XEROX-BLAUVELT SITE
SITE ID NO. 344021

I. SITE LOCATION AND DESCRIPTION

The Xerox-Blauvelt Site is located (see Figures 1 and 2) at approximately the intersection of State Route 303 and Bradley Hill Road in Blauvelt, Rockland County, New York. The Xerox facility lies between the west side of Route 303 and an active freight rail line owned by Conrail. A small unnamed tributary that discharges into the Hackensack River runs along the western perimeter of the Xerox facility to the north into a light industrial park. The Site is located in a valley that slopes downward to the north. Groundwater moves predominantly to the north-northwest. Potable water for the area is provided by a combination of individual supply wells and public water. Users in the area contaminated by this site are all supplied by the public water authority. The source of this water is not impacted by site contamination. The geology of the site area is characterized by an overburden of glacial till underlain by sandstones of the Brunswick Formation. Currently, the operations at the facility are limited to the storage and distribution of copiers/equipment and various office functions. Previously, the facility was used for the cleaning and refurbishing of electrostatic copiers and copier parts.

For the purposes of the following discussions, the overall "Site" can be thought of as consisting of "on-site" and "off-site" components. On-site refers to the property leased and operated by Xerox Corporation and off-site refers to other properties influenced by the migration of contaminated groundwater from the facility. These properties include a light industrial/corporate park and a private swim club. To minimize confusion, the term "Site" as used here refers to all lands influenced by contamination resulting from previous operations at the Xerox facility.

II. SITE HISTORY AND ENFORCEMENT STATUS

Operations that resulted in the contamination of the Site took place during the 1970s and no longer occur. Beginning in 1970, a variety of solvents were used to spray clean electrostatic copiers and copier parts. The solvents were composed of a blend of chlorinated organic compounds (e.g. tetrachloroethene, trichloroethene, 1,1,1-trichloroethane) and mineral spirits. The mineral spirits helped to reduce the amount of solvent evaporation during the spray cleaning process.

Fresh and spent solvents used in the refurbishing process were stored in two underground storage tanks located at the north end of the property. On at least two occasions, overflows from the waste solvent tank resulted in the release of contaminants onto the ground surface. The released contaminants seeped into the surrounding soils and groundwater. Additionally, solvents were released into the soils and groundwater underneath the plant building where the refurbishing operations took place. The storage tanks were removed in December 1979 and the refurbishing operations were phased out.

In 1980, Xerox Corporation conducted a groundwater investigation at the site and found that groundwater was contaminated with tetrachloroethene, trichloroethene, and methylene chloride. Additional sampling and analysis by the Department also indicated the presence of 1,1,1-trichloroethane. On December 6, 1983, the Department transmitted a claim letter to

Xerox Corporation under the provisions of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). This letter stated that Xerox Corporation may be responsible for the releases at the site.

In August 1984, the Department and Xerox Corporation entered into an Order on Consent which called for Xerox to complete additional investigations at the site. The results of that investigation (approved in May 1985) showed soil contamination in the former underground tank storage area, a north-northwest groundwater flow direction, and groundwater contamination including chemicals floating on the groundwater table. Additional confirmatory investigations were conducted in the fall of 1985.

On April 16, 1989, the Department and Xerox entered into a second Order on Consent which called for Xerox to take steps (interim remedial measures (IRMs)) to prevent the migration of contaminated groundwater off-site and to complete a Remedial Investigation and Feasibility Study (RI/FS). The purpose of the RI/FS, completed in December 1992, was to determine the nature and extent of the contamination both on-site and off-site and to identify the best alternative for remediating the contamination found.

In response to the environmental conditions found at the site, "Interim Remedial Measures (IRMs)" have been implemented to reduce the migration of contaminants from the site and reduce the levels of contaminants present on-site. Beginning in 1989, groundwater containment wells were operated at the northern perimeter of the site to prevent any further migration of contaminated groundwater to the north. Contaminants are removed from the collected water which is then released to the nearby stream. Additionally, a system to remove soil contaminants by extracting soil vapor under vacuum has been tested and operated in the former tank area. The vapors and water collected during this process are also treated before release. Regular monitoring is conducted to ensure that the treatment systems are operating properly. The information obtained by designing and implementing these IRMs was used during the evaluation of full scale remedial alternatives in the feasibility study. Figure 7 shows the locations of the IRM operations.

The main components of the RI included obtaining and analyzing samples of soil, soil vapor (to help define the extent of groundwater contamination), groundwater, air, surface water, surface water sediments, and other physical data needed to establish the extent of contamination. The purpose of the feasibility study was to identify the best alternative to mitigate the negative impacts created by the presence of contamination in the affected media (soil, groundwater, surface water, etc.).

A third Order on Consent will be negotiated between the Department and Xerox which will address the implementation of the remedy selected in this decision document.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

A Citizen Participation (CP) Plan was developed and implemented to provide concerned citizens and organizations with opportunities to learn about and comment upon the investigations and studies. All major reports were placed in document repositories in the vicinity of the site and made available for public review. A public contact list was developed and used to distribute fact sheets and meeting announcements.

On February 4, 1993, a public meeting was held at the Orangetown Town Hall to present the results of the RI/FS and to describe the proposed remedy. Prior to the meeting, a news release was issued and an invitation/fact sheet was mailed to those persons on the contact list. The public comment period regarding the RI/FS and the proposed remedy extended from January 11, 1993 until February 15, 1993.

Inquiries and comments (written and verbal) were received and responded to throughout the course of the project from citizens, elected officials, and special interest groups. Comments received regarding the Proposed Remedial Action Plan have been addressed and are documented in the Responsiveness Summary (Exhibit C).

IV. SCOPE AND ROLE OF THE RESPONSE ACTION

The remedial action selected in this document addresses the Xerox facility and areas immediately to the north. The media contaminated at the Site include on-site soils, on-site groundwater, off-site groundwater, and to a much lesser extent, surface water/sediments (nearby stream), and releases from contaminated soils into the air by volatilization. The principal threat at the Site is the contaminated soil on-site which releases contaminants to the other media. The information below further defines the risks presented by the Site and describes how the remedy will minimize these risks.

Groundwater underneath the Xerox property moves towards the north-northwest. The nearest water supply wells in the vicinity of the Site have been found to be unaffected by contamination from this Site. Drinking water for the majority of nearby residences comes from the local public water supply. All water consumers in the area of contaminated groundwater are supplied by the local water authority.

In some cases, the characteristics of a given site make it advantageous to complete the investigations and remedial actions in distinct pieces, or "operable units." An example would be a site where there was a landfill, a lagoon, and a storage area. In that case, it could be more efficient to address each unit separately. At the Xerox-Blauvelt Site, there were no advantages in dividing the Site into separate operable units. Therefore, the remedy selected in this document addresses the entire site.

V. SUMMARY OF SITE CHARACTERISTICS

As discussed in more detail in the RI/FS Reports, the media contaminated at the Site include on-site soils, on-site groundwater, off-site groundwater, and to a much lesser extent, surface water/sediments (nearby stream), and releases from contaminated soils into the air by volatilization. The principal threat at the Site is the contaminated soil on-site which releases contaminants to the other media. Groundwater underneath the Xerox property moves towards the north-northwest. The nearest water supply wells in the vicinity of the Site have been found to be unaffected by contamination from this Site. Drinking water for the majority of nearby residences comes from the local public water supply. More specifically, the major conclusions from these investigations can be summarized as follows:

Soils

Soils underneath the Xerox building and in the former tank storage area are contaminated with (primarily) tetrachloroethene (maximum at 9,590,000 ppb underneath the building), 1,1,1-trichloroethane (1,520,000 ppb), and trichloroethene (156,000 ppb). The highest soil contaminant concentration found off-site was immediately north of the Xerox facility (tetrachloroethene at 28 ppb; this is not significant). Tables 1 and 2 summarize the on-site and off-site soil quality data.

Groundwater

Groundwater in both the soils above bedrock and in the bedrock is contaminated by Site related compounds. Two separate groundwater plumes exist. The first is located under the main building at the facility where the refurbishing operations took place during the 1970's. The second plume begins in the former underground tank storage area and extends approximately 1400 feet to the north-northwest. The western extent of the plume is roughly outlined by the railroad tracks and the eastern extent is marked by a rise in topography to the east of the swim club (see Figures 3-5). No groundwater supply wells are known to exist within the area of contaminated groundwater.

The highest concentrations of contaminants in groundwater are found on-site at the water table in the former tank storage area. The predominant contaminants found are 1,2-dichloroethene (a degradation product of trichloroethene) found at a maximum concentration of 311,000 parts per billion (ppb). Other predominant contaminants include tetrachloroethene (maximum of 72,000 ppb) and 1,1,1-trichloroethane (maximum at 57,000 ppb). These high concentrations reflect the presence of residual amounts of the solvents spilled in the 1970s. These liquids, termed non-aqueous phase liquids (NAPLs), exist in thin layers up to approximately two inches thick and contribute to groundwater and soil contamination. The groundwater standard for these and many of the other contaminants is 5 ppb. Off-site, concentrations decline rapidly and are predominated by tetrachloroethene (highest concentration found is 5,880 ppb immediately north of the Xerox property). The typical depth of groundwater from land surface is 10 to 20 feet. Tables 3-8 summarize the groundwater data.

Surface Water/Sediments

Contaminated groundwater discharges into a small man-made pond in the corporate park which in turn discharges into the stream that empties into the Hackensack River. Figure 6 shows the locations of the surface water/sediment sampling stations. Contaminant concentrations are highest in the pond (tetrachloroethene at 54 ppb) and diminish rapidly due to volatilization. Contaminant concentrations in the stream sediments follow the same pattern. Tables 9 and 10 summarize the surface water/sediment quality data.

The main source of descriptive information for the site are the RI/FS Report (see the Administrative Record, Exhibit A). A complete description of the site can be found in that document.

VI. SUMMARY OF SITE RISKS

In accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP, 40 CFR Part 300), a baseline risk assessment has been completed as one component of characterizing the site. The results of the baseline risk assessment are used to help identify potential remedial alternatives and select a remedy.

Part of the RI/FS process included evaluating the risks presented to human health and the environment by the Site as it exists now. The results of this "baseline risk assessment" are used to help identify applicable remedial alternatives and select a remedy. The components of the baseline risk assessment for this Site include:

- a review of the Site environmental setting;
- identification of Site-related chemicals and media of concern;
- an evaluation of the toxicity of the contaminants of concern;
- identification of potential exposure pathways;
- estimating the added risk of experiencing health effects; and
- an evaluation of the impacts of the Site upon the environment.

Exposure pathways consist of five elements: a source of contamination, transport through an environmental media, a point of exposure, a route of human exposure, and an exposed population. An exposure route is the mechanism by which contaminants enter the body (e.g., inhalation, ingestion, absorption).

The risk assessment for this Site consists of a human health assessment and a Fish and Wildlife Impact Analysis (Appendix D and section 1.6, respectively, of the Feasibility Study). The human health assessment identified the potential exposure pathways as being contaminated surface water, sediments, and air. The potential exposure routes identified included incidental ingestion of surface water, incidental ingestion of sediments, dermal (skin) exposure to surface water, dermal exposure to sediments, and breathing contaminated air. The exposure scenarios evaluated included adult and youth trespassers exposed to contaminated surface water/sediments, and workers exposed to contaminated air.

To estimate risks, it is necessary to establish a set of exposure conditions such as amounts of media consumed or exposed to, contaminant concentrations in the media, frequency and duration of exposures, and so forth. In this case, reasonable maximum exposures were estimated based upon actual Site data and generally agreed upon exposure values. For example, to evaluate the risk posed to a trespassing youth who may ingest stream water, it was assumed that the youth would ingest 50 milliliters (1.7 ounces) per hour, four hours per day, two days per week, 22 weeks per year, for nine years. Contaminants were divided into the two categories of carcinogens and those that may cause non-cancer health effects.

The results of the human health assessment indicate that left unremediated, the greatest risk of an increased incidence of cancer would be for adult trespassers with dermal exposure to surface water. The main reason why the calculated risks were greater for adult trespassers than youth is that adults were assumed to have a much longer overall exposure period (30 versus 9 years). The incremental risk of additional cancers for adult trespassers was estimated to be 1.0 per million of exposed population. That is, if one million adult trespassers were exposed to surface water as assumed in the assessment, approximately one of those persons would be predicted to develop a form of cancer. The contaminant contributing the most to this risk is tetrachloroethene.

Sampling of ambient air in the former tank storage area indicated the presence of trichloroethene at levels that exceed guidance levels based on breathing contaminated air 24 hours per day for a lifetime (70 years). Based upon a very limited amount of data, a conservative estimate of the increased risk of cancer was predicted to be 4 in one million. It must be emphasized that this estimate applies to conditions on the Xerox facility.

The risks associated with exposure to noncarcinogenic contaminants are determined using the "Hazard Index" approach. A Hazard Index is the ratio of predicted exposure levels to acceptable exposure levels. A Hazard Index greater than one indicates that adverse noncarcinogenic effects may occur, while a value below one indicates that such effects are unlikely to occur. At this Site, the total Hazard Index for exposure to noncarcinogenic related contaminants is much less than one, suggesting that adverse noncarcinogenic effects are not likely to occur.

There are a number of assumptions, uncertainties, and limitations associated with these estimates that are addressed in the Feasibility Study. In general, the main sources of uncertainty include, among others:

- actual exposure levels;
- accuracy of toxicological data; and
- the complex interaction of the uncertainty elements.

To evaluate environmental impacts, a Fish and Wildlife Impact Analysis (FWIA) was completed. The main conclusions of the FWIA are that the adverse impacts of Site related contaminants on terrestrial and aquatic life are limited, that the implementation of the remedy will result in minor negative impacts to the terrestrial habitat on-site and off-site, and that the positive effects to water quality associated with remediation exceed and offset the negative impacts.

In summary, the results of the baseline risk assessment indicate the potential for increased risk of cancer if exposure to site contaminants occurs. If groundwater from within the area of contamination were to be used as a source of drinking water, significant risks would be incurred. Adverse impacts upon fish and wildlife are limited. The major environmental medium of concern is contaminated soil that results in the contamination of groundwater and the release of contaminants to surface water/sediments and the air. The existing and potential threat to human health and the environment indicate the need to implement a remedy to mitigate these concerns to the extent feasible.

VII. DESCRIPTION OF THE REMEDIAL ALTERNATIVES

To determine the most appropriate method for remediating the site, the Feasibility Study completed a process that took place in three parts. The first step identified and "screened" a large number of technologies that could be employed at the site to treat, contain, or dispose of the contaminants. Technologies that passed the initial screening phase were then grouped into different combinations to form remedial alternatives for further evaluation. After an initial analysis to identify the most promising alternatives, a detailed analysis was performed to serve as the basis for selecting a preferred alternative.

To identify technologies useful in addressing the contamination at the site, the three progressively more specific categories of "general response actions," "remedial technologies," and "process options" were identified. For example, regarding debris/soil, one of the general response actions considered was containment. This was then narrowed into the remedial technology of capping which was further subdivided into the process options of synthetic, asphaltic, and layered caps. A summary of the general response actions, remedial technologies, and process options considered is given in the Feasibility Study.

The initial screening process evaluates all of the identified process options against the single criterion of technical implementability. This also includes the evaluation of the "No Action" alternative which is carried through the entire process to demonstrate the need for remediation at the site and as a requirement of the NCP. A detailed discussion and evaluation of the initial screening process can be found in Section 4 of the Feasibility Study.

The remedial technologies and process options that passed the screening process were then assembled into different combinations or remedial alternatives. Theoretically, an immense number of combinations are possible but the NCP provides guidance (40 CFR 300.430(e)(3)) on how to assemble suitable technologies into alternative remedial actions for evaluation. Three sets of alternatives are described: (1) a range of alternatives that remove or destroy contaminants to the maximum extent feasible and eliminate or minimize to the degree possible, the need for long-term management; (2) "other alternatives which, at a minimum, treat the principal threats posed by the site but vary in the degree of treatment employed and the quantities and characteristics of the treatment residuals and untreated waste that must be managed;" and (3) "one or more alternatives that involve little or no treatment, but provide protection of human health and the environment primarily by preventing or controlling exposure to ... contaminants, through engineering controls" and other methods to "assure continued effectiveness of the response action."

Other than the no-action alternative which is carried through the analysis for comparison purposes, the potential alternatives for remediating the Site present different methods for achieving the major goals of treatment of on-site soil contamination, preventing the further spread of groundwater contamination (containment), and active treatment of contaminated groundwater. The alternatives vary in their approach to these major goals. Additional goals include the restoration of surface water/sediments and air quality that is influenced by Site contaminants. Although a large number of possible alternatives could be defined, the Feasibility Study presents six alternatives that are representative of the possible actions that could be taken.

As presented below, present worth is the amount of money needed now (in 1992 dollars and with 5% interest) to fund the construction, operation, and maintenance (O&M) of the alternative for 30 years. These figures do not include the costs already incurred to complete the investigations or to complete the interim remedial measures at the site. Capital cost mainly reflects initial construction costs and annual O&M reflects an average over 30 years of the money needed to operate and maintain the alternative for one year. Time to implement refers to the time needed to achieve remedial objectives. All costs and implementation times are estimates.

<u>Alternative 1:</u> **No action + monitoring.**

Present Worth: $315,100
Annual O&M: $20,500
Capital Cost: $0

Time to Implement: 30 years

The costs and activities associated with this alternative all deal with monitoring. Continuation of the existing IRMs would not be included in this "no-action" alternative. Samples of groundwater, stream water, sediments, and ambient air would be taken on an annual basis. This will also include the monitoring of the fish and invertebrates in the nearby stream by a competent biologist. Provision is also made for maintenance of the wells.

<u>Alternative 2:</u> Soil vapor extraction/ treatment + NAPL recovery/disposal + groundwater containment/remediation/ treatment (2 Phase™ & conventional wells) + monitoring

Present Worth: $3,238,000
Annual O&M: $92,000
Capital Cost: $1,828,000
Time to Implement: 5-10 years

This alternative includes the installation of vacuum extraction (2 Phase™ Process) and conventional groundwater extraction wells to contain and collect groundwater. Under Alternative 2, the components of the existing IRMs would continue and would be expanded. The 2 Phase™ Process is a remedial technology patented by Xerox Corporation that simultaneously combines groundwater and soil vapor removal under conditions of high vacuum (20-25 inches of mercury). The 2 Phase™ wells would also be used to collect soil vapor and thereby remove the volatile contaminants from the soils under the building and in the former tank storage area. Before groundwater is extracted in the tank area and under the building, the 2 Phase™ wells would be used to remove NAPLs present on top of the water table and in the associated soils.

Contaminated groundwater would be collected from all three zones identified during the remedial investigation including the overburden (soils above bedrock), shallow bedrock (the first 15 - 20 of bedrock), and deep bedrock (below shallow bedrock to the base of the groundwater plume at perhaps 100 feet below land surface).

Collected groundwater would be treated using one or more of the processes including air stripping, UV light catalyzed oxidation, carbon adsorption, and applicable physical treatment steps such as filtration and phase separation. Treated groundwater would be discharged in accordance with appropriate standards to the nearby stream.

Collected soil vapors would be treated by carbon adsorption or other process options to ensure that adverse air emissions would not occur. NAPLs collected from the soil vapor and groundwater recovery systems would be disposed of off-site in accordance with the applicable requirements for the management of hazardous waste. Both air and water discharges would be monitored to ensure compliance with the appropriate requirements.

The various components of the alternative would be constructed and operated in phases to prevent the unintentional expansion of the areas of contamination. This could happen, for example, if on-site groundwater was lowered before the NAPLs were removed. Since the blending of the chlorinated solvents with mineral spirits resulted in a mixture with a density less than water, the NAPLs rest on top of the water table. If the water level was lowered with the NAPLs still present, they would move with the water table and further contaminate the soils below the existing water table.

Operation and maintenance (O&M) activities would include the soil and groundwater 2 Phase™ Process systems on-site and off-site, the soil vapor treatment systems, the conventional groundwater collection systems, the groundwater treatment systems, and the monitoring systems (both process monitoring and environmental sampling and analysis).

The environmental monitoring provisions of Alternative 1 would be supplemented by the air and water discharge compliance monitoring described above.

<u>Alternative 3:</u> Soil vapor extraction/ treatment + NAPL recovery/disposal + groundwater containment/remediation treatment (2 Phase™ & conventional wells) + enhanced bioremediation + monitoring

Present Worth: $3,542,000
Annual O&M: $99,500
Capital Cost: $2,016,000
Time to Implement: 5-10 years

This would be the same as Alternative 2 except that the system would be designed and operated so as to enhance the on-site biodegradation of the contaminants. This would primarily involve supplying adequate oxygen to the subsurface and adding essential nutrients to stimulate the growth of naturally present organisms capable of degrading the Site contaminants. This process would apply primarily to the mineral spirits since the chlorinated compounds are more resistant to biodegradation. Additional data would be needed to meaningfully predict the effectiveness of this technology.

The remaining components of the alternative, including the monitoring provisions, would be the same as for Alternative 2.

<u>Alternative 4:</u> Soil cap + NAPL recovery/ disposal + (conventional wells) + groundwater containment/remediation/ treatment (conventional wells) + monitoring

Present Worth: $2,035,000
Annual O & M: $76,500
Capital Cost: $870,500
Time to Implement: 30 years

The main differences between Alternative 4 and Alternatives 2 and 3 are that there would be no soil vapor extraction components, areas with significant soil contamination would be covered to reduce the infiltration of precipitation, and only conventional groundwater extraction wells would be used rather than a combination of conventional and 2 Phase™ Process wells. Since the use of the 2 Phase™ Process wells is considered somewhat innovative, this alternative represents a more typical approach to groundwater contamination problems.

Since it is anticipated that NAPL recovery and soil treatment would be less effective than for Alternatives 2/3, a soil cover (asphalt) is proposed to limit the infiltration of precipitation. This will result in the lessening of contaminant leaching from the soils into groundwater.

The methods employed to treat and discharge groundwater and to dispose of collected NAPLs would be the same as for Alternatives 2/3.

O&M activities include maintaining the soil cover, operating the groundwater collection/treatment systems, repairing and replacing components as needed, and implementing the various monitoring requirements.

Alternative 5: Soil vapor extraction/ treatment + NAPL recovery/disposal + groundwater containment/treatment (2 Phase™ & conventional wells) + monitoring

Present Worth: $2,243,000
Annual O&M: $85,400
Capital Cost: $931,300
Time to Implement: 30 years

This alternative is similar to Alternative 4 in that it is primarily a containment alternative. It would go beyond Alternative 4 by including a component to actively remediate the on-site soils that serve as a source of groundwater contamination. Rather than cover the soils, 2 Phase™ Process wells would be used to remove contaminants from the shallow soils by vacuum extraction. NAPLs would be recovered under vacuum, collected, and disposed off-site. The existing groundwater containment wells would continue to be operated to prevent further off-site migration of groundwater contaminants. Contaminated groundwater within the on-site plumes would not, however, be collected and treated.

Off-site, conventional groundwater recovery wells would be used to contain the plume and prevent further migration. There would not be any active collection and treatment of groundwater from within the body of the off-site plume.

Contaminated groundwater and soil vapor would be treated and released as described above. O&M activities would be similar to those described in Alternative 2.

Alternative 6: NAPL recovery/disposal (conventional wells) + soil excavation and on-site treatment (aeration) + groundwater containment/treatment (conventional wells) + monitoring

Present Worth: $2,163,000
Annual O&M: $71,200
Capital Cost: $1,069,000
Time to Implement: 30 years

This alternative differs in that it involves the excavation of contaminated soils for treatment using an aeration process rather than treating the soils in place using a vacuum extraction process. Approximately 3,000 cubic yards of the most heavily contaminated soils from the former tank storage area would be excavated, processed, and treated by forcing air through the soil mass. Contaminants in the soil would transfer into the air stream which would be subsequently treated (e.g. activated carbon) to prevent adverse air emissions. If the degree of treatment was adequate, soils would be placed back into the areas they were removed from.

Deeper soils that could not be practicably excavated would be treated using 2 Phase™

Process wells as described above. Collected vapors would be treated along with those from the excavated soils.

On-site groundwater would be contained using the existing conventional recovery wells. Groundwater treatment and discharge would be the same as described above.

Off-site, a system of conventional groundwater recovery wells would be used to contain the off-site plume. There would not be a component for actively collecting and treating water from within the body of the plume. Again, groundwater would be treated to established levels before release to the nearby stream.

O&M activities would be similar to those described above except for activities associated with the operation of the soil excavation and aeration system. Monitoring would be similar to the activities described in Alternative 2.

VIII. SUMMARY OF THE COMPARATIVE ANALYSIS OF THE ALTERNATIVES

The Site specific goals for remediating this Site can be summarized in general as follows:

- o reduce soil contamination to prevent soils from releasing contaminants to groundwater that would result in exceedances of groundwater quality standards through partitioning, leaching, or other mechanisms;
- o reduce soil contamination so that contaminants are not released to the ambient air resulting in exceedances of ambient air standards or risk based guidance values;
- o reduce soil contamination to levels that do not exceed health-based exposure levels for reasonable worst case direct exposure scenarios;
- o reduce the concentration of groundwater contaminants to the higher of prerelease conditions or water quality standards;
- o reduce the concentration of contaminants in groundwater that discharges to surface water and sediments to prevent exceedances of surface water/sediment quality standards and/or guidance values;
- o indirectly reduce the concentration of contaminants in surface water/sediments to levels below standards and/or guidance values by treating contaminated groundwater;
- o indirectly reduce the concentration of contaminants in air to the higher of background or ambient air standards/guidance by treating soils that serve as the source of released contaminants.

Table 11 lists chemical specific cleanup goals for groundwater and soil. The ability of the selected remedy to obtain these goals across the Site is dependent upon many factors. These include the natural heterogeneities of the soil, groundwater, and bedrock systems at the site, the characteristics of the contaminants involved, and the physical limitations of the technologies that comprise the remedy. As part of the remedial design process, a remedy "Performance Analysis and Design Modification Plan" shall be developed and implemented during the remediation to monitor and evaluate the effectiveness of the remedy and make changes, if needed, to improve the ability of the selected remedy to achieve the remedial goals. The plan shall include specific and measurable performance criteria and steps to be taken if criteria are not met. This process shall include obtaining Department approval for any physical changes to the design of the remedy.

The selected remedy for the Site is Alternative 2, soil vapor extraction/treatment + NAPL recovery/disposal + groundwater containment/remediation/ treatment (2 Phase™ & conventional wells) + monitoring. Based on available information, this alternative appears to provide the best balance of trade-offs among the alternatives with respect to the evaluation criteria described below. This section evaluates the expected performance of the remedy against these criteria.

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is given followed by an evaluation of the preferred and optional alternatives against that criterion.

Threshold Criteria - The first two criteria must be satisfied in order for an alternative to be eligible for selection.

1. Protection of Human Health and the Environment--This criterion is an overall and final evaluation of the health and environmental impacts to assess whether each alternative is protective. This evaluation is based upon a composite of factors assessed under other criteria, especially short/long-term impacts and effectiveness and compliance with SCGs (see below).

The remedy will control risks to human health and the environment by reducing the release of contaminants to the groundwater, surface water, and air pathways. The combination of on-site treatment of contaminated soils along with the containment and treatment of contaminated groundwater both on and off-site will eliminate the source of continuing contamination, prevent the further spread of contaminants, and actively reduce the concentration of contaminants in the environment. The cleanup of the soil and groundwater will result in the indirect cleanup of the air, surface water, and stream sediments. The relatively low level of contamination in these media and the low risks to human health and the environment make it appropriate to remediate them indirectly. No unacceptable short-term risks or cross-media impacts will be caused by implementation of the remedy.

It is possible that a greater degree of contaminant reduction in soil could be obtained by excavation and ex-situ processing. However, this would create potential air emission problems resulting in the exceedance of ambient air quality guidelines with the resulting additional health risks.

2. Compliance Standards, Criteria, and Guidance (SCGs)--Compliance with SCGs addresses whether or not a remedy will meet all Federal and State environmental laws and regulations and if not, provides grounds for invoking a waiver.

The implementation of the selected remedy should result in compliance with all SCGs. The primary SCGs associated with this Site are the groundwater quality standards promulgated in 6 NYCRR Part 703. Although the hydrogeologic complexities of the soil and bedrock may ultimately make it impracticable to reduce the concentration of all groundwater contaminants to levels below the groundwater standards at all locations, Alternative 2 presents the most "feasible" (as defined by the evaluation criteria described in this section) method to achieve the goal of restoring groundwater to pre-release conditions and mitigating significant threats to human health or the environment.

Implementation of Alternative 2 should also result in the attainment of soil quality objectives based upon guidance for the protection of human health, the environment, and groundwater quality. By remediating soil and groundwater, surface water/sediments and air quality guidance targets should also be attained.

Primary Balancing Criteria - The next five "primary balancing criteria" are used to weigh major trade-offs among the different hazardous waste management strategies.

3. Short-term Impacts and Effectiveness--The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment are evaluated. The length of time needed to achieve the remedial objectives is estimated and compared with other alternatives.

Alternative 2 presents the opportunity to achieve a high degree of effectiveness in obtaining the remedial objectives while at the same time minimizing the possibilities for adverse impacts to the community, workers, and the environment. This is made possible by performing the active treatment steps without exposing people or surface habitats to contaminated media. Contaminated groundwater will be extracted from the ground and piped to a treatment facility. Contaminated soils will be treated in place. Although workers involved in the construction of the remedy will be exposed to contaminated media, standard precautions required by law can mitigate the exposure concerns.

The direct excavation and treatment of contaminated soil would result in a shorter time to achieve soil cleanup goals but this would be at the expense of greater potential for adverse exposures to the community and the environment.

It is possible that the addition of a bioremediation component in Alternative 3 would lessen the time needed to achieve the remedial goals. However, the predominant contaminants are resistant to biodegradation and additional data would be needed to determine if significant time savings could realistically by found. Additionally, pilot scale tests of the 2 Phase™ Process wells alone (without enhancing biodegradation) demonstrated the ability to achieve significant contaminant reductions.

4. Long-term Effectiveness and Permanence--If wastes or residuals will remain at the Site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude and nature of the risk presented by the remaining wastes; 2) the adequacy of the controls intended to limit the risk to protective levels; and 3) the reliability of these controls.

The goal of implementing Alternative 2 would be to remove as much of the contaminants in the soil and groundwater as feasible. Therefore, the need to control residuals will be minimized. Once appropriate long-term monitoring has shown that the remedy has substantially obtained the remedial goals, no active waste management should be needed.

The preferred remedy would be permanent in that contaminants will be removed from the Site rather than simply contained or treated and left in place.

Only Alternatives 2 and 3 would completely contain the areas of contamination and actively reduce contaminant concentrations. The feasibility study concludes that the levels of overall contaminant reduction achieved by Alternatives 2 and 3 would be comparable. Therefore, the additional costs incurred in implementing Alternative 3 would not be worthwhile. The similarities in effectiveness are primarily due to the volatility of the contaminants which makes their removal by vacuum extraction favorable, and the resistance of the chlorinated components to biodegradation.

5. Reduction of Toxicity, Mobility, or Volume--Preference is given to alternatives that permanently, and by treatment, significantly reduce the toxicity, mobility, or volume of the wastes at the Site. This includes assessing the fate of the residues generated from treating the wastes at the Site.

The selected remedy will permanently reduce the volume of contaminants at the Site by extraction from soils and groundwater. Mobility would be reduced in that the areal extent of contaminated groundwater would be maintained at current levels by the installation and operation of containment wells. Without a combination of containment and active remediation of both groundwater and soil, the likelihood of obtaining the remedial objectives in a reasonable amount of time would be greatly diminished.

The fate of the residues generated from the treatment of wastes at the Site is dependent upon the treatment process involved. Air stripping results in the release of contaminants to the ambient air. When the rate of this release results in the prediction that ambient air standards or guidance values would be exceeded, additional treatment steps would be required. This prevents the cleanup of one media at the expense of another. Where activated carbon is used to remove contaminants from either water or a vapor stream, the carbon would be sent off-site for regeneration at an approved facility. Other techniques, such as catalytic oxidation, may be employed to convert collected contaminants into non-toxic end products such as carbon dioxide and water.

6. Implementability--The technical and administrative feasibility of implementing the alternative is evaluated. Technically, this includes the difficulties associated with the construction and operation of the alternative, the reliability of the technology, and the ability to effectively monitor the effectiveness of the remedy. Administratively, the availability of the necessary personnel and materiel is evaluated along with potential difficulties in obtaining special permits, rights-of-way for construction, etc.

No significant obstacles are envisioned for implementing the selected remedy. Each of the technologies proposed have been successfully implemented at the Site on a pilot scale. Since the areas of contamination extend into multiple properties, arrangements for access to construct and operate the remedy must be completed but this should be manageable.

7. Cost--Capital and operation and maintenance costs are estimated for the alternatives and compared on a present worth basis. Although cost is the last criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for final selection.

The present worth cost of the selected remedy ($3,238,000) is the lowest cost of the alternatives that adequately meet the remedial goals for the Site.

Estimated Costs (Present Worth) of Alternatives:

Alternative 1:	No action + monitoring	$ 315,100
Alternative 2:	Soil vapor extraction/ treatment + NAPL recovery/disposal + groundwater containment/remediation/ treatment (2 Phase™ & conventional wells) + monitoring	$3,238,000
Alternative 3:	Soil vapor extraction/treatment + NAPL recovery/disposal + groundwater containment/remediation treatment (2 Phase™ & conventional wells) + enhanced bioremediation monitoring	$3,542,000
Alternative 4:	Soil cap + NAPL recovery/ disposal + (conventional wells) + groundwater containment/remediation/ treatment (conventional wells) + monitoring	$2,035,000
Alternative 5:	Soil vapor extraction/ treatment + NAPL recovery/disposal + groundwater containment/treatment (2 Phase™ & conventional wells) + monitoring	$2,243,000
Alternative 6:	NAPL recovery/disposal (conventional wells) + soil excavation and on-site treatment (aeration) + groundwater containment/ treatment (conventional wells) + monitoring	$2,163,000

Modifying Criterion - This final criterion is taken into account after evaluating those above. It is focused upon after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance--Concerns of the community regarding the RI/FS Reports and the Proposed Remedial Action Plan have been evaluated. A "Responsiveness Summary" has been prepared that describes public comments received and how the Department has responded to the concerns raised. The Responsiveness Summary is included in this document as Exhibit C.

IX. SELECTED REMEDY

The remedy selected for the site by the NYSDEC was developed in accordance with the New York State Environmental Conservation Law (ECL) and is consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 USC Section 9601, et. seq., as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA).

Based upon the results of the Remedial Investigation and Feasibility Study (RI/FS), and the criteria for selecting a remedy, the NYSDEC has selected Alternative 2 (groundwater containment + groundwater collection and treatment + NAPL collection and disposal + soil treatment via vacuum extraction). The on-site containment/treatment of groundwater and a limited soil vapor extraction system is already in place. The first stage of the off-site groundwater containment system is under construction. The estimated cost to implement the remedy (present worth) is $3,238,000. The cost to construct the remedy is estimated to be $1,828,000. The average annual operation and maintenance cost is estimated to be $92,000.

The elements of the selected remedy are as follows:

- o A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Uncertainties identified during the remedial investigation and feasibility study will be resolved.

- o **Preventing the further spread of contaminated groundwater** by installing groundwater extraction wells at the leading edges of the plume. Operation of the existing containment wells on the Xerox property where groundwater is most contaminated will be continued.

- o **Active remediation of groundwater** by collecting and treating groundwater from under the Xerox building, from the former tank storage area, and from properties to the north. Figure 8 illustrates a conceptual design of the groundwater containment and collection system for the Site. Groundwater collection will be enhanced by using a two phase (groundwater + soil vapor) high vacuum extraction process patented by Xerox Corporation (2 Phase™ Process). Groundwater will be treated by a combination of technologies (e.g. air stripping, UV light catalyzed oxidation, and adsorption onto activated carbon). Areas to be disturbed by the installation of the groundwater collection system will be surveyed by a competent biologist prior to installation to ensure that important faunal or floral species are not destroyed.

- o **Active remediation of contaminated soils** by extracting contaminants from the soil under high vacuum using the 2 Phase™ Process wells installed beneath the Xerox building and in the former tank storage area. The contaminated vapors collected by this process will be treated using activated carbon or other suitable technologies before release to the atmosphere. Remediation of the soils will prevent groundwater from becoming recontaminated.

- o **Indirect remediation of surface water, sediments, and ambient air** by treating the sources of contaminants to these media, namely the contaminated groundwater and soil. Since the degree of contamination of the nearby stream (surface water and its sediments) and the air is low, directly treating the sources of the contamination will result in the cleanup of the stream and air.

- o **An environmental monitoring program** to evaluate the performance of the remedial program and to ensure that carrying out the remedy does not create additional problems such as adverse air emissions or impacts to surface water. This will also include the monitoring of the fish and invertebrates in the nearby stream by a competent biologist.

The performance goals to be obtained include:

1. reduce soil contamination to prevent soils from releasing contaminants to groundwater that would result in exceedances of groundwater quality standards through partitioning, leaching, or other mechanisms;

2. reduce soil contamination so that contaminants are not released to the ambient air resulting in exceedances of ambient air standards or risk based guidance values;

3. reduce soil contamination to levels that do not exceed health-based exposure levels for reasonable worst case direct exposure scenarios;

4. reduce the concentration of groundwater contaminants to the higher of background or water quality standards;

5. reduce the concentration of contaminants in groundwater that discharges to surface water and sediments to prevent exceedances of surface water/sediment quality standards and/or guidance values;

6. indirectly reduce the concentration of contaminants in surface water/sediments to levels below standards and/or guidance values by treating groundwater; and

7. indirectly reduce the concentration of contaminants in air to the higher of background or ambient air standards/guidance by treating soils that serve as the source of released contaminants.

Table 11 summarized the chemical specific remedial goals for soil and groundwater. As discussed above, a "Performance Analysis and Design Modification Plan" shall be developed and implemented to evaluate the effectiveness of the remedy and, if necessary, make changes within the scope of the remedy to improve performance.

X. STATUTORY DETERMINATIONS

The following discussion describes how the remedy complies with the decision criteria in the laws and regulations.

1. Protection of Human Health and the Environment

The selected remedy will control risks to human health and the environment by removing contaminants from soils, groundwater, and indirectly, from surface water and air. By employing an in-situ remedial process, exposure to site contaminants will be minimal. Soil vapor vacuum extraction techniques will be used to remove contaminants from soils. The extracted soil vapor will be treated to remove contaminants before the vapor is released to the atmosphere. Routine testing of the air discharge will confirm that releases are within acceptable limits. Contaminated groundwater generated from the groundwater recovery networks and the vacuum extraction systems will also be treated before release to the nearby stream. Again, regular monitoring of the discharge will be performed to ensure that there are no adverse impacts to the stream. Implementation of the remedy will continue until such time that a demonstration has been made to the satisfaction of the Department that the results are protective of human health and the environment. No unacceptable short-term risks or cross-media impacts will be caused by implementation of the remedy.

2. Compliance with ARARs

The implementation of the selected remedy should result in compliance with all ARARs. Chemical specific ARARs include regulatory standards and guidance values for maximum concentrations in groundwater, surface water/sediments, air, and soils. The selected remedy will comply with these ARARs by removing the contaminants from the soils and groundwater which release contaminants to the other media. Within the scope of the remedy, the remedial process will continue and be modified, if necessary, until it has been shown that further reductions in contaminant concentrations in the various media is not technically practicable and the results attained are protective of human health and the environment.

Since the remedy is an in-situ response, the action specific ARARs include releases of treated groundwater and vapors along with incidental actions such as the disposal of drill cuttings and treatment residuals (e.g. spent activated carbon). The release of treated water and vapors will be accomplished in accordance with the applicable requirements. All incidental disposal actions will also be carried out in compliance with the applicable requirements.

Although the Site does not include location sensitive areas (e.g. regulated wetlands, coastal zone, historic areas, etc.), location specific issues will be addressed. Specifically, before construction begins, a competent biologist where survey the areas will construction will occur to ensure that no sensitive flora or fauna will be damaged by the action. Since the remedy will encompass properties owned by more than one party, steps will be taken to address property specific issues.

3. Cost-Effectiveness

Of the alternatives that can achieve the remedial goals and meet the threshold evaluation criteria, the selected remedy has the lowest cost.

4. Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable.

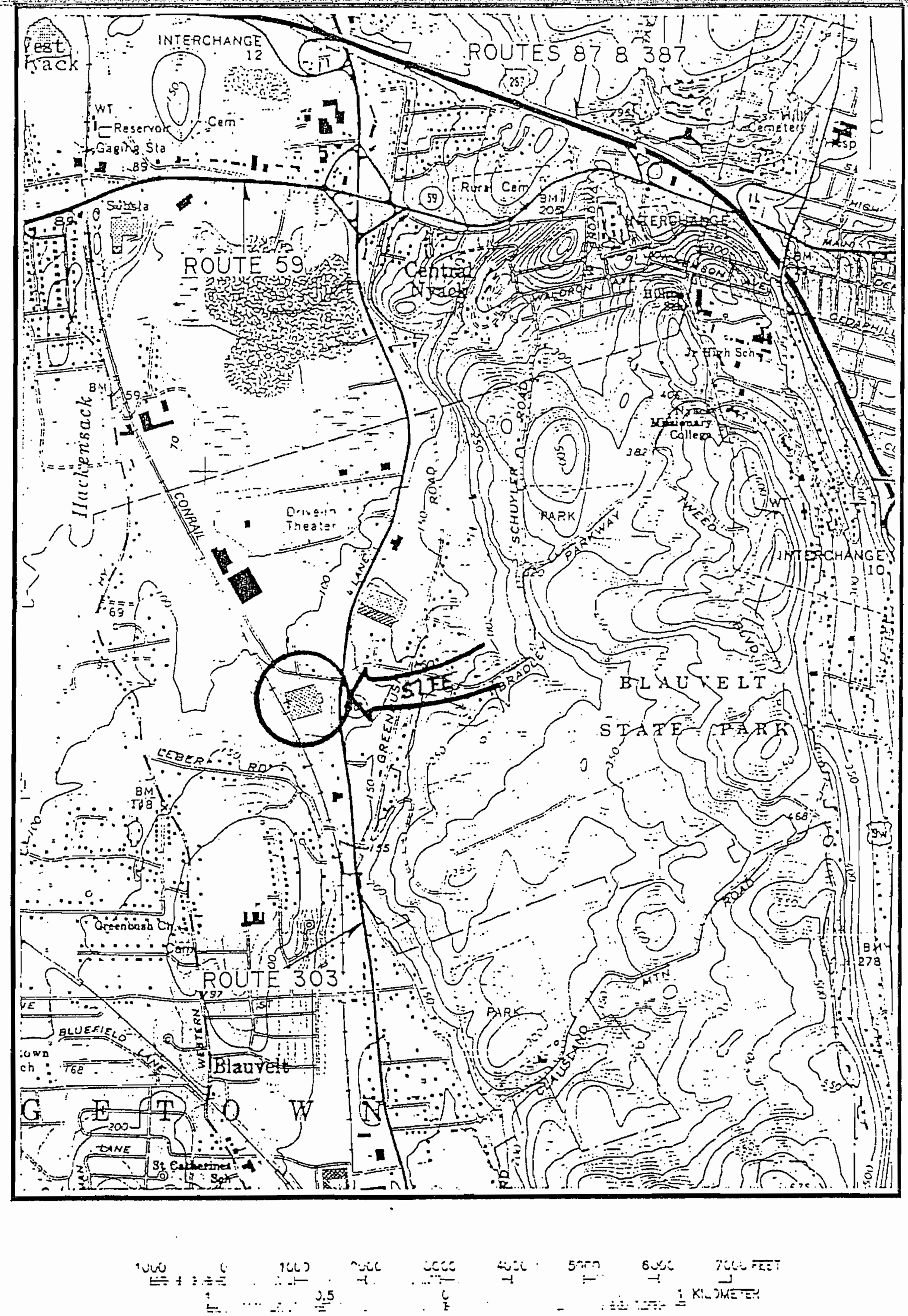
The NYSDEC has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the site. Of those alternatives that are protective of human health and the environment and comply with ARARs, the State has determined that this remedy provides the best balance of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume, short-term impacts and effectiveness, implementability, and cost, also considering the statutory preference for treatment as a principal element.

The selected remedy is permanent since contaminants will be removed from the impacted media and not simply contained. The use of a high vacuum soil vapor and groundwater extraction system is considered to be an alternative treatment technology. This technology comprises a major portion of the overall remedy.

5. Preference for Treatment as a Principal Element

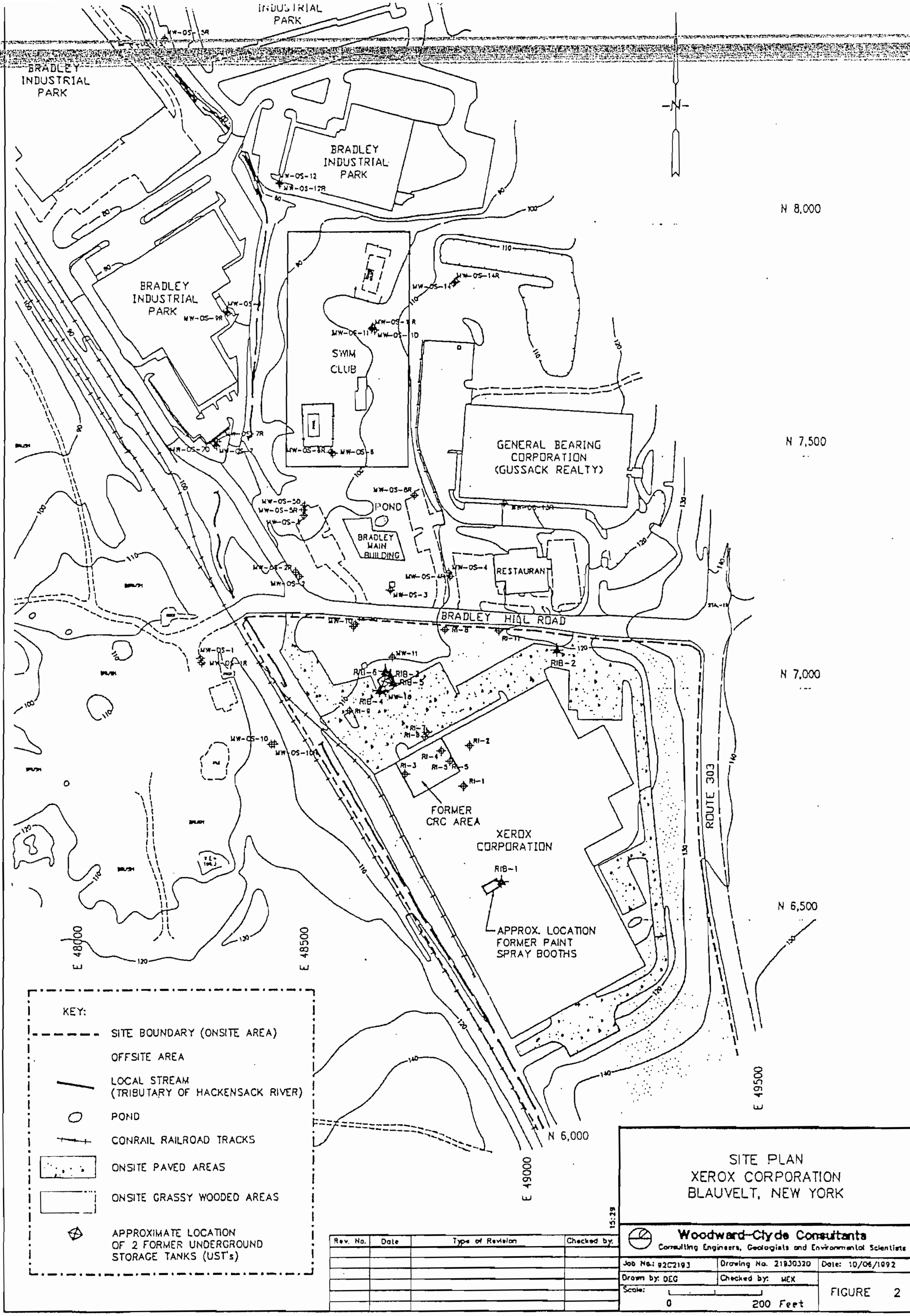
The principal element of the selected remedy is treatment of groundwater and soil. Contaminated soil will be treated with the vacuum extraction system. Contaminated groundwater will be extracted and treated by a combination unit operations including, as applicable, phase separation, air stripping, ultraviolet peroxidation, and carbon adsorption. Collected soil vapor will be treated using activated carbon or another technology with equivalent or superior removal efficiencies.

FIGURES



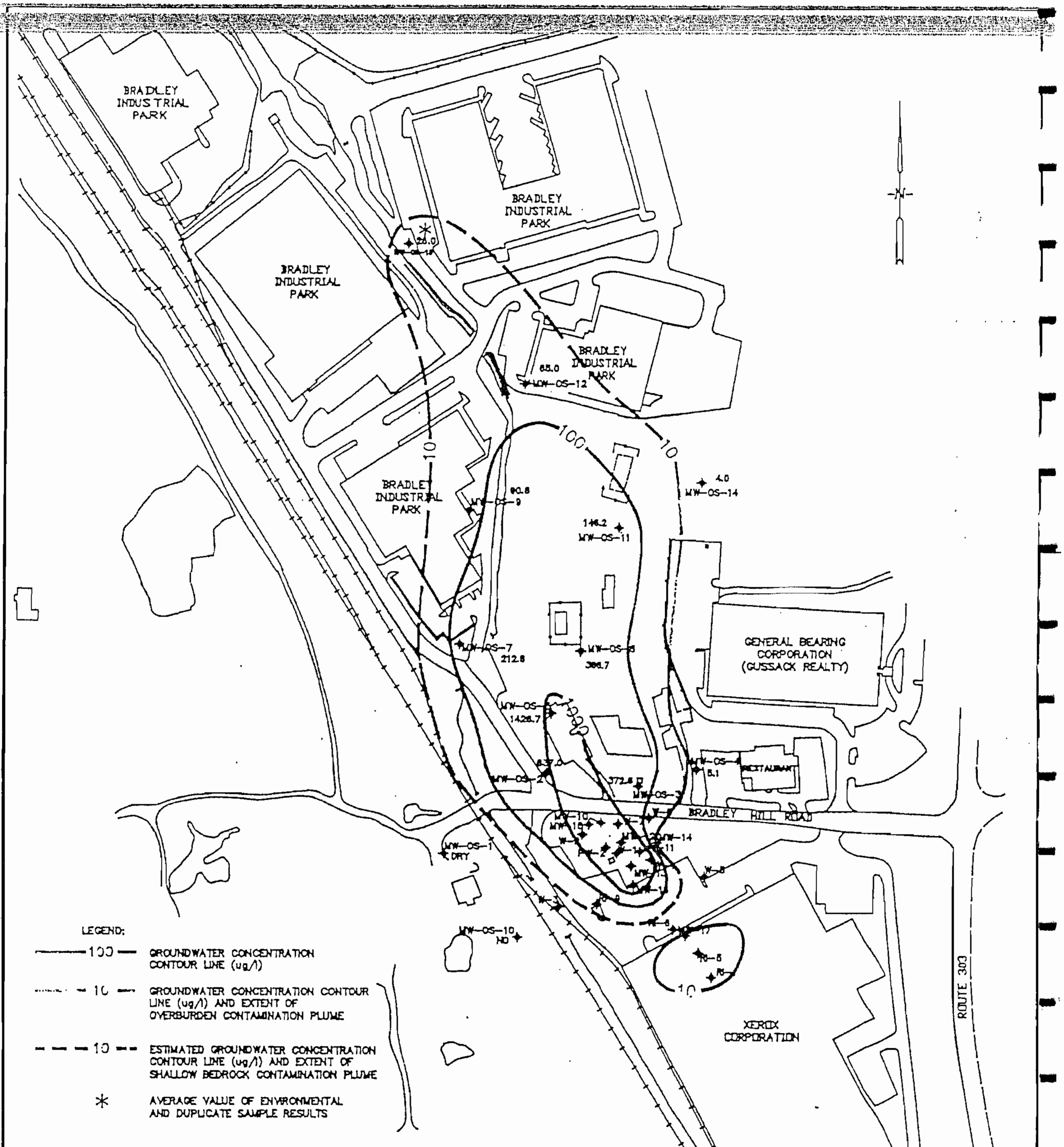
REGIONAL LOCATION PLAN

FIGURE 1



SITE PLAN
XEROX CORPORATION
BLAUVELT, NEW YORK

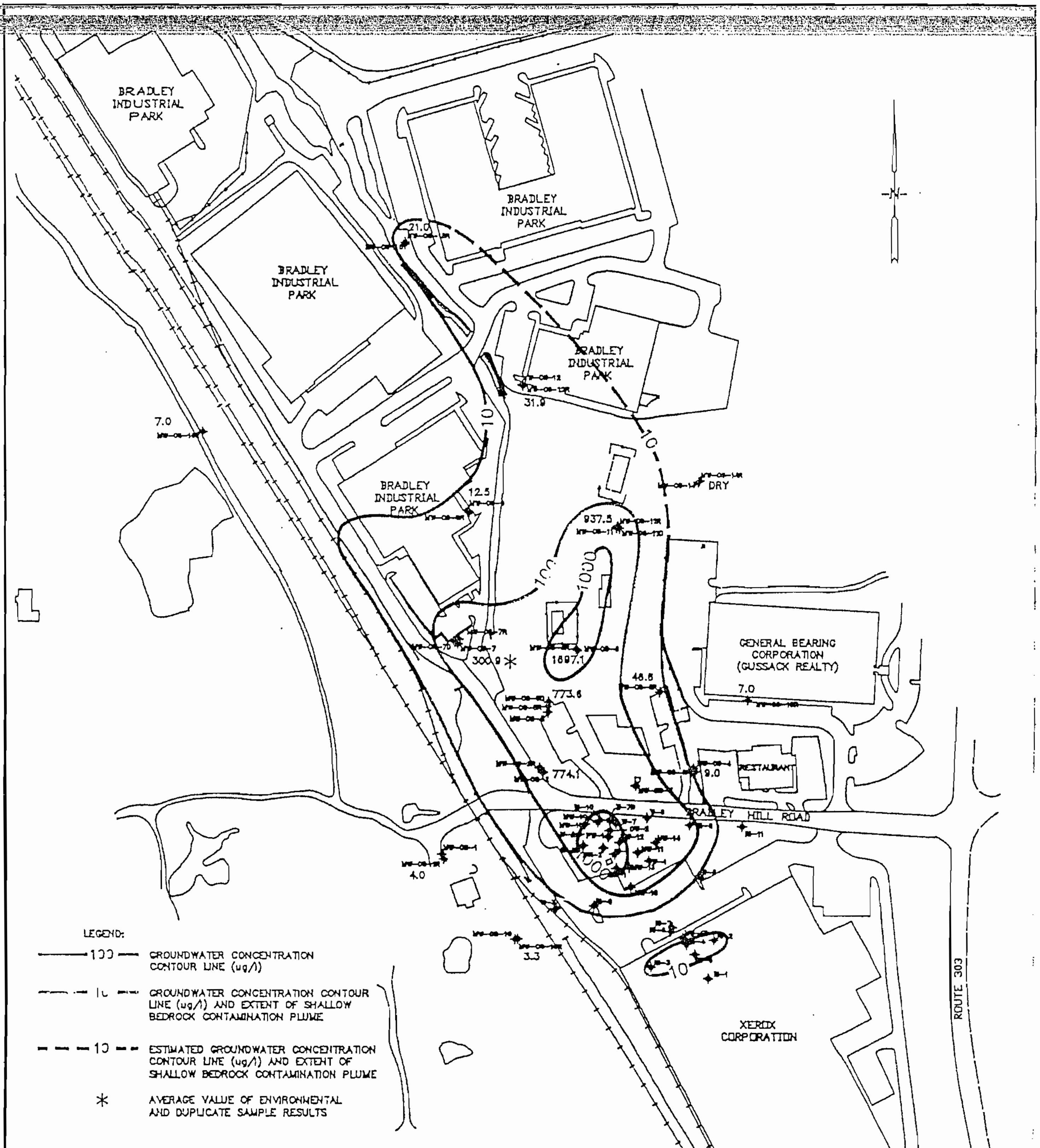
FIGURE 2



EXTENT OF OVERBURDEN GROUNDWATER PLUME
TOTAL VOLATILE ORGANICS
3rd QUARTER (JULY) 1992
XEROX CORPORATION
BLAUVELT, NEW YORK

Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Scientists

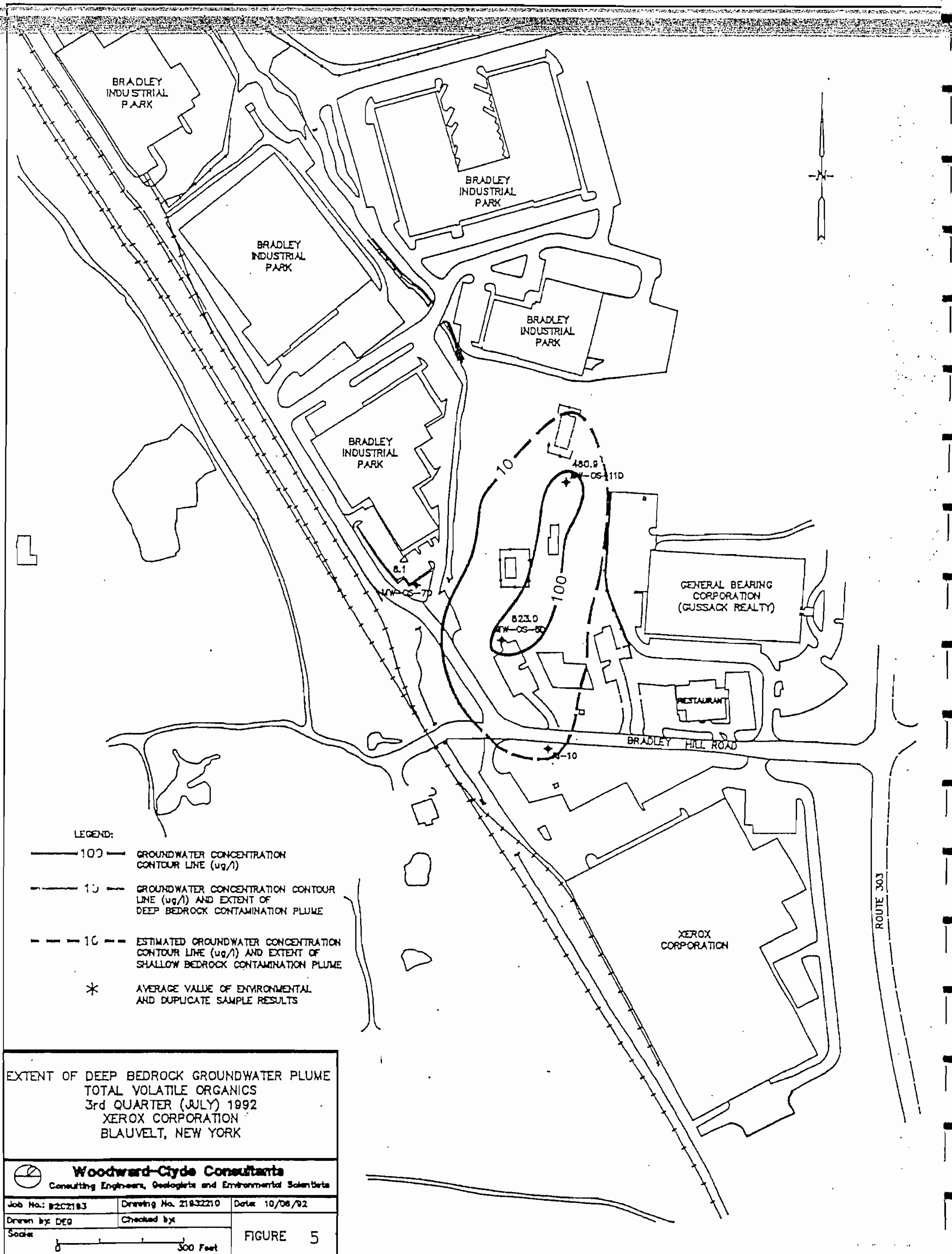
Job No.: 92C2193	Drawing No. 21832190	Date: 10/08/1992
Drawn by: DEG	Checked by:	FIGURE 3
Scale: 0 — 300 Feet		

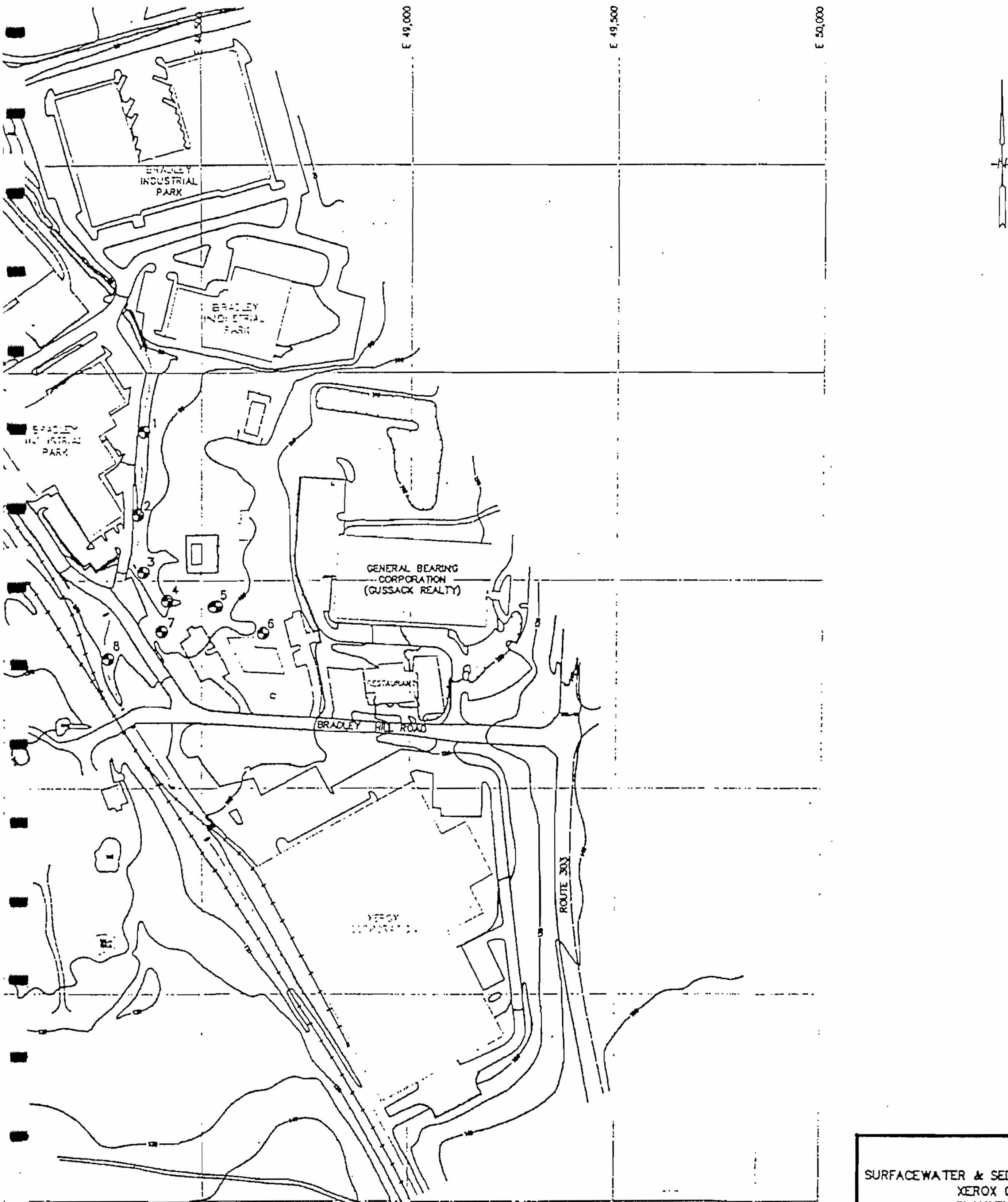


EXTENT OF SHALLOW BEDROCK GROUNDWATER PLUME
TOTAL VOLATILE ORGANICS
3rd QUARTER (JULY) 1992
XEROX CORPORATION
BLAUVELT, NEW YORK

Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Scientists

Job No.: 92C2183	Drawing No. 21932200	Date: 10/06/1992
Drawn by: DEG	Checked by:	FIGURE 4
Scale: 0 — 300 Feet		


BRADLEY INDUSTRIAL PARK
BRADLEY INDUSTRIAL PARK
BRADLEY INDUSTRIAL PARK
BRADLEY INDUSTRIAL PARK
BRADLEY INDUSTRIAL PARK
10
480.9
MW-OS-11D
100
8.1
MW-OS-7D
823.0
MW-OS-8D
GENERAL BEARING CORPORATION (GUSSACK REALTY)
RESTAURANT
BRADLEY HILL ROAD
-10
ROUTE 303
XEROX CORPORATION
LEGEND:
100 GROUNDWATER CONCENTRATION CONTOUR LINE (ug/l)
10 GROUNDWATER CONCENTRATION CONTOUR LINE (ug/l) AND EXTENT OF DEEP BEDROCK CONTAMINATION PLUME
10 ESTIMATED GROUNDWATER CONCENTRATION CONTOUR LINE (ug/l) AND EXTENT OF SHALLOW BEDROCK CONTAMINATION PLUME
* AVERAGE VALUE OF ENVIRONMENTAL AND DUPLICATE SAMPLE RESULTS
EXTENT OF DEEP BEDROCK GROUNDWATER PLUME
TOTAL VOLATILE ORGANICS
3rd QUARTER (JULY) 1992
XEROX CORPORATION
BLAUVELT, NEW YORK
Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Scientists
Job No.: 92C2193
Drawing No. 21932210
Date: 10/06/92
Drawn by: DEG
Checked by:
Scale
0
300 Feet
FIGURE 5



LOCATED APPROXIMATELY 500' UPSTREAM FROM SOUTH END OF XEROX CORP. BUILDING 9

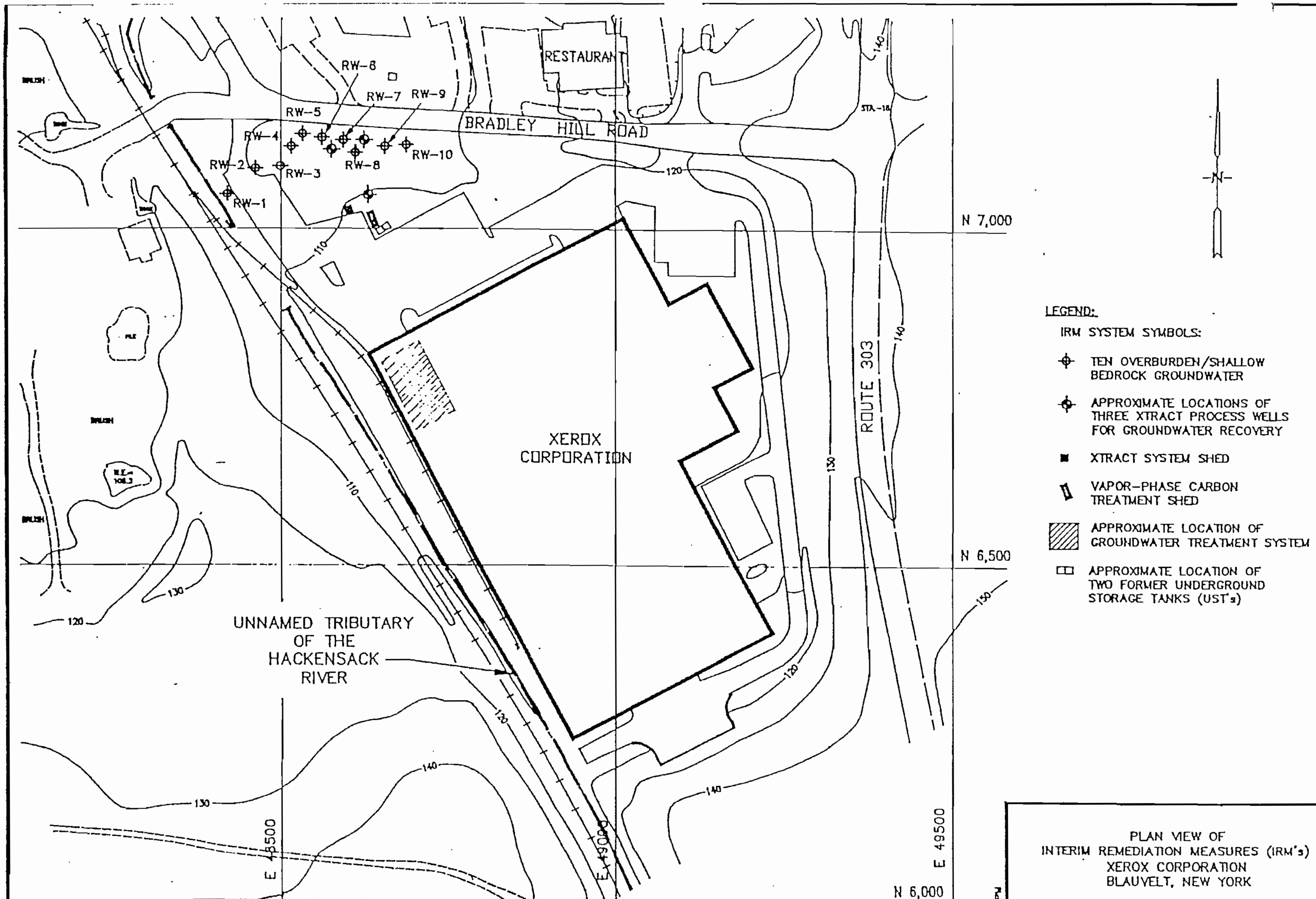
Rev. No.	Date	Type of Revision	Checked by:

11:50

SURFACEWATER & SEDIMENT SAMPLING LOC
XEROX CORPORATION
BLAUVELT, NEW YORK

Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental

Job No.: 92C2193	Drawing No. 21932130	Date: 10/0
Drawn by: DEG	Checked by:	FIGURE
Scale: 0 — 300 Feet		

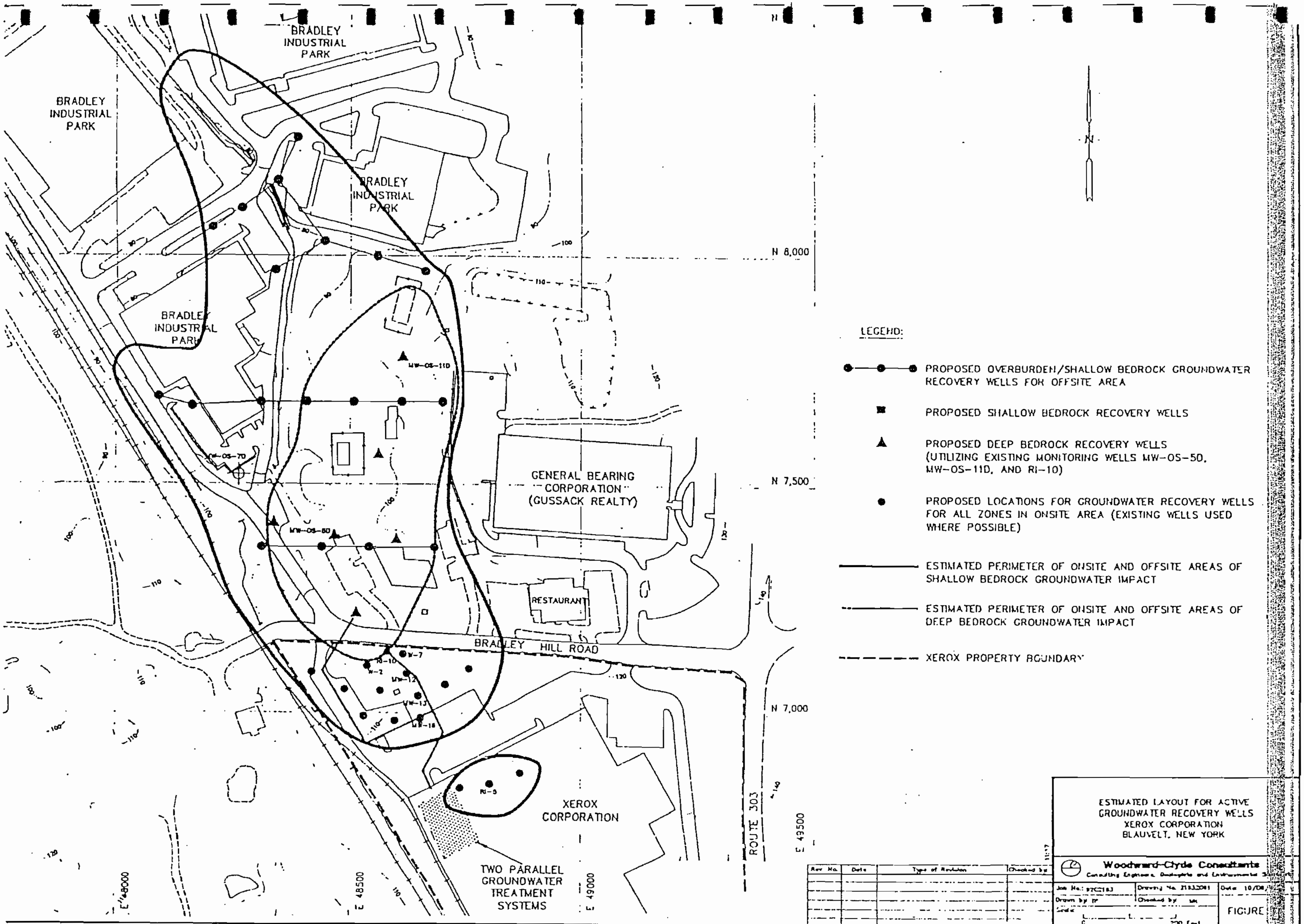


PLAN VIEW OF
INTERIM REMEDIATION MEASURES (IRM's)
XEROX CORPORATION
BLAUVELT, NEW YORK

Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Scientists

Job No.: 92C2183	Drawing No. 21932180	Date: 10/06/92
Drawn by: DEO	Checked by: DMH	FIGURE 7
Scale: 200 FT.		

Rev. No.	Date	Type of Revision	Checked by:


LEGEND:
PROPOSED OVERBURDEN/SHALLOW BEDROCK GROUNDWATER RECOVERY WELLS FOR OFFSITE AREA
PROPOSED SHALLOW BEDROCK RECOVERY WELLS
PROPOSED DEEP BEDROCK RECOVERY WELLS (UTILIZING EXISTING MONITORING WELLS MW-OS-50, MW-OS-11D, AND RI-10)
PROPOSED LOCATIONS FOR GROUNDWATER RECOVERY WELLS FOR ALL ZONES IN ONSITE AREA (EXISTING WELLS USED WHERE POSSIBLE)
ESTIMATED PERIMETER OF ONSITE AND OFFSITE AREAS OF SHALLOW BEDROCK GROUNDWATER IMPACT
ESTIMATED PERIMETER OF ONSITE AND OFFSITE AREAS OF DEEP BEDROCK GROUNDWATER IMPACT
XEROX PROPERTY BOUNDARY
BRADLEY INDUSTRIAL PARK
BRADLEY INDUSTRIAL PARK
BRADLEY INDUSTRIAL PARK
BRADLEY INDUSTRIAL PARK
GENERAL BEARING CORPORATION (GUSSACK REALTY)
RESTAURANT
BRADLEY HILL ROAD
ROUTE 303
XEROX CORPORATION
TWO PARALLEL GROUNDWATER TREATMENT SYSTEMS
MW-OS-11D
MW-OS-50
MW-OS-70
N 8,000
N 7,500
N 7,000
E 48000
E 48500
E 49000
E 49500
ESTIMATED LAYOUT FOR ACTIVE GROUNDWATER RECOVERY WELLS
XEROX CORPORATION
BLAUVELT, NEW YORK
Woodward-Clyde Consultants
FIGURE

TABLES

TABLE 1

SUMMARY OF ON-SITE SOIL QUALITY
RANGE OF ANALYTICAL CONCENTRATIONS
XEROX, BLAUVELT, NEW YORK

Well Designation

Parameter (ug/kg)	Minimum	Location	Date	Maximum	Location	Date
Methylene chloride	ND	--	--	276,000*	RI-5/VES-1	10/90
Vinyl chloride	ND	--	--	515	RIB-4	10/90
Chloroethane	ND	--	--	271	RIB-4	10/90
1,1-Dichloroethene	ND	--	--	12.3	RI-6	10/90
1,1-Dichloroethane	ND	--	--	269	RIB-4	10/90
1,2-Dichloroethane	ND	--	--	16.2	RIB-4	10/90
1,2-Dichloroethene (cis+trans)	ND	--	--	19,200	RIB-3	10/90
1,1,1-Trichloroethane	ND	--	--	1,520,000	RI-5/VES-1	10/90
Trichloroethene	ND	--	--	156,000	RI-5/VES-1	10/90
Tetrachloroethene	ND	--	--	9,590,000	RIB-3	10/90
Toluene	ND	--	--	104	RIB-4	10/90
Ethylbenzene	ND	--	--	28.4	RIB-4	10/90
Total Xylenes (o,m,p)	ND	--	--	91,800	RI-10	10/90
Total Volatiles	ND	--	--	10,902,000	RI-5/VES-1	10/90
Mineral Spirits	ND	--	--	71,700,000	RI-5/VES-1	10/90
Lead (ppm)	ND	--	--	4,520	RIB-2	10/90

ND = None Detected
*Analyte found in lab or method blank.

TABLE 2

SUMMARY OF OFF-SITE SOIL QUALITY
RANGE OF ANALYTICAL CONCENTRATIONS
XEROX, BLAUVELT, NEW YORK

Well Designation

Parameter (ug/kg)	Minimum	Location	Date	Maximum	Location	Date
Methylene chloride	ND	--	--	12.4*	MW-OS-6R	9/91
Vinyl chloride	ND	--	--	ND	--	--
Chloroethane	ND	--	--	ND	--	--
1,1-Dichloroethene	ND	--	--	ND	--	--
1,1-Dichloroethane	ND	--	--	ND	--	--
1,2-Dichloroethane	ND	--	--	ND	--	--
1,2-Dichloroethene (cis+trans)	ND	--	--	cis 10.7	MW-OS-2R	10/91
1,1,1-Trichloroethane	ND	--	--	ND	--	--
Trichloroethene	ND	--	--	6.66	MW-OS-2R	10/91
Tetrachloroethene	ND	--	--	28.3	MW-OS-2R	10/91
Toluene	ND	--	--	ND	--	--
Ethylbenzene	ND	--	--	ND	--	--
Total Xylenes (o,m,p)	ND	--	--	ND	--	--
Total Volatiles	ND	--	--	44.3	MW-OS-2R	10/91
Mineral Spirits	ND	--	--	ND	--	--
Lead (ppm)	NA	--	--	NA	--	--

ND = None Detected
NA = Not Analyzed
*Total volatile concentration at MW-OS-6R.

TABLE 3

SUMMARY OF ON-SITE GROUNDWATER QUALITY
RANGE OF ANALYTICAL CONCENTRATIONS
OVERBURDEN MONITORING WELLS
XEROX, BLAUVELT, NEW YORK

Well Designation

Parameter (ppb)	Minimum	Location	Date	Maximum	Location	Date
Methylene chloride	ND	--	--	6,690	W-1	12/90
Vinyl chloride	ND	--	--	3.62	W-8	12/90
Chloroethane	ND	--	--	ND	--	--
1,1-Dichloroethene	ND	--	--	2,000	MW-16	1/92
1,1-Dichloroethane	ND	--	--	5,400	MW-13*	12/90
1,2-Dichloroethane	ND	--	--	4,380	W-1	5/91
1,2-Dichloroethene (cis+trans)	ND	--	--	311,000	MW-13*	12/90
Chloroform	ND	--	--	33,300	MW-13*	12/90
Bromoform	ND	--	--	ND	--	--
Dibromochloromethane	ND	--	--	ND	--	--
Bromodichloromethane	ND	--	--	7.12	W-8	5/91
1,1,1-Trichloroethane	ND	--	--	57,000	MW-17	1/92
1,1,2-Trichloroethane	ND	--	--	ND	--	--
Trichloroethene	ND	--	--	39,100	MW-17	11/91
Tetrachloroethene	1.4	U-6	9/91	72,400	MW-17	11/91
Toluene	ND	--	--	821	MW-16	2/91
Total Volatiles (ppb)	1.44	W-3	9/91	429,230	MW-13*	2/91
Lead (ppm)	ND	--	--	0.199	W-1	12/90
Mineral Spirits	ND	--	--	220,000	MW-17	1/92

ND = None Detected
*NAPL Present

TABLE 4

SUMMARY OF ON-SITE GROUNDWATER QUALITY
RANGE OF ANALYTICAL CONCENTRATIONS
SHALLOW BEDROCK MONITORING WELLS
XEROX, BLAUVELT, NEW YORK

Well Designation

Parameter (ppb)	Minimum	Location	Date	Maximum	Location	Date
Methylene chloride	ND	--	--	266	OW-1	5/91
Vinyl chloride	ND	--	--	403	OW-1	5/91
Chloroethane	ND	--	--	2.48	U-6D	12/90
1,1-Dichloroethene	ND	--	--	365	OW-1	5/91
1,1-Dichloroethane	ND	--	--	1,930	OW-1	5/91
1,2-Dichloroethane	ND	--	--	ND	--	--
1,2-Dichloroethene (cis+trans)	ND	--	--	43,000	OW-1	5/91
Chloroform	ND	--	--	16.5	PW-1	12/90
Bromoform	ND	--	--	14.9	W-7D	12/90
Dibromochloromethane	ND	--	--	39.1	W-7D	12/90
Bromodichloromethane	ND	--	--	ND	--	--
1,1,1-Trichloroethane	ND	--	--	6,400	W-7D	4/92
1,1,2-Trichloroethane	ND	--	--	30.4	OW-2	2/91
Trichloroethene	ND	--	--	5,880	OW-1	2/91
Tetrachloroethene	ND	--	--	5,100	W-9D	1/92
Toluene	ND	--	--	ND	--	--
Total Volatiles (ppb)	2.3	RI-7	4/92	52,795	OW-1	5/91
Lead (ppm)	ND	--	--	0.284	U-6D	4/92
Mineral Spirits	ND	--	--	170	OW-1	1/92

ND = None Detected

TABLE 5

SUMMARY OF ON-SITE GROUNDWATER QUALITY
RANGE OF ANALYTICAL CONCENTRATIONS
DEEP BEDROCK MONITORING WELLS
XEROX, BLAUVELT, NEW YORK

Well Designation

Parameter (ppb)	Minimum	Location	Date	Maximum	Location	Date
Methylene chloride	ND	--	--	ND	--	--
Vinyl chloride	ND	--	--	ND	--	--
Chloroethane	ND	--	--	ND	--	--
1,1-Dichloroethene	ND	--	--	ND	--	--
1,1-Dichloroethane	ND	--	--	ND	--	--
1,2-Dichloroethane	ND	--	--	ND	--	--
1,2-Dichloroethene (cis+trans)	ND	--	--	2.1	RI-10	1/92
Chloroform	ND	--	--	2.84	RI-10	12/90
Bromoform	ND	--	--	ND	--	--
Dibromochloromethane	ND	--	--	ND	--	--
Bromodichloromethane	ND	--	--	ND	--	--
1,1,1-Trichloroethane	ND	--	--	4.5	RI-10	1/92
1,1,2-Trichloroethane	ND	--	--	ND	--	--
Trichloroethene	ND	--	--	ND	--	--
Tetrachloroethene	7.41	RI-10	11/91	20	RI-10	12/90
Toluene	ND	--	--	ND	--	--
Total Volatiles (ppb)	7.41	RI-10	11/91	31.6	RI-10	1/92
Lead (ppm)	ND	--	--	ND	--	--
Mineral Spirits	ND	--	--	ND	--	--

ND = None Detected

TABLE 6

SUMMARY OF OFF-SITE GROUNDWATER QUALITY
RANGE OF ANALYTICAL CONCENTRATIONS
OVERBURDEN MONITORING WELLS
XEROX, BLAUVELT, NEW YORK

	Well Designation					
Parameter (ppb)	Minimum	Location	Date	Maximum	Location	Date
Methylene chloride	ND	--	--	ND	--	--
Vinyl chloride	ND	--	--	ND	--	--
Chloroethane	ND	--	--	ND	--	--
1,1-Dichloroethene	ND	--	--	98.4	MW-OS-2	1/92
1,1-Dichloroethane	ND	--	--	33	MW-OS-2	4/92
1,2-Dichloroethane	ND	--	--	ND	--	--
1,2-Dichloroethene (cis + trans)	ND	--	--	3,380	MW-OS-2	1/92
Chloroform	ND	--	--	8	MW-OS-4	1/92
Bromoform	ND	--	--	ND	--	--
Dibromochloromethane	ND	--	--	ND	--	--
Bromodichloromethane	ND	--	--	ND	--	--
1,1,1-Trichloroethane	ND	--	--	640	MW-OS-2	4/92
1,1,2-Trichloroethane	ND	--	--	ND	--	--
Trichloroethene	ND	--	--	1,500	MW-OS-2	1/92
Tetrachloroethene	ND	--	--	5,880	MW-OS-2	1/92
Toluene	ND	--	--	ND	--	--
Total Volatiles (ppb)	ND	--	--	11,648.4	MW-OS-2	1/92
Lead (ppm)	ND	--	--	0.152	MW-OS-2	1/92
Mineral Spirits	ND	--	--	ND	--	--

ND = None Detected

TABLE 7

SUMMARY OF OFF-SITE GROUNDWATER QUALITY
RANGE OF ANALYTICAL CONCENTRATIONS
SHALLOW BEDROCK MONITORING WELLS
XEROX, BLAUVELT, NEW YORK

Well Designation

Parameter (ppb)	Minimum	Location	Date	Maximum	Location	Date
Methylene chloride	ND	--	--	ND	--	--
Vinyl chloride	ND	--	--	ND	--	--
Chloroethane	ND	--	--	ND	--	--
1,1-Dichloroethene	ND	--	--	139	MW-OS-11R	1/92
1,1-Dichloroethane	ND	--	--	23.4	MW-OS-11R	1/92
1,2-Dichloroethane	ND	--	--	ND	--	--
1,2-Dichloroethene (cis+trans)	ND	--	--	547	MW-OS-11R	1/92
Chloroform	ND	--	--	9.11	MW-OS-9R	1/92
Bromoform	ND	--	--	ND	--	--
Dibromochloromethane	ND	--	--	ND	--	--
Bromodichloromethane	ND	--	--	ND	--	--
1,1,1-Trichloroethane	ND	--	--	560	MW-OS-11R	1/92
1,1,2-Trichloroethane	ND	--	--	ND	--	--
Trichloroethene	ND	--	--	912	MW-OS-11R	1/92
Tetrachloroethene	ND	--	--	1,220	MW-OS-11R	1/92
Toluene	ND	--	--	ND	--	--
Total Volatiles (ppb)	2.8	MW-OS-11R	1/92	3,401.4	MW-OS-11R	1/92
Lead (ppm)	ND	--	--	0.0406	MW-OS-12R	4/92
Mineral Spirits	ND	--	--	ND	--	--

ND = None Detected

TABLE 8

SUMMARY OF OFF-SITE GROUNDWATER QUALITY
RANGE OF ANALYTICAL CONCENTRATIONS
DEEP BEDROCK MONITORING WELLS
XEROX, BLAUVELT, NEW YORK

Well Designation

Parameter (ppb)	Minimum	Location	Date	Maximum	Location	Date
Methylene chloride	ND	--	--	ND	--	--
Vinyl chloride	ND	--	--	ND	--	--
Chloroethane	ND	--	--	ND	--	--
1,1-Dichloroethene	ND	--	--	7.2	MW-OS-5D	1/92
1,1-Dichloroethane	ND	--	--	2.2	MW-OS-5D	1/92
1,2-Dichloroethane	ND	--	--	ND	--	--
1,2-Dichloroethene (cis+trans)	ND	--	--	42	MW-OS-5D	4/92
Chloroform	ND	--	--	6.58	MW-OS-5D	1/92
Bromoform	ND	--	--	ND	--	--
Dibromochloromethane	ND	--	--	ND	--	--
Bromodichloromethane	ND	--	--	ND	--	--
1,1,1-Trichloroethane	ND	--	--	26.3	MW-OS-5D	1/92
1,1,2-Trichloroethane	ND	--	--	ND	--	--
Trichloroethene	ND	--	--	44.7	MW-OS-5D	1/92
Tetrachloroethene	6.1	MW-OS-7D	4/92	60.9	MW-OS-5D	1/92
Toluene	ND	--	--	ND	--	--
Total Volatiles (ppb)	6.1	MW-OS-7D	4/92	188.05	MW-OS-5D	1/92
Lead (ppm)	ND	--	--	ND	--	--
Mineral Spirits	ND	--	--	ND	--	--

ND = None Detected

92C2193.T14/TDG/XB-D22

TABLE: 9

THE CONCENTRATIONS ($\mu g/L$) OF VOCs IN SURFACE WATERSAMPLES FROM THE BLAUVELTSITE

	SAMPLING STATIONS									
COMPOUND	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Detection Limit**
1,1-Dichloroethane	ND[(1)]	ND	ND	1.97	2.55	2.53	*	ND	ND	1
1,2-Dichloroethene (total)	8.24	ND	1.40	4.52	7.61	7.45	*	ND	ND	1
1,1,1-Trichloroethane	3.70	ND	2.13	7.65	16.6	17.3	*	ND	ND	1
Trichloroethene	4.99	ND	3.59	12.1	25.1	26.1	*	ND	ND	1
Tetrachloroethene	12.5	2.21	6.66	21.2	46.3	53.9	*	ND	ND	1
Total VOCs	29.43	2.21	13.78	47.44	98.16	107.28	*	ND	ND	

*No Data - Dry at time of sampling
[(1)]ND = Not Detectable

TABLE 10
THE CONCENTRATIONS (μg/Kg) OF VOCs IN STREAM SEDIMENT SAMPLES FROM THE BLAUVELTSITE

	SAMPLING STATIONS									
COMPOUND	1	2	3	4	5	6	7	8	9	Detection Limit
1,1-Dichloroethane	ND[1]	ND	ND	ND	6.82	9.81	ND	ND	ND	5
1,2-Dichloroethene (total)	ND	8.58	ND	ND	27.0	ND	20.7	ND	ND	5
1,1,1-Trichloroethane	16.6	ND	ND	ND	ND	ND	ND	ND	ND	5
Trichloroethene	ND	10.7	7.10	ND	ND	ND	19.9	ND	ND	5
Tetrachloroethene	ND	25.1	ND	12.8	ND	ND	42.1	ND	ND	5
Methylene chloride	12.8	7.09	7.03	9.13	8.79	ND	5.43	9.74	ND	5
Total VOCs	29.4	51.47	14.13	21.93	42.61	9.81	88.13	9.74	ND	

*No Data - Dry at time of sampling
[1]ND = Not Detectable

TABLE 11

CHEMICAL SPECIFIC CLEANUP GOALS
XEROX-BLAUVELT SITE NO. 344021

Compound	Groundwater Cleanup Goal[1] (ug/l)	Soil Cleanup Goal[4] (mg/kg)
Benzene	0.7	0.029
Bromodichloromethane	5[3]	NA
Bromoform	50[2]	NA
Chlorobenzene	5	0.825
Chloroethane	5	NA
Chloroform	7	0.108
Dibromochloromethane	5	NA
Dichlorobenzene	5	4.250
1,1-Dichloroethane	5	0.075
1,2-Dichloroethane	5	0.035
1,1-Dichloroethene	5	0.162
1,2-Dichloroethene(cis)	5	0.122
1,2-Dichloroethene(trans)	5	0.148
Ethylbenzene	5	2.750
Methylene Chloride	5	0.022
Tetrachloroethene	5	0.910
Toluene	5	0.750
1,1,1-Trichloroethane	5	0.380
1,1,2-Trichloroethane	5	0.140
Trichloroethene	5	0.315
Vinyl Chloride	2	0.057
Xylenes(indiv.)	5	0.600
Lead	25	NA

(1) Based upon 6 NYCRR 703.5 (September 1, 1991) unless otherwise noted.

(2) Based upon 10 NYCRR Part 5.

(3) Based upon NYSDEC Division of Water T.O.G.S 1.1.1 dated November 15, 1991.

(4) Soil Goal = $K_{d(0.5\%)}$ X Groundwater Goal X DAF

$K_{d(0.5\%)}$ = soil/water distribution coefficient with soil organic carbon at 0.5%.
DAF = Dilution and Attenuation Factor = 100.

NA = Not Available.

EXHIBITS

EXHIBIT A
ADMINISTRATIVE RECORD
XEROX-BLAUVELT SITE NO. 344021

A. Reports and Work Plans:

1. "Investigative Program, Xerox Refurbishing Plant, Blauvelt, New York," dated December 1980, prepared by Recra Research, Inc.

2. "Hydrogeologic/Investigative Program, Xerox Corporation, Blauvelt, New York Facility," dated January 15, 1985, two volumes, prepared by Recra Research, Inc.

3. "Report, Interim Remedial Response, Xerox Corporation, Blauvelt, New York," dated November 1985, prepared by Dames & Moore.

4. "Field Report, Sampling and Analysis, Groundwater and Surface Water, Xerox Corporation, Blauvelt, New York," dated December 16-17, 1985, prepared by Recra Research, Inc.

5. "Well Inventory, Blauvelt, New York," dated March 22, 1989, prepared by Woodward-Clyde Consultants (WCC).

6. "Remedial Investigation Work Plan, Blauvelt Facility," dated August 3, 1989 as amended by letter dated September 8, 1989 from R. Ehlenberger (WCC) to E. Duffney (Xerox), prepared by WCC.

7. "Scope of Work, Feasibility Study for Blauvelt, New York Site, Xerox Corporation," enclosed with letter dated July 6, 1992 from R. Hess (Xerox) to A. English (NYSDEC), Re: FS Work Plan.

8. "Remedial Investigation Report, Xerox Corporation, Blauvelt, New York," prepared by Woodward-Clyde Consultants, dated October 15, 1992 as revised by "Summary of Additional Site Characterization, Blauvelt Facility," dated February 1993, and "Supplemental Report on the Environmental Site Assessment, Bradley Corporate Park Properties, Blauvelt, New York," dated March 1993, both prepared by H&A of NY.

9. "Feasibility Study for the Blauvelt, NY Site, Xerox Corporation," prepared by Woodward-Clyde Consultants, dated March 1993.

10. "Record of Decision, Xerox-Blauvelt Site No. 344021," prepared by the NYSDEC, dated March 1993.

B. Order on Consent:

1. "In the matter of the Development and Implementation of an Interim Remedial Response, Remedial Investigation, and Feasibility Study, for an Inactive Hazardous Waste Disposal site, under Article 27, Title 13, of the Environmental Conservation Law of the State of New York (the "ECL") by Xerox Corporation, Respondent, "Order on Consent Index No. W3-0007-32-04, dated April 16, 1990.

C. Correspondence:

1. Letter dated June 26, 1989 from A. English (NYSDEC) to R. Hess (Xerox), Re: summary of changes to RI work plan.

2. Letter dated August 21, 1990 from Mr. R. Hess (Xerox) to A. English (DEC), Re: installation of on-site groundwater monitoring wells.

3. Letter dated August 28, 1990 from A. English (DEC) to R. Hess (Xerox), Re: changes to on-site drilling program.

4. Letter dated October 1, 1990 from R. Hess (Xerox) to A. English (DEC), Re: pilot vacuum extraction program.

5. Letter dated November 2, 1990 from A. English (DEC) to R. Hess (Xerox), Re: performance of pilot vacuum extraction study.

6. Letter dated January 7, 1991 from R. Hess (Xerox) to A. English (DEC), Re: results of pilot study.

7. Letter dated February 22, 1991 from E. Duffney (Xerox) to A. English (DEC), Re: proposed expansion of vacuum extraction study (VES).

8. Letter dated April 4, 1991 from R. Hess (Xerox) to A. English (DEC) Re: additional VES documentation.

9. Letter dated May 23, 1991 from A. English (DEC) to R. Hess (Xerox), Re: performance of expanded VES.

10. Letter dated November 11, 1991 from R. Hess (Xerox) to A. English (DEC), Re: installation of off-site groundwater monitoring wells.

11. Letter dated December 19, 1991 from A. English (DEC) to R. Hess (Xerox), Re: progress of RI/FS.

12. Letter dated January 13, 1992 from R. Hess (Xerox) to A. English (DEC), Re: progress of RI/FS.

13. Letter dated February 11, 1992 from R. Hess (Xerox) to A. English (DEC), Re: additional groundwater monitoring wells.

14. Letter dated February 25, 1992 from A. English (DEC) to R. Hess (DEC), Re: additional groundwater monitoring wells.

15. Letter dated February 28, 1992 from R. Hess (Xerox) to A. English (NYSDEC) Re: changes to VES.

16. Letter dated March 13, 1992 from A. English (NYSDEC) to R. Hess (Xerox), Re: VES modifications.

17. Letter dated April 10, 1992 from E. Duffney (Xerox) to A. English

(NYSDEC), Re: FS work plan.

18. Letter dated April 21, 1992 from A. English (NYSDEC) to E. Duffney (Xerox), Re: FS work plan.

19. Letter dated June 24, 1992 from E. Duffney (Xerox) to A. English (NYSDEC), Re: sampling.

20. Letter dated June 29, 1992 from A. English (NYSDEC) to E. Duffney (Xerox), Re: sampling.

21. Letter dated July 8, 1992 from E. Duffney (Xerox) to A. English (NYSDEC), Re: sampling.

22. Letter dated July 8, 1992 from A. English (NYSDEC) to R. Hess (Xerox), Re: FS Scope of Work.

23. Letter dated September 28, 1992 from A. English (NYSDEC) to E. Duffney (Xerox), Re: VES Trench Test.

24. Letter dated October 2, 1992 from E. Duffney (Xerox) to A. English (NYSDEC), Re: VES Restart.

25. Letter dated October 20, 1992 from E. Duffney (Xerox) to A. English (NYSDEC), Re: RI Report.

26. Letter dated October 20, 1992 from E. Duffney (Xerox) to A. English (NYSDEC), Re: FS Report.

27. Memorandum from B. Seeley (NYSDEC) to A. English (NYSDEC) Re: Data Validation.

28. Letter dated November 19, 1992 from A. English (NYSDEC) to E. Duffney (Xerox), Re: RI/FS Reports.

29. Letter dated December 21, 1992 from A. English (NYSDEC) to E. Duffney (Xerox), Re: RI/FS Reports.

30. Letter dated January 8, 1993 from L. Smith (H&A of NY) to E. Duffney (Xerox), Re: RI Report.

D. <u>Citizen Participation:</u>

1. "Citizen Participation Plan for Xerox Corporation, site code 344021, Town of Orangetown, Rockland County, New York," revised February 1990, prepared by the NYSDEC.

2. "Proposed Remedial Action Plan, Xerox-Blauvelt Site No. 344021," prepared by the NYSDEC, dated January 1993.

3. Notice of Public Meeting held February 4, 1993 at the Orangetown Town Hall,

prepared by the NYSDEC.

4. Responsiveness Summary, included as Exhibit C of the Record of Decision dated March 1993.

5. Transcript of the February 4, 1993 Public Meeting regarding the Proposed Remedial Action Plan, prepared by Meister Reporting Services, dated February 23, 1993.

E. Guidance:

1. "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA," EPA/540/G-89/004, OSWER Directive 9355.3-01, October 1988.

2. "New York State Air Guide -1, Guidelines for the Control of Toxic Air Contaminants," dated 1991, prepared by the NYSDEC Division of Air Resources.

3. "Technical and Operational Guidance Series (I.I.I) - Ambient Water Quality Standards and Guidance Values," dated November 15, 1991, prepared by the NYSDEC Division of Water.

4. "Clean-up Criteria for Aquatic Sediments," dated December 1989, prepared by the NYSDEC Division of Fish and Wildlife.

5. "Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites," prepared by NYSDEC Division of Fish and Wildlife, dated June 18, 1991.

F. Laboratory Data:

1. Analytical reports attached to a letter dated March 16, 1989 from S. Toscano (General Testing Corp.) to E. Duffney (Xerox), two volumes.

2. The following laboratory reports were generated by General Testing Inc. for the remedial investigation.

Date	Report ID	Date	Report ID
1/8/91	R90/5013,5438,4559, 4535,4506,4480,4396, 4334,4358,4298.	7/10/91	R91/2351
		10/7/91	R91/4322
10/31/91	R91/4770	10/28/91	R91/4105,4106,4203, 42284265,4374,4412, 4424,4568,4666.
12/24/91	R91/5694		
12/26/91	R91/5710	12/30/91	R91/5781,5829
2/4/92	R92/264,265	4/28/92	R92/1339
7/8/92	R92/1885,2024,2240, 2254,2416.	8/7/92	R92/2929
		8/27/92	R92/3114,2955
9/9/92	R92/3867		

xer41

CLASSIFICATION CODE: 2 REGION: 3 SITE CODE: 344021
EPA ID: NYD095165890

NAME OF SITE : Xerox Corporation
STREET ADDRESS: Blauvelt Facility
TOWN/CITY: Orangetown
COUNTY: Rockland
ZIP: 10962

SITE TYPE: Open Dump- X Structure- Lagoon- Landfill- Treatment Pond-
ESTIMATED SIZE: 1+ Acres

SITE OWNER/OPERATOR INFORMATION:
CURRENT OWNER NAME....: Xerox Corporation
CURRENT OWNER ADDRESS.: Blauvelt, NY
OWNER(S) DURING USE...: Xerox Corporation
OPERATOR DURING USE...: Xerox Corporation
OPERATOR ADDRESS......: Blauvelt, NY
PERIOD ASSOCIATED WITH HAZARDOUS WASTE: From 1970 To 1979

SITE DESCRIPTION:
Overfills of underground storage tanks (1977) and indoor spills resulted in releases of a mixture of halogenated solvents and mineral spirits used for cleaning electrostatic copiers and associated parts. The tanks have been removed. Contamination of soil and groundwater on site has been confirmed. A separate solvent phase was identified at several locations downgradient of the former tank area.

A DEE consent order has been signed for an RI/FS and an IRM. The IRM is in progress to remove the floating product and prevent further off-site migration. Contaminated groundwater extends approximately 1500 feet to the north-northwest under a corporate park and private swim club. A ROD is expected soon.

HAZARDOUS WASTE DISPOSED: Confirmed-X Suspected-

TYPE	QUANTITY (units)
Trichloroethylene, tetrachloroethylene, 1,1,1-trichloroethane, methylene chloride (F001)	unknown
Aliphatic hydrocarbons	unknown

ANALYTICAL DATA AVAILABLE:
Air-   Surface Water-X Groundwater-X Soil-X
Sediment-

CONTRAVENTION OF STANDARDS:
Groundwater-X   Drinking Water-X   Surface Water-   Air-

LEGAL ACTION:

TYPE..:   Consent Order-DEE
State- X   Federal-
STATUS: Negotiation in Progress-   Order Signed- X

REMEDIAL ACTION:

Proposed-x   Under design-   In Progress-   Completed-
NATURE OF ACTION: vacuum extraction on soil, gw containment and tr

GEOTECHNICAL INFORMATION:
SOIL TYPE: Glacial till
GROUNDWATER DEPTH: 4-12 feet

ASSESSMENT OF ENVIRONMENTAL PROBLEMS:

On-site soil contamination has led to groundwater contamination that extends off-site.

ASSESSMENT OF HEALTH PROBLEMS:

The primary health concern at the site is the potential for exposure to contaminated groundwater. Groundwater is the source of drinking water in much of the area, and there are numerous private and industrial wells within a one mile radius of the site. Private residences are located within 800m to 850m of the Xerox site. Testing of several residential and industrial/commerial wells in the area has indicated the presence of chlorinated solvents, but a direct connection to Xerox's groundwater contaminant plume has not been established at this time. Xerox has submitted the Final Version of the RI Work Plan. The extent of the contaminant plume and associated health concerns will be evaluated as further data is generated by the RI.

EXHIBIT C
RESPONSIVENESS SUMMARY
XEROX-BLAUVELT SITE
SITE ID NO. 344021

This document summarizes the comments and questions received by the New York State Department of Environmental Conservation (NYSDEC) regarding the Proposed Remedial Action Plan (PRAP) for the subject site. A public comment period was held between January 11, 1993 and February 15, 1993 to receive comments on the proposal. A public meeting was held on February 4, 1993 at the Orangetown Town Hall to present the results of the investigations performed at the site and to describe the PRAP. The information below summarizes the comments and questions received and the Department's responses to those comments.

DESCRIPTION OF THE SELECTED REMEDY

The major elements of the selected remedy include:

o A **remedial design program** to verify the components of the conceptual design and provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program. Uncertainties identified during the remedial investigation and feasibility study will be resolved (especially the vertical extent of contamination in the deep bedrock).

o **Preventing the further spread of contaminated groundwater** by installing groundwater extraction wells at the leading edges of the plume. Operation of the existing containment wells on the Xerox property where groundwater is most contaminated will be continued.

o **Active remediation of groundwater** by collecting and treating groundwater from under the Xerox building, from the former tank storage area, and from properties to the north. Groundwater collection will be enhanced by using a two phase (groundwater + soil vapor) high vacuum extraction process patented by Xerox Corporation (2 Phase™ Process). Groundwater will be treated by a combination of technologies (e.g. air stripping, UV light catalyzed oxidation, and adsorption onto activated carbon). Areas to be disturbed by the installation of the groundwater collection system will be surveyed by a competent biologist prior to installation to ensure that important faunal or floral species are not destroyed.

o **Active remediation of contaminated soils** by extracting contaminants from the soil under high vacuum using the 2 Phase™ Process wells installed beneath the Xerox building and in the former tank storage area. The contaminated vapors collected by this process will be treated using activated carbon or other suitable technologies before release to the atmosphere. Remediation of the soils will prevent groundwater from becoming recontaminated.

o **Indirect remediation of surface water, sediments, and ambient air** by treating the sources of contaminants to these media, namely the contaminated groundwater and soil. Since the degree of contamination of the nearby stream (surface water and its sediments) and the air is low, directly treating the sources of the contamination will result in the cleanup of the stream and air.

o An environmental monitoring program to evaluate the performance of the remedial program and to ensure that carrying out the remedy does not create additional problems such as adverse air emissions or impacts to surface water.

The information given below is summarized from a transcript of the February 4, 1993 meeting and two letters received during the comment period. The issues have been grouped into the following categories:

I. Questions/Comments Raised During the Public Meeting
  A. Issues Regarding the Proposed Remedy
  B. Issues Regarding the Current Conditions at the Site
  C. Issues Regarding the Past Conditions at the Site
  D. General Issues

II. Written Comments Received

I. QUESTIONS/COMMENTS RECEIVED DURING THE PUBLIC MEETING

A. Issues Regarding the Proposed Remedy:

A.1 **Issue:** The description of the proposed remedy indicates that there will be construction and other activities on the property of the Oratamin Swim Club. When and how will the Club be involved in that process?

Response: In the coming months, Xerox Corporation will undertake a program to design the full scale remedy. During this time, arrangements between Xerox and the Oratamin Club for access to the property will be discussed. The activities to take place on the property will be described and opportunities to request changes will be provided.

A.2 **Issue:** Will the remedy affect the future use of the Swim Club?

Response: Until the remedy is completed, some precautions may be needed if activities were to include excavations into the saturated zone (below the water table). Since the soils above the water table are uncontaminated and the water table is relatively deep (> 10 feet), restrictions on future use of the property should be very limited and more properly addressed on a case by case basis.

A.3 **Issue:** What is the basis of the estimate that it will take five to 10 years to complete the remediation and what factors might negatively influence the actual time needed?

Response: The estimate is based upon a number of factors including the level of contamination, the physical and chemical characteristics of the aquifer, the geology of the area, the characteristics of the technology to be employed, and results of similar operations at other sites. Factors that could lengthen the project include local complexities in the soil/bedrock system, limitations on the extent of the recovery system (if necessary to minimize disruption of the site), and unforeseen problems. Natural soil systems are often complex in terms of the variety of soil types and soil particle sizes involved. Contaminants tend to adhere onto soil particles. In general, it is more difficult to remove contaminants from fine soils than coarse soils. Pockets of fine soils (i.e. clays, silts) can release contaminants over long periods of time. These complexities result in the long time periods needed to complete groundwater remedies.

A.4 **Issue:** What will the people at the Swim Club be able to see, hear, and observe during the implementation of the remedy?

Response: During the construction of the remedy, there will be workers and equipment at the Swim Club similar to what occurred during the investigations. Equipment will include, for example, drill rigs, backhoes, and support vehicles. The timing of construction can, to a significant degree, accommodate the active season of the Club. During the operation and maintenance phase of the project, the remedial systems will not be very noticeable. Most, if not all, of the active components will be underground and will not produce distracting noises. Much can be done to minimize the presence of the remedy.

A.5 **Issue:** Are there ways that the air emission problems that would be created during a soil excavation program could be mitigated?

Response: There are techniques such as foam application that can be used to lessen the release of contaminants into the air during soil excavation but the effectiveness of these techniques is very limited due to the high volatility of the contaminants at this site. This highlights one of the advantages of the selected remedy. Since no significant soil excavation will occur, the release of volatiles to the air and the associated risks will be much less than a remedy relying on soil excavation and disposal.

A.6 **Issue:** It would be better to excavate the contaminated soil and haul it away rather than treat it in place.

Response: As discussed in the feasibility study, after considering all of the positive and negative aspects of soil excavation at this site, it was concluded that cleanup of the soil by soil vapor vacuum extraction presents a better overall balance of the factors to consider. Although it might take less time to excavate and haul away the soil, the bulk of the time needed to complete the remedy is associated with the cleanup of groundwater. If the soil were removed immediately, it would still take five to ten years to cleanup the groundwater (see A.3). Therefore, a soil excavation component may not significantly shorten the time needed to complete the entire remedy. Also, significant logistical problems would be encountered such as excavating significant quantities of soil from under an operating building. Other disadvantages include using up very scarce landfill space and incurring transportation costs and risks.

A.7 Issue: What kind of monitoring is the DEC going to provide over the next five to ten years, and how will we know that the process is going along according to the proposed remedy?

Response: There will be two main types of monitoring. The first will be environmental monitoring of groundwater, surface water, air, and soil to evaluate the progress and effectiveness of the remedy. Second, the equipment that comprises the remedy will be monitored to determine the effectiveness and performance of the system. Two plans will be developed during the remedial design phase which will specify the details of the monitoring programs. These will be the "Operation and Maintenance Plan" and the "Performance Analysis and Design Modification Plan." These plans and the reports created during the implementation of the plans will be available to the public.

A.8 Issue: How clean will the site be after cleanup?

Response: As detailed in the Record of Decision, the goals for cleanup include reducing groundwater contamination to levels below the limits promulgated in DEC's groundwater quality regulations, reducing soil contamination so that it no longer releases significant levels of contaminants to the groundwater, and reducing the contamination in both media so that secondary releases to the stream and air are not significant.

A.9 Issue: During the implementation of the remedy, will progress reports be available to the public?

Response: As discussed in A.7 above, progress reports will be available to the public. The extent of citizen participation during the remedy has yet to be determined and can be modified during the course of the remedy depending upon the level of interest in the project.

A.10 Issue: What are the risks involved in implementing the remedy?

Response: Other than for the workers who will be constructing and operating the remedy, the risks are minimal. Extensive regulatory and industry requirements are in place to protect workers from occupational hazards. For the general public, the greatest risk would be presented by a failure of the soil vapor air cleaning systems. After contaminant laden soil vapor is extracted from the ground, it will be treated to remove the contaminants before it is released to the air. Monitoring and maintenance procedures will be in place to prevent a failure from occurring. It should be noted that even if a total failure were to occur, the failure would have to continue for an extended period of time (months to years depending upon actual circumstances) without being corrected for the risk to be significant. This is extremely unlikely given that there will be daily to weekly observations of the system.

The other concern that was expressed was regarding the possibility of a pipe failure. The piping system to move collected groundwater from the Swim Club to the treatment area will be underground. The system will not be under high pressure and any release would result in the water returning to the groundwater where it came from. Therefore, this scenario does not pose a significant risk.

B. Issues Regarding the Current Conditions at the Site:

B.1 **Issue:** Given the existence of contamination in the groundwater and the nearby stream, is it safe for persons to use the facilities of the Oratamin Swim Club?

Response: Yes. The reasons why it is safe to use the Club are that contaminated groundwater is covered by 10 to 20 feet of uncontaminated soil and the level of contamination in the stream is very low (tens of parts per billion). Using very conservative exposure assumptions, it was determined in the risk assessment that the risks from ingestion or dermal exposure to the stream are not significant. The Swim Club is supplied by public water not threatened by the Xerox plume and the pool is not filled with groundwater.

B.2 **Issue:** Does the existence of the contaminants have an affect on land values, the ability to get loans, the ability to sell the Swim Club?

Response: The existence of chemical contamination on a property can certainly have negative affects on the value of the property. The degree of the impact depends upon a number of factors and is determined on a case by case basis.

B.3 **Issue:** Is the Swim Club publicly listed on a tax or real estate map as a polluted site?

Response: No. The official listing of inactive hazardous waste sites is published by the NYSDEC and NYSDOH. The contamination addressed by this project is listed as being associated with the Xerox-Blauvelt facility. We are not aware of any listings of the type suggested in the question.

B.4 **Issue:** Is it safe to perform excavations at the Swim Club in the process of maintaining the pool and equipment?

Response: Unless the excavations were to proceed into soils below the water table, routine excavations should not pose any threat since the soils above the water table are not contaminated. It would be prudent to notify the NYSDEC and Xerox Corporation if any deep excavations are planned.

B.5 **Issue:** What are the boundaries of the potential investigation for hazardous waste migration?

Response: There were no boundaries during the investigations. The object was to determine the extent of contamination regardless of whether it crossed property lines or other boundaries. This was accomplished in an iterative fashion. Starting at the source of contamination, soil borings and groundwater monitoring wells were installed and sampled/analyzed in all directions until the results of the analyses showed that the investigation had proceeded to the edge or beyond the extent of the contamination.

B.6 **Issue:** Please explain why in the August 28, 1990 letter from the DEC to Xerox it states that "soil gas testing does not always correspond with groundwater analyses."

Response: In some cases, soils are so fine grained (e.g. clay) or the water table is so far below the ground surface that surface soil gas surveys are unable to detect the presence of contaminated groundwater. Fine grained soils inhibit the upward migration of contaminant vapors and if the groundwater is far below the surface, the vapors disperse to non-detectable levels. Therefore, the results of soil gas analyses cannot always be expected to correspond with groundwater quality.

B.7 **Issue:** Where is the western edge of the groundwater plume?

Response: The western edge of the groundwater plume is approximated by the railroad tracks to the west of the Xerox facility.

B.8 **Issue:** How many feet from the railroad tracks is the plume?

Response: It is not possible to specify the exact location of the plume edge to an accuracy greater than perhaps 50 to 100 feet. The concentration of contaminants in monitoring wells approximately 50 feet west of the tracks varies from non-detect to a few parts per billion.

B.9 **Issue:** Were area residents informed of the problems at the Xerox site during the 1989 area well survey?

Response: Xerox worked with the Rockland County Health Department to complete the survey and to obtain samples of selected well water. Where samples were taken, the Health Department sent out notices. The County Health Department maintains records of the notices.

B.10 **Issue:** It is known that private water supply wells to the west of the Xerox plume are contaminated with similar chemicals. Additional testing of these wells is needed. The source of the contamination in these wells needs to be found.

Response: A representative of the County Health Department present at the meeting made it known that they would assist whoever in the area would like to have their water tested. Based upon the results of that testing, further investigations are needed to determine the source of the contamination found in these wells.

B.11 **Issue:** After the spills at the site, could contaminants have gotten into the stream, overflowed the stream banks during heavy rains, and been deposited in areas not studied?

Response: Due to the volatility of the chemicals involved and the large amount of dilution that would be involved in a rain event as large as suggested, it is very unlikely that any significant amounts of contamination would be left behind in areas not actively investigated during these studies. The possiblity of residual contamination decreases with distance from the site.

B.12 **Issue:** Has the bottom of the plume been found?

Response: It has been found that in the center of the main plume, contamination extends to below the deepest of the existing monitoring wells. The deepest of these wells is screened at approximately 70 feet below the ground surface. During the design phase of the remedy, deeper wells will be installed to ascertain the full depth of the plume. It is estimated that this will be at approximately 100 feet.

B.13 **Issue:** Why aren't air emissions from the stream of concern?

Response: Air emissions from the stream or the small pond are not of concern because the concentrations in the water are so low (tens of parts per billion). In contrast, the concentration of contaminants in the on-site soils is thousands of times greater.

B.14 **Issue:** Were contaminants found in the groundwater at all of the locations sampled?

Response: No. Some of the monitoring wells were found to be placed outside of the plume area.

B.15 **Issue:** Is the shape of the plume consistent with local geology?

Response: Yes, it appears to be consistent.

B.16 **Issue:** Explain why there are monitoring wells a significant distance from the northeast edge of the plume whereas in the southwest the furthest wells are close to the edge of the plume.

Response: Analytical data from the early 1980s indicated the presence of the same types of contaminants found at the Xerox facility in groundwater to the northeast. This area is side/upgradient of the Xerox facility. Additional wells were installed to the northeast to confirm whether or not the contamination in this area is related to the Xerox plume. It was determined that it is not related.

B.17 **Issue:** What are the results from sampling the newly installed monitoring well MW-OS-16D?

Response: Contaminants were not detected in this well.

C. <u>Issues Regarding the Past Conditions at the Site:</u>

C.1 **Issue:** How were the 1977/79 spills first reported?

Response: Xerox reports that complaints were received by the County Health Department.

C.2 **Issue:** Does Xerox Corp. know the source of the initial complaints about the spills?

Response: No.

C.3 Issue: Were there any odors that anybody noticed at the time of the spill?

Response: Yes, odors were noticed around the area of the spills.

C.4 Issue: Were the odors noticed inside or outside the plant?

Response: The odors were noticed outside of the plant in the vicinity of the storage tanks.

C.5 Issue: What did Xerox do after it became aware of the spills?

Response: Xerox stated that as required by the Rockland County Health Department, Xerox developed and implemented a Spill Prevention, Control, and Countermeasures Plan.

C.6 Issue: Did Xerox notify the Rockland County Health Department about the spills?

Response: No.

C.7 Issue: Did the County Health Department send an inspector to the Xerox facility?

Response: Yes.

C.8 Issue: When were the surrounding property owners first notified of the spill?

Response: To the best of our knowledge, no program was in place to notify residents in the area that a spill had occurred.

C.9 Issue: Was the Town Board notified of the spills?

Response: Not to our knowledge.

C.10 Issue: When did the DEC first become involved?

Response: The DEC took samples in the area in 1982 and listed the site in the Registry of Inactive Hazardous Waste Sites in December 1983.

C.11 Issue: Who receives the hazardous waste site lists?

Response: The Registry is distributed to all County Clerk's Offices, County Health Departments, and ten DEC offices across the State. It is also available upon request.

C.12 Issue: Who receives copies of the Citizen Participation Plan?

Response: Citizen Participation Plans are prepared for each site undergoing a Remedial Investigation and Feasibility Study. The plans are placed in one or more document repositories near the site and are maintained by the DEC office in charge of the investigations or actions.

C.13 **Issue:** Is the Registry used during real estate searches?

Response: It is likely that a thorough title search would also include a review of the Registry.

C.14 **Issue:** What is the closest property to the Xerox facility?

Response: The closest property in the area of contamination is property owned by the Bradley Corporate Park on the north side of Bradley Hill Road.

C.15 **Issue:** Have any of the adjoining property owners initiated any lawsuits against Xerox?

Response: The owners of Bradley Corporate Park have initiated a lawsuit against Xerox for issues related to the contamination.

C.16 **Issue:** What are the details of the lawsuit?

Response: The details of the lawsuit are not known to the Department. The parties to the lawsuit should be contacted for details.

C.17 **Issue:** What portion of the site was investigated during the 1984/5 hydrogeologic investigation?

Response: The investigations completed in 1984/5 were limited to the Xerox facility and did not extend off-property.

C.18 **Issue:** Was Bradley Corporate Park included in the 1984/85 investigation?

Response: No.

C.19 **Issue:** When was the pond behind the Bradley office first tested?

Response: The DEC obtained samples from the pond in 1982.

C.20 **Issue:** When was access to the Bradley Corporate Park obtained?

Response: The access agreement between Xerox and Bradley to perform the field investigations was executed in May 1991.

C.21 **Issue:** Why did it take so long to gain access?

Response: Because of legal and financial considerations, the negotiations were difficult and protracted.

C.22 **Issue:** Did the delays in obtaining access allow the further migration of contaminants?

Response: The delays in completing the investigations are likely to have resulted in further migration of contamination. Without off-site data from that time, it is not possible to accurately estimate the extent of the additional migration.

C.23 Issue: Does the fact that a property is under investigation for a hazardous waste spill have to be listed on any SEQR declaration of environmental review when any developmental permits are applied for development?

Response: Environmental assessment forms associated with the SEQR process generally focus upon the potential impacts of the proposed action (e.g. development related construction). The review, however, is broad. It is possible that knowledge regarding environmental contamination in the vicinity of a proposed action should be made known and evaluated during the SEQR review. An actual determination would depend upon the details of the situation. The details could be submitted to the appropriate Department official for an opinion.

C.24 Issue: During the time of the spills, could children at the Swim Club have been exposed to contaminants?

Response: It is not likely that children on Swim Club property would have had any significant exposure. It is possible that children playing off the property in the area where contaminants ran-off into storm water swales could have been exposed, but we have no information that this occurred.

C.25 Issue: What was the volume of the spill in 1977?

Response: To our knowledge, there was no record of the amount spilled.

C.26 Issue: What was the size of the storage tanks?

Response: The capacity of each of the two tanks was 10,000 gallons.

C.27 Issue: Based on the contamination found, has modelling been performed to calculate the volumes spilled?

Response: No because the results of such modelling would be so uncertain as to be useless.

C.28 Issue: Are there records regarding the levels of the chemicals in the tanks at the time of the spills?

Response: There are records of the bulk volumes of solvents placed into the virgin solvent tank when deliveries were made and records of the volumes of waste solvent shipped away from the waste solvent tank for disposal.

C.29 Issue: In the late 1970s early 1980s, large amounts of soil from Bradley properties west of the railroad tracks were excavated and sold to the Town. Has any consideration been given to trying to find out if that dirt could have been contaminated?

Response: Current soil and groundwater data from the west side of the tracks (limited) do not indicate the presence of any significant levels of contamination. The Department has no data from the 1970s to form an opinion as to the quality of the soil mentioned in the question.

D. General Issues:

D.1 Issue: For properties outside of the area of contamination from the Xerox plume, would building approvals need to go through the DEC?

Response: No.

D.2 Issue: Are the contaminants found at the Xerox site common? Are they found in car engine degreasers or septic systems?

Response: Yes. The main contaminants involved at this site are tetrachloroethene, trichloroethene, trichloroethane, and degradation products. These are all common solvents and degreasers.

D.3 Issue: It is appalling that it has taken so long to get to this point. The DEC should impose some kind of regulation to give it the authority to get the job done.

Response: There are many factors that have resulted in this project taking so long. Much of the statutory, regulatory, and fiscal structures that the Department now operates under were not in existence when the problems at this site occurred. The Department's authority to compel these investigations are balanced by requirements that protect the rights of the potentially responsible parties. The Department is required to make every effort to get responsible parties to undertake and finance the investigations with their own funds rather than expend public monies. Much of the "muscle" the Department now has to move the projects along was obtained relatively recently by the passage of the 1986 Environmental Quality Bond Act. The involvement of third party property owners who are interested in protecting their own positions has also contributed to delays. Additionally, the Department cannot unilaterally impose regulations giving it broad power to compel actions.

D.4 Issue: There should be a town committee or board whose function it is to communicate with the DEC regarding hazardous waste issues. The Town should be kept aware of what is happening within its borders.

Response: As part of its citizen participation responsibilities, the Department is willing, and does participate in information sharing with local municipalities. This generally occurs on a site specific basis but does occur on a regional basis when there are a number of sites in a single area. The Department is open to such an arrangement with the Town of Orangetown.

D.5 **Issue:** How does someone find out where there are hazardous waste sites?

Response: The Registry of Inactive Hazardous Waste Sites in New York is available in County Clerk's offices and in the offices of the Department across the State.

D.6 **Issue:** There needs to be more control so that spills like this one don't occur.

Response: Beginning in the early 1980s and continuing today, an extensive body of laws and regulations have been developed and implemented to reduce and deal with environmental contamination. The issues and ramifications are complex and costly and extend throughout the country. Information on specific laws and regulations are available upon request.

D.7 **Issue:** Is it the custom and practice of the DEC to indicate that any area within one mile would in fact be considered a potential site for transportation of waste? A real estate appraiser was told by someone in the Albany Office of the DEC that anything within one mile of a waste site would be considered a potential site for travel of contaminants.

Response: There is no Department regulation or policy that states that any property within one mile of an inactive hazardous waste site should be considered a potential site. No response to the Department's request for additional information regarding this matter has been received.

D.8 **Issue:** Section 5.3.6 of the Risk Assessment states that there are no public or private recreational areas such as parks or large water bodies around the site. Does this mean the Swim Club was overlooked?

Response: No. It was a misstatement to imply that the Swim Club is not a significant recreational facility. The intention was to indicate that there are no recreational facilities where normal use would result in public exposure to site contaminants. We know that there are low concentrations of site contaminants in the pond and stream in the Bradley property. Since this is not part of the Swim Club facility, exposure to the water was considered a non-recreational (trespasser) exposure. Even so, the exposure levels assumed were very conservative (high). Therefore, the results of the risk assessment are also conservative even though the terminology was unintentionally misleading.

D.9 **Issue:** Did the many restrictions in the access agreement between Bradley Park and Xerox slow down the work?

Response: No. Even though the access agreement had many restrictions, case by case exceptions were granted and the work was not significantly delayed.

II. WRITTEN COMMENTS RECEIVED

E. <u>Letter Dated February 13, 1993 from V. Morgan, The Oratamin Club.</u>

The comments given below are taken verbatim from the letters received and are included in their entirety.

"The Oratamin Club, a swimming and tennis facility jointly owned by its members, approximately 45 local families, is situated north of the Blauvelt facility of the Xerox corporation. The Club has given free and full permission to Xerox to install and monitor discovery wells on Club property, and Xerox has done a good job of keeping the Club informed of its discovery-phase activities. The findings of the discovery phase indicate that a plume of subsurface pollutants has spread north from the Xerox property with the prevailing groundwater movement and is now present at various depths under the Club's property.

The remedial phase is about to begin, and the Club's members and management have several concerns that we would like to have in the public record:"

E.1 "During the period between Memorial Day and Labor Day the Oratamin Club is used daily by members for a range of outdoor activities including swimming, tennis, softball and volleyball. A sandbox and swing set are used by young children. The final report that summarizes the findings of the discovery phase never mentions that this neighboring property is an active recreational facility. This should be corrected."

Response: As discussed in D.8 above, there was no intention to imply that the Swim Club is not an active recreational facility. The conclusions of the risk assessment are applicable to the actual situation.

E.2 "Xerox revealed the problem and the need for the monitoring wells to Club officers in 1990, approximately 13 years after the first release of pollutants. Xerox knew, New York State knew. Did the local government know? Did anyone inform the neighbors? Why was there not a better mechanism for alerting neighboring properties?"

Response: Although there are no legal requirements to require notification of citizens living in the vicinity of a hazardous waste site until the investigations are complete and a proposed remedy exists, the Department has begun to expand its citizen participation activities. The amount of interest and concern regarding the 1000+ sites in New York varies greatly from site to site and limited resources makes it difficult to anticipate and address every concern. However, as the program obtains more experience, additional steps are being taken to provide for better communication. As of May 1992, State regulations (6 NYCRR 375-1.8(d)) require that when "final decisions concerning a site's classification are made, the Department shall announce by mail or telephone the decision to the clerks of the county; the town or city (as the case may be); and (where located in one) the village, within which the site is located, the site owner and adjacent property owners."

E.3 "The New York State Department of Health representative at the Public Hearing made it clear that they do not consider the site dangerous to use for recreational purposes, but suggest that the stream on the westerly side of the property should be avoided. We are concerned about all the years between the initial pollution and now, during which time young children of Club members often played in the stream during the summer months. Yet during that time we were never warned, never notified even though Xerox and the State had knowledge that the pollution was seeping through the soil and was likely to be present in the stream."

Response: Without actual data from the time of concern, exposure and risk estimates would be very speculative. Regarding the need for better communication, see No. 2 above.

E.4 "The monitoring wells are relatively small and out of the way. They have not been a problem, although they have served as a constant reminder that there is something amiss. The remediation phase promises to be more intrusive, more visible, and possibly disruptive of the normal use of the property. Unlike the passive monitoring wells, the remediation wells are active and, therefore, have more potential to fail. No specific plan for cleaning up possible new pollution caused by a failure of the wells and piping system was mentioned, nor was a requirement for posting a bond to insure clean-up of such a spill, should it occur."

Response: As discussed in the response to I.A.7 above, plans for addressing these and other issues will be developed during the design phase of the remedy. These issues will be primarily addressed in the remedy Operation and Maintenance Plan. The consent order between Xerox and the NYSDEC to complete the design and implementation of the remedy will include requirements for the clean-up of releases caused by implementing the remedy.

E.5 "The public hearing made it clear that no agency of government seems to be concerned with the economic impact of the Xerox / Blauvelt pollution or of its remediation. We at the Oratamin Club feel that the pollution from Xerox has diminished the value of our property, hindered our ability to attract members to the Club, thereby reducing our future revenues, and curtailed our ability to improve the property, at least in regard to excavation or to construction in the area of the remediation wells and/or piping. Our ability to use the property as collateral for loans for capital improvements may be affected by the status of the property as a pollution site. Do the state environmental laws make any provision for compensating victims of pollution?

Response: Environmental liability and compensation issues are very complex and situation specific. These issues need to be addressed by independent counsel. There is no provision for use of monies from the New York State 1986 Environmental Quality Bond Act for these situations.

E.6 "In light of the economic impact outlined above, is there any provision in state or local law for adjusting the value upon which property taxes are determined?

Response: This question must be addressed by the local authorities who establish the taxes.

E.7 "The Club is supported entirely by membership fees. The visible elements of the proposed remediation plan are going to serve as constant reminders of the Club's location in a pollution zone. There are other swimming and/or tennis Clubs in the immediate area that are not in known pollution zones. Who compensates the Club for loss of membership and revenue due to its diminished attractiveness as a place for healthful recreation?"

Response: See the response to issue No. 5.

F. Letter dated February 10, 1993 from M.A. Gavioli, Orangetown Planning Board Member.

F.1 "Are monitoring wells results of water samples gathered at different seasons during the year? As a Planning Board member I have experienced different results on water samples depending upon the time of year the samples are taken. I urge additional testing during the "rainy" season when the water table is high."

Response: Groundwater samples are gathered and analyzed on a quarterly basis.

F.2 "I am very concerned about the scarcity of monitoring wells on the west of the railroad tracks. It has been testified that "excavation of approximately 800,000 square yards [sic] of fill took place in the western portion near the tracks after the Xerox spill". This tremendous change in grade "to bring the site down to the elevations provided" could alter the validity of soil tests, and water samples."

Response: The data obtained during the RI/FS indicates that the plume of contaminated groundwater does not extend significantly beyond (i.e. to the west) the railroad tracks. There is no information to suggest that contaminants from the Xerox facility were transported to the Bradley properties to the west of the tracks. Therefore, there is no basis for installing additional monitoring wells to the west of the tracks.

F.3 "In addition, the railroad tracks were a double track in width and changed to a single track more recently. The configuration of the tracks at the time of the spill in 1979 could also affect soil tests. There are persons along Western Highway located north-west of Xerox, along the direction of the contaminants, who use well water. These are compelling reasons to install more monitoring wells on the western portion of the railroad tracks."

Response: The existence of two tracks in the past and one track now is not relevant to the migration of contaminants in groundwater or to the presence of site related contaminants in soils.

G. Letter dated February 8, 1993 from S. Colman, New York State Assemblyman.

G.1 "How clean do you anticipate the Xerox site to be after the clean up?

Response: Implementation of the selected remedy should result in a complete cleanup of the site. Essentially unrestricted use of the site should be possible.

G.2 "Will the Air-Stripping process be used during the clean up? If so, will there be any release of contaminants into the air?

Response: Air-stripping is one part of the conceptual design of the remedy. Appropriate air monitoring and air emission control will be required.

G.3 "Will any of the clean-up procedures involve the use of activated carbon filters? If so, how will these be disposed of?

Response: Activated carbon may be used for treating both air and water streams. The spent carbon will be returned to the supplier for regeneration.

G.4 "The Air-Stripping and Vacuum Process have been used in the past, how effective were they?

G.5 Response: Both processes have been employed at this site as part of Interim Remedial Measures and as part of pilot tests. The results indicate that the technologies are capable of achieving the pertinent remedial goals.

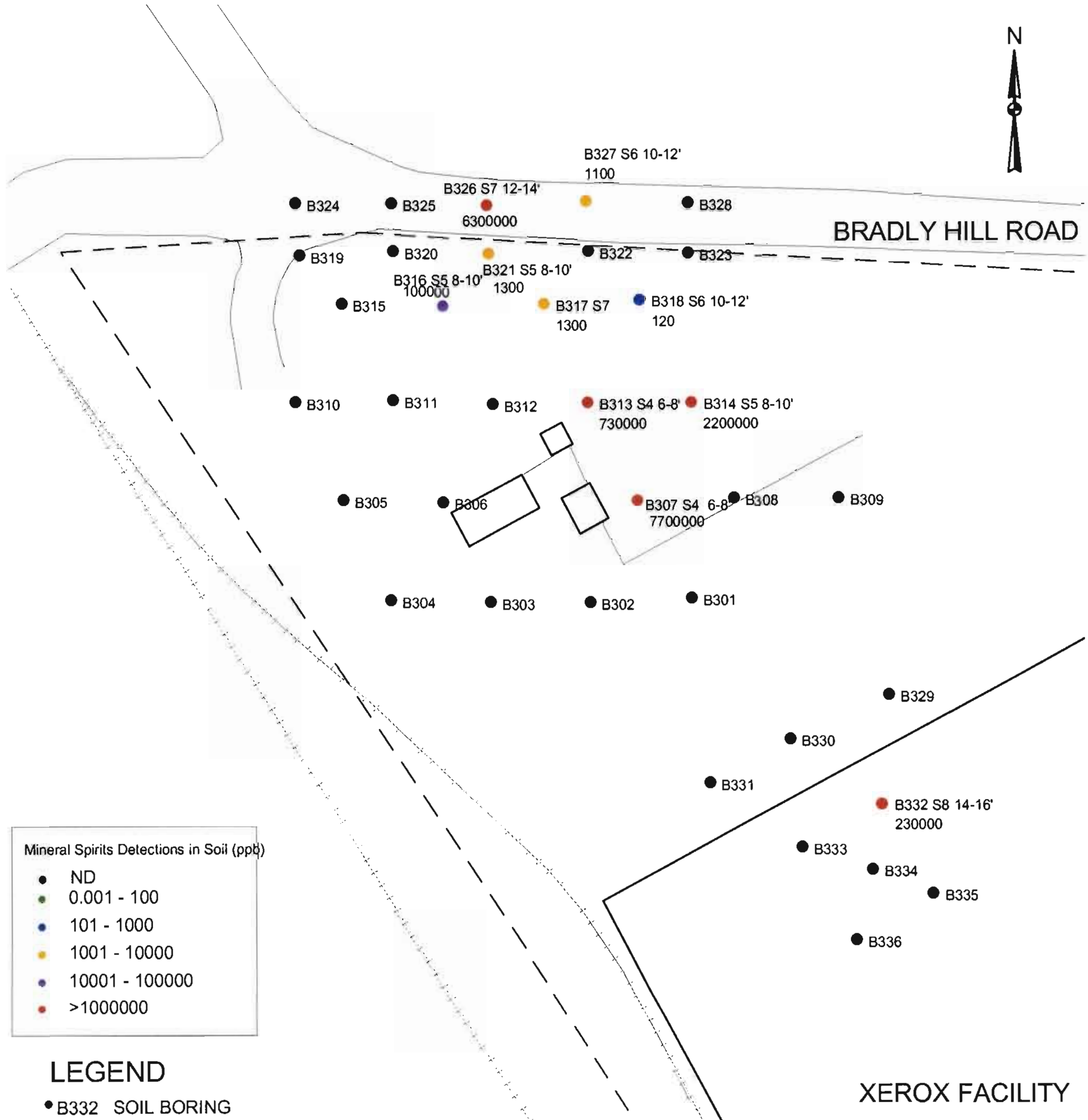
G.6 "Will the statistics that you gather during the monitoring of this project be available to the public?"

Response: The data regarding the effectiveness of the remedy will be available to the public. A decision about placing the data in the document repository or making it available upon request will be made during the design phase.

APPENDIX C

SOIL SAMPLING RESULTS – JUNE 2000 REBOUND PROGRAM

HALEY & ALDRICH



LEGEND

- B332 SOIL BORING COMPLETED UNDER OBSERVATION OF HALEY & ALDRICH, SEPTEMBER 2000 WITH A NON-DETECT ANALYTICAL VALUE.

- B307 S2 6-8' 240000 — SOIL BORING COMPLETED UNDER OBSERVATION OF HALEY & ALDRICH, SEPTEMBER 2000.

SAMPLE NUMBER AND DEPTH

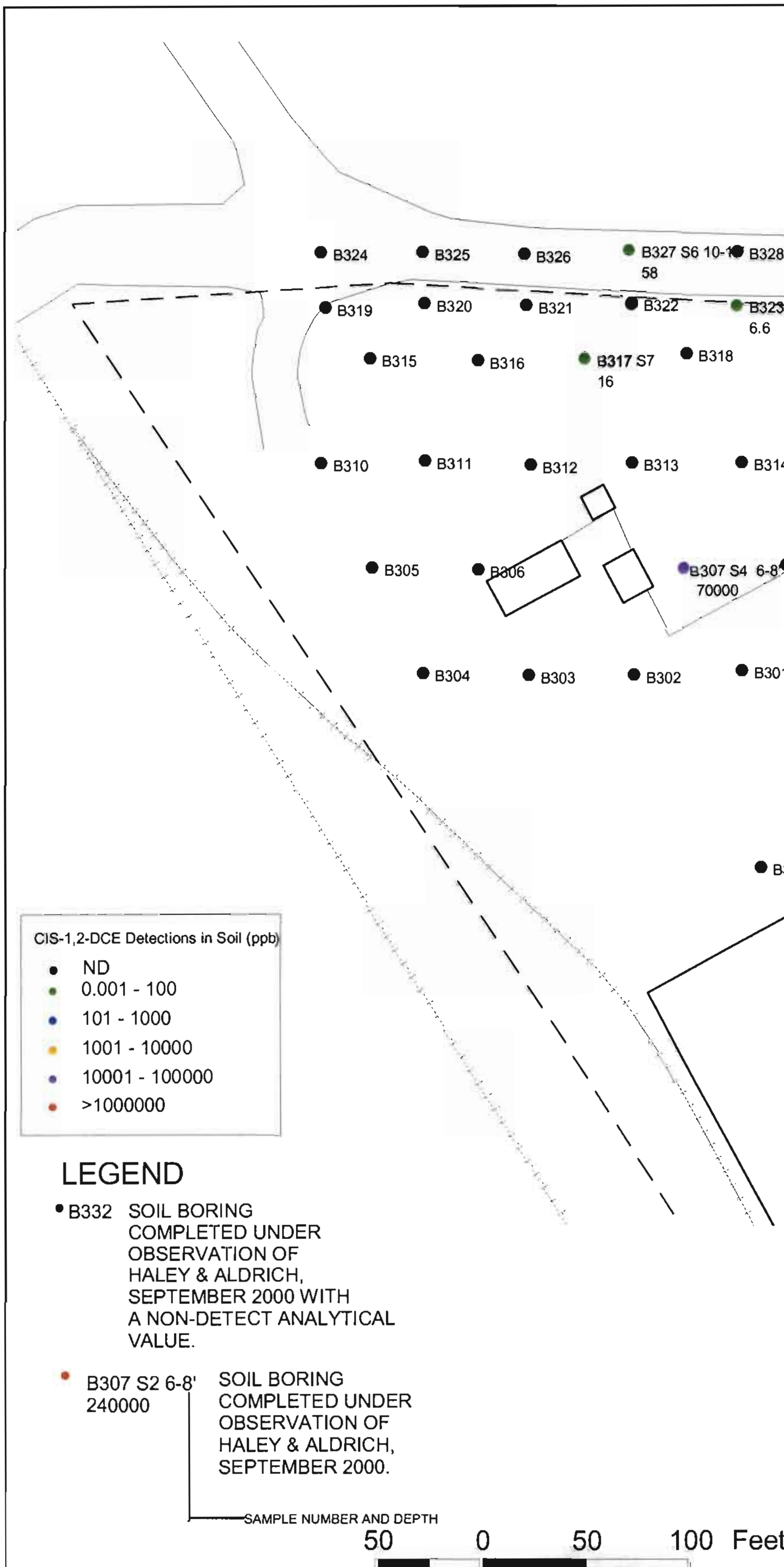
50 0 50 100 Feet

HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

XEROX CORPORATION
BLAUVELT, NEW YORK

SEPTEMBER 2000
SOIL SAMPLING PROGRAM
MINERAL SPIRITS

SCALE: AS SHOWN OCTOBER 2000

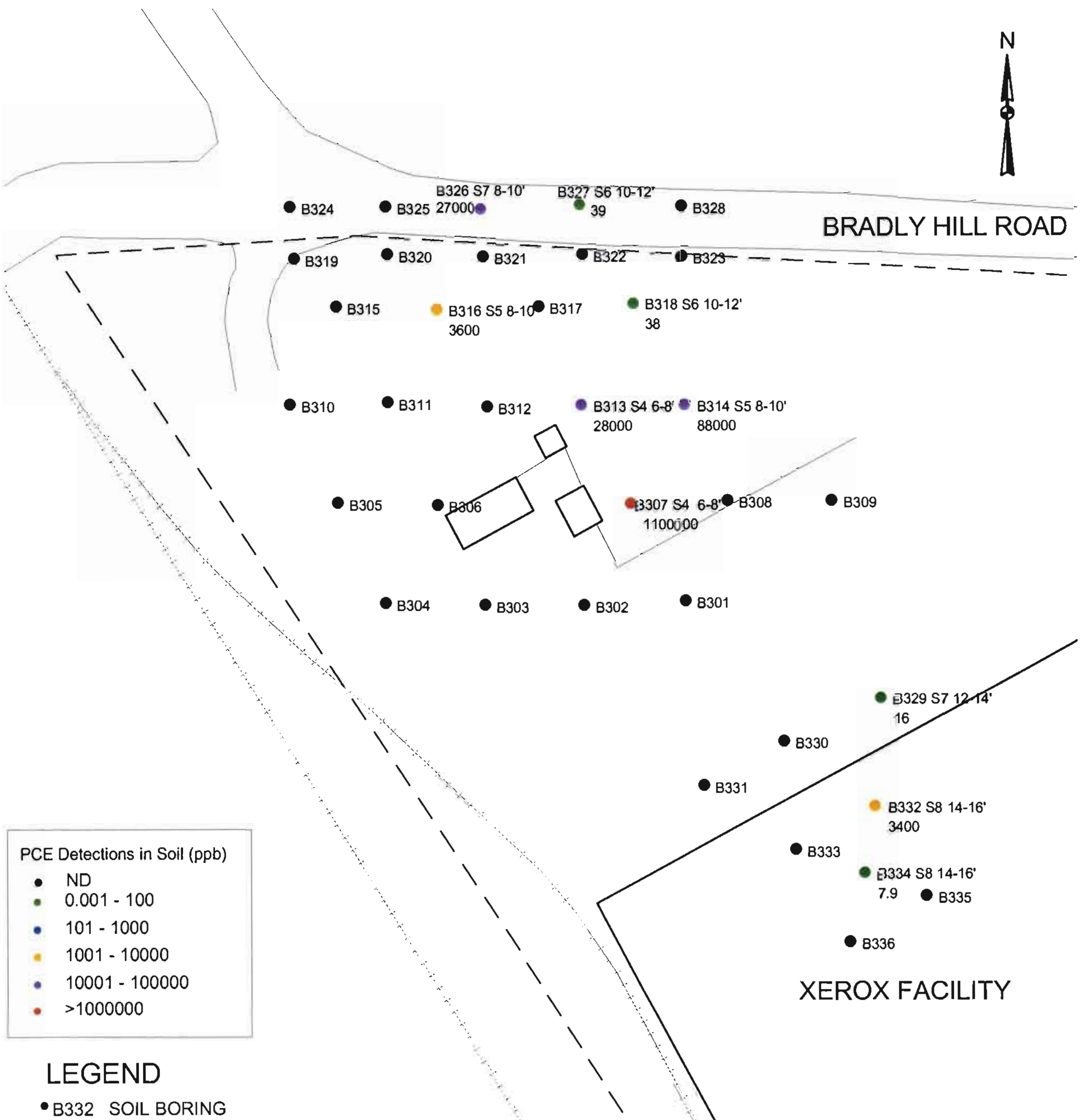


HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

XEROX CORPORATION
BLAUVELT, NEW YORK

SEPTEMBER 2000
SOIL SAMPLING PROGRAM
CIS-1,2-DCE

SCALE: AS SHOWN OCTOBER 2000



LEGEND

• B332 SOIL BORING COMPLETED UNDER OBSERVATION OF HALEY & ALDRICH, SEPTEMBER 2000 WITH A NON-DETECT ANALYTICAL VALUE.

• B307 S2 6-8' 240000 — SOIL BORING COMPLETED UNDER OBSERVATION OF HALEY & ALDRICH, SEPTEMBER 2000.

SAMPLE NUMBER AND DEPTH

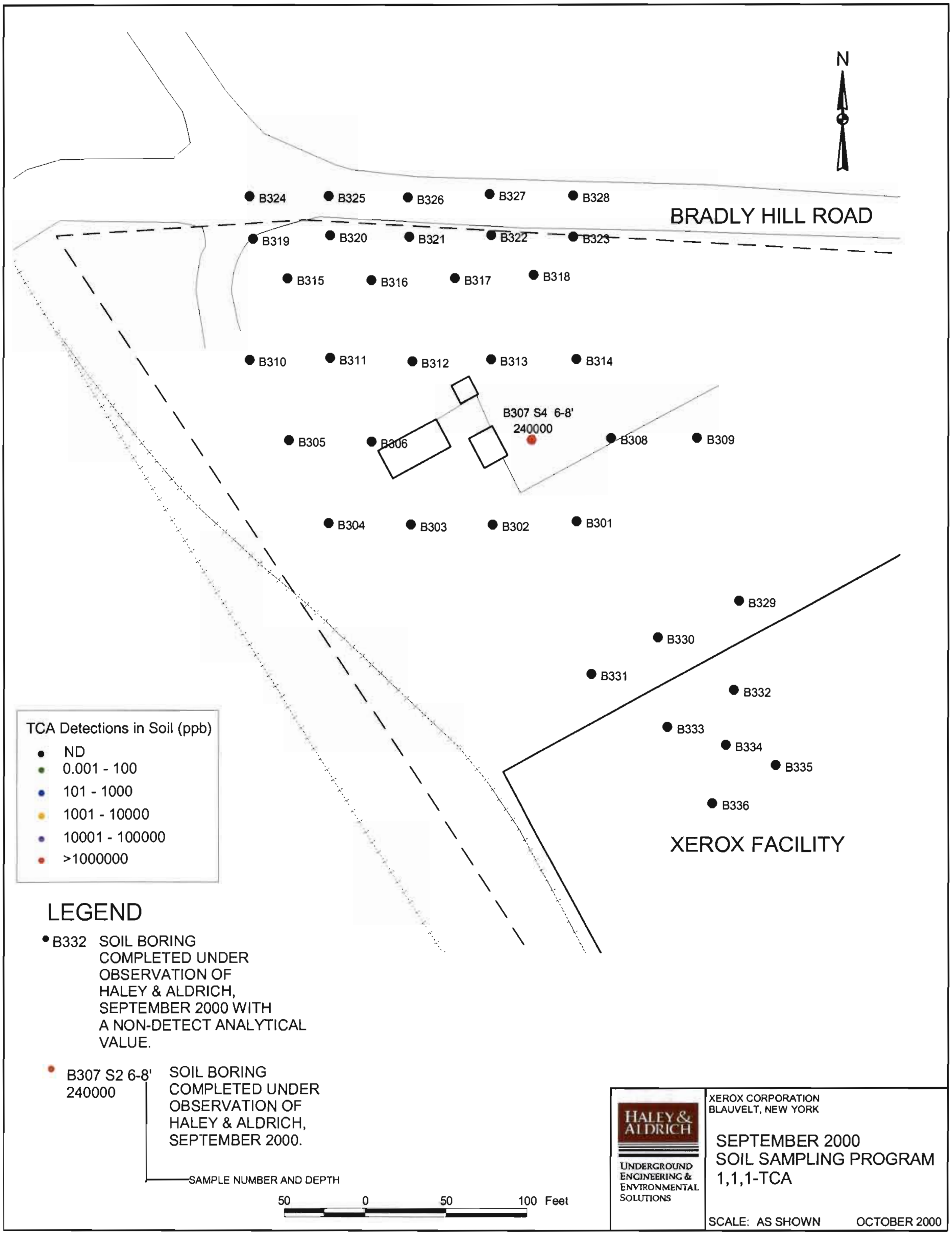
50 0 50 100 Feet

HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

XEROX CORPORATION
BLAUVELT, NEW YORK

SEPTEMBER 2000
SOIL SAMPLING PROGRAM
PCE

SCALE: AS SHOWN | OCTOBER 2000



N
BRADLY HILL ROAD
B324
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B308
B309
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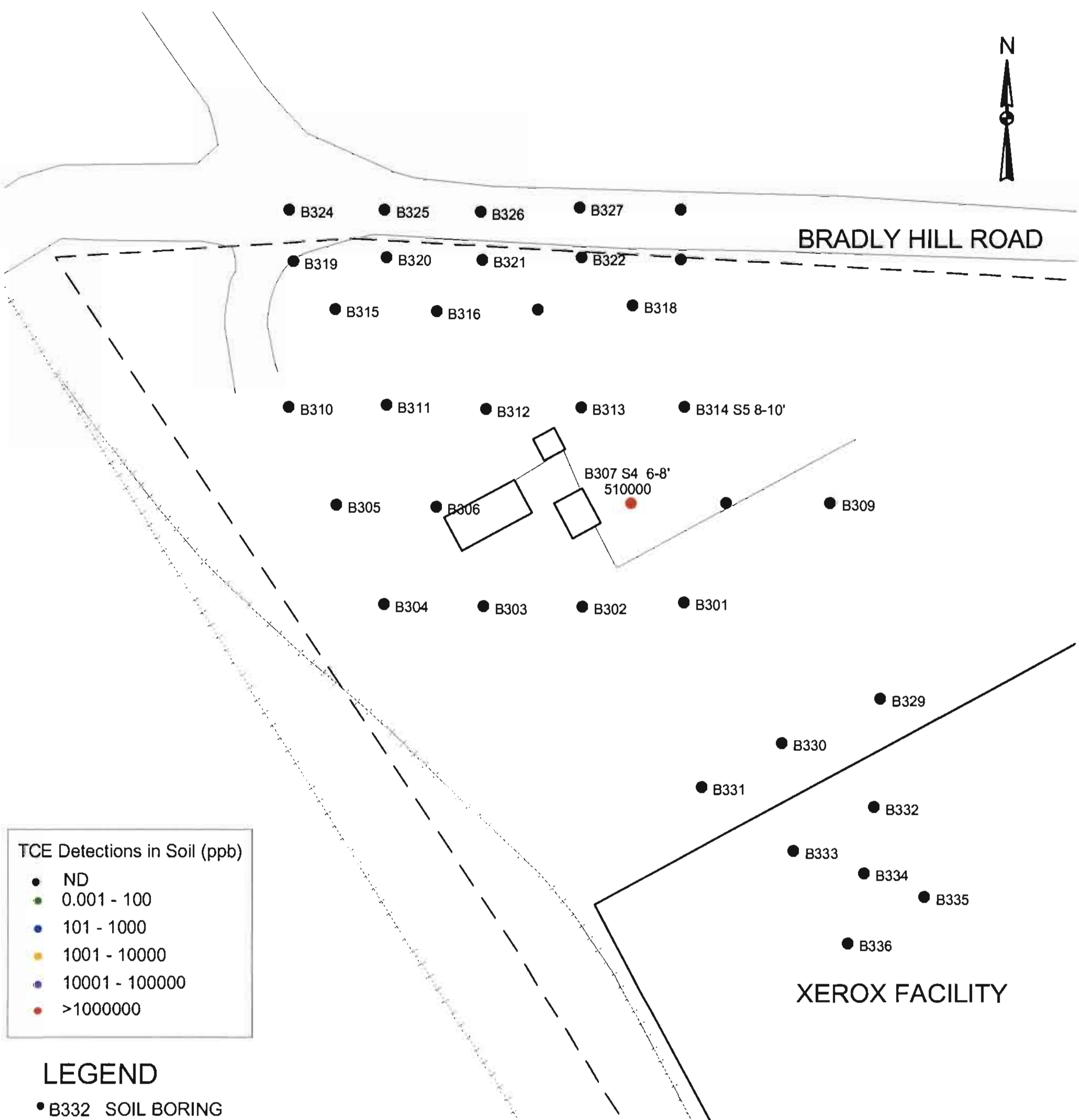
B303
B302
B301
B329
B330
B331
B332
B333
B334
B335
B336
XEROX FACILITY
TCA Detections in Soil (ppb)
ND
0.001 - 100
101 - 1000
1001 - 10000
10001 - 100000
>1000000
LEGEND
B332 SOIL BORING COMPLETED UNDER OBSERVATION OF HALEY & ALDRICH, SEPTEMBER 2000 WITH A NON-DETECT ANALYTICAL VALUE.
B307 S2 6-8'
240000
SOIL BORING COMPLETED UNDER OBSERVATION OF HALEY & ALDRICH, SEPTEMBER 2000.
SAMPLE NUMBER AND DEPTH
50
0
50
100 Feet
HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS
XEROX CORPORATION
BLAUVELT, NEW YORK
SEPTEMBER 2000
SOIL SAMPLING PROGRAM
1,1,1-TCA
SCALE: AS SHOWN
OCTOBER 2000



TCE Detections in Soil (ppb)

- ND
- 0.001 - 100
- 101 - 1000
- 1001 - 10000
- 10001 - 100000
- >1000000

LEGEND

• B332 SOIL BORING COMPLETED UNDER OBSERVATION OF HALEY & ALDRICH, SEPTEMBER 2000 WITH A NON-DETECT ANALYTICAL VALUE.

• B307 S2 6-8' 240000 SOIL BORING COMPLETED UNDER OBSERVATION OF HALEY & ALDRICH, SEPTEMBER 2000.

SAMPLE NUMBER AND DEPTH

50 0 50 100 Feet

HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

XEROX CORPORATION
BLAUVELT, NEW YORK

SEPTEMBER 2000
SOIL SAMPLING PROGRAM
TCE

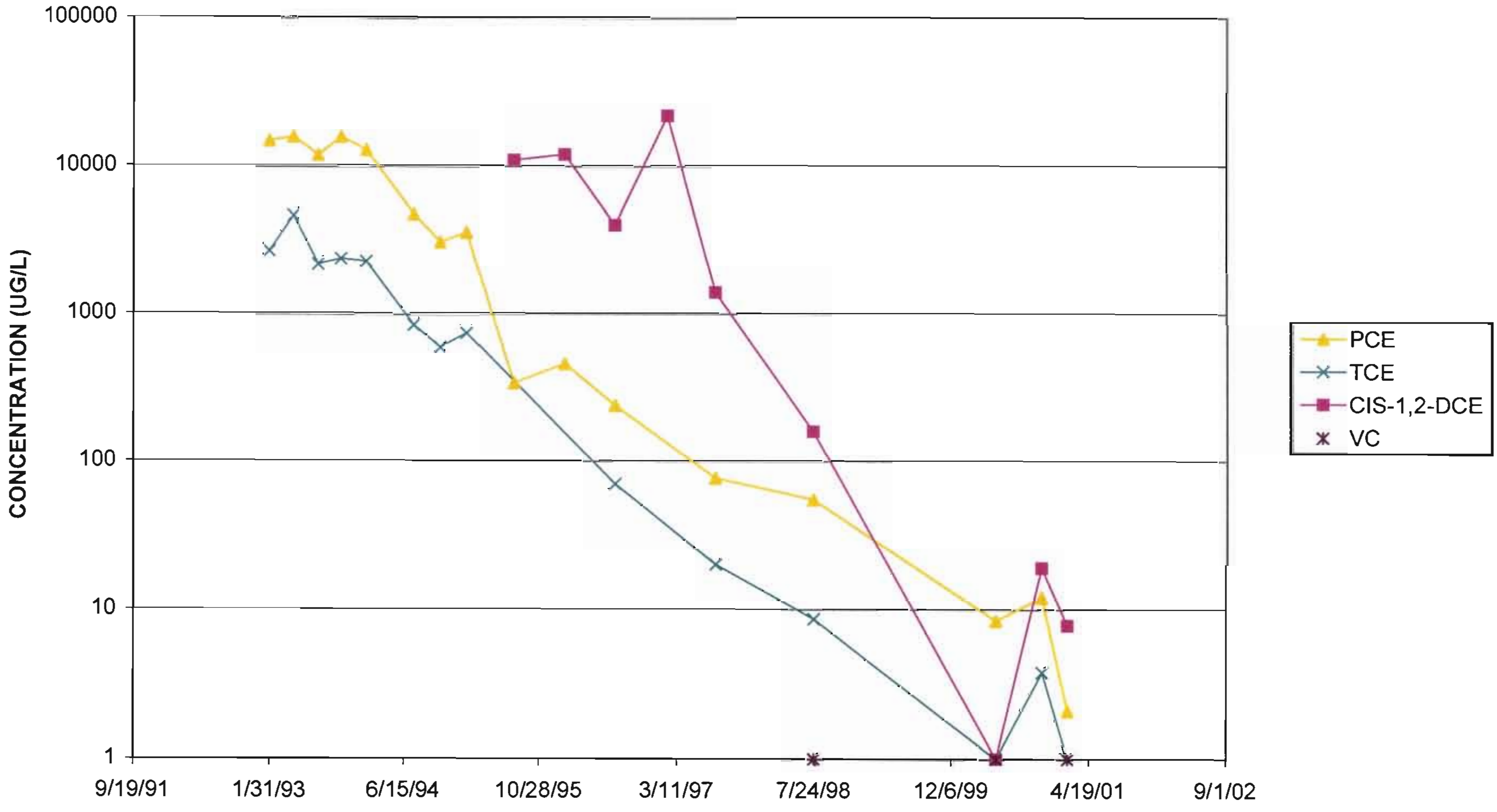
SCALE: AS SHOWN OCTOBER 2000

APPENDIX D

TIME SERIES PLOTS FOR MW-10, MW-12, MW-13, PW-2, W-1, W-2, OS-2R, OS-4R, OS-6R, OS-7R, AND OS-8R

HALEY & ALDRICH

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
MW-10



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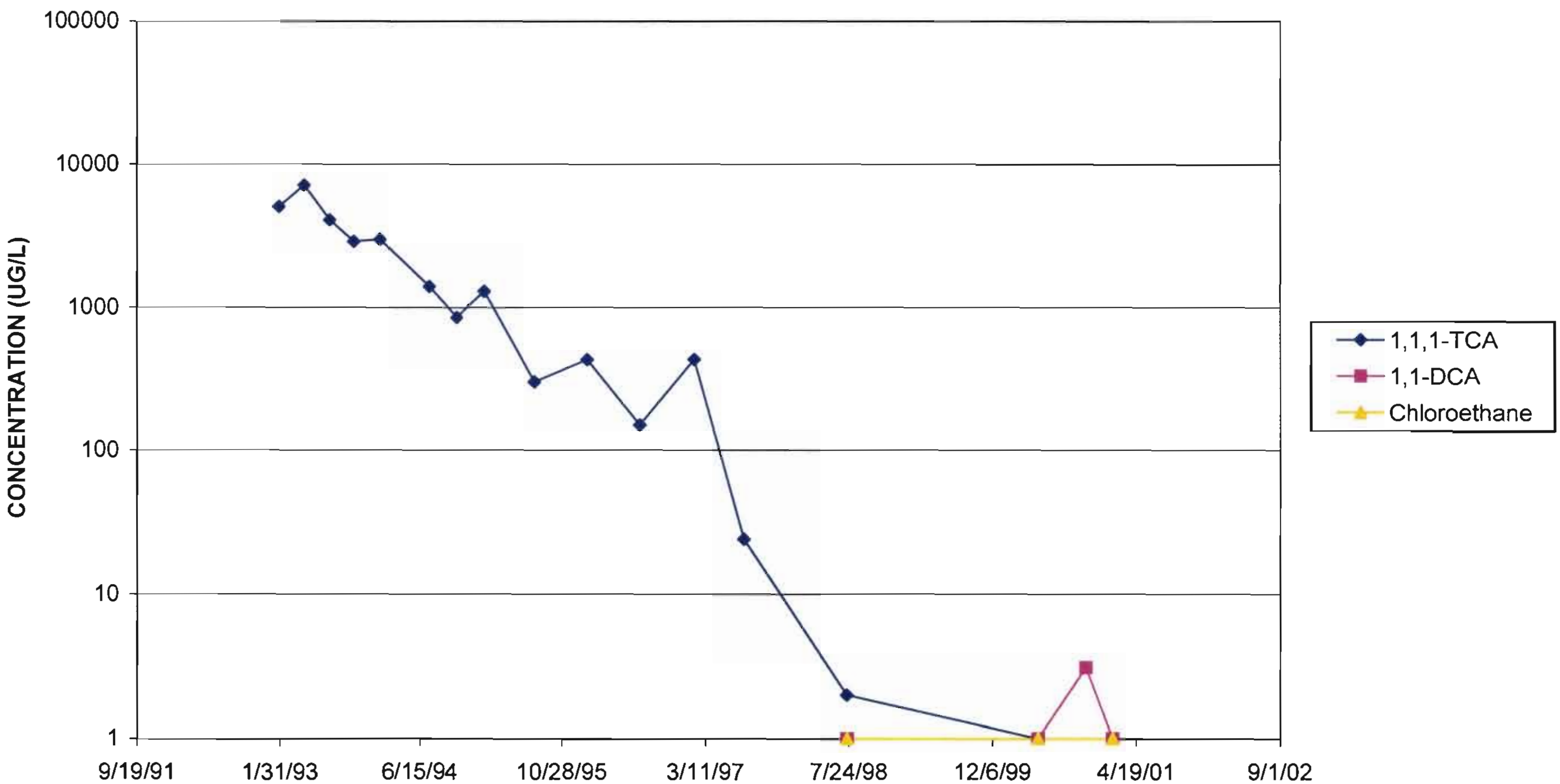
XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
MW-10



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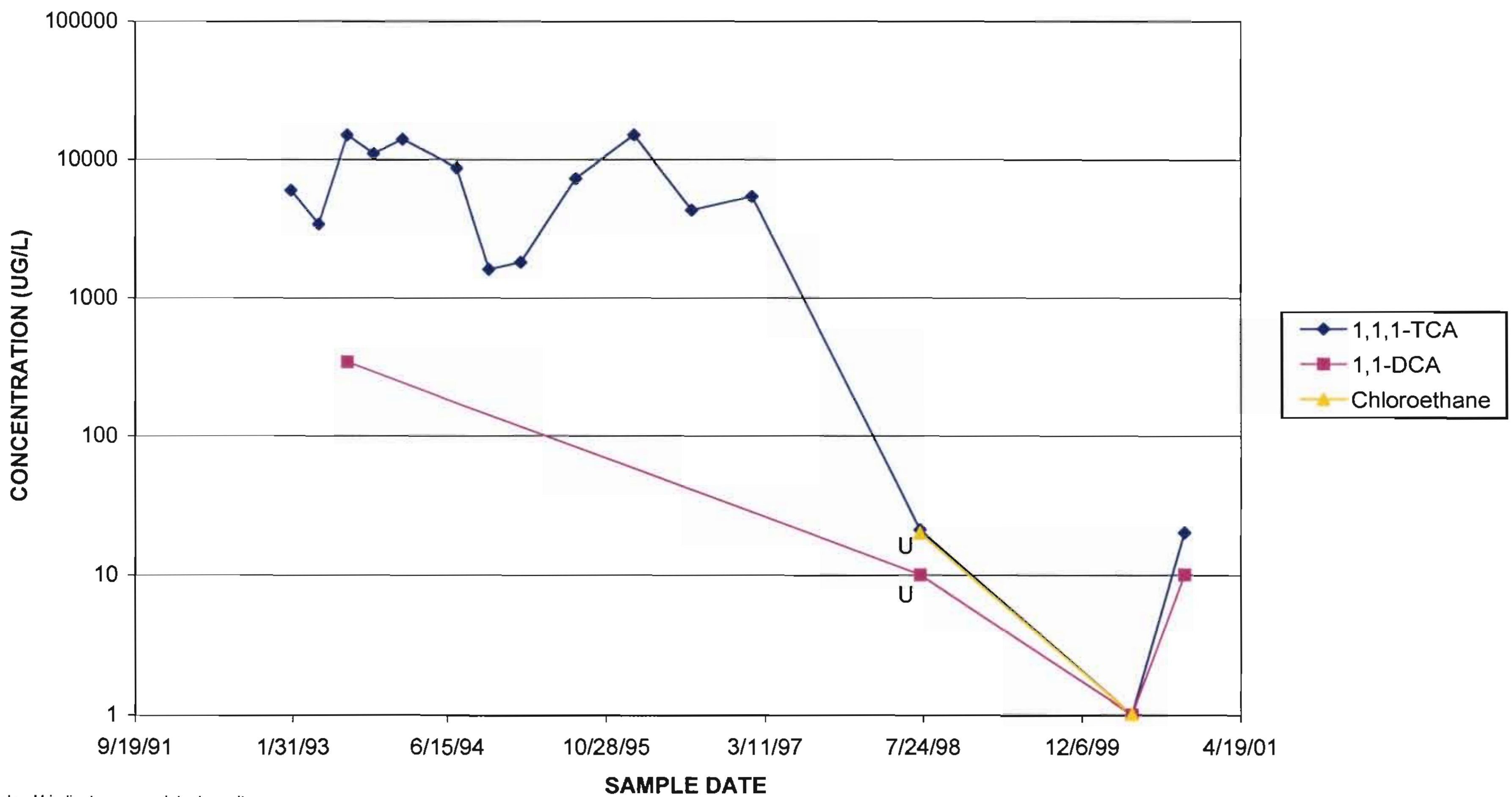
XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
MW-12



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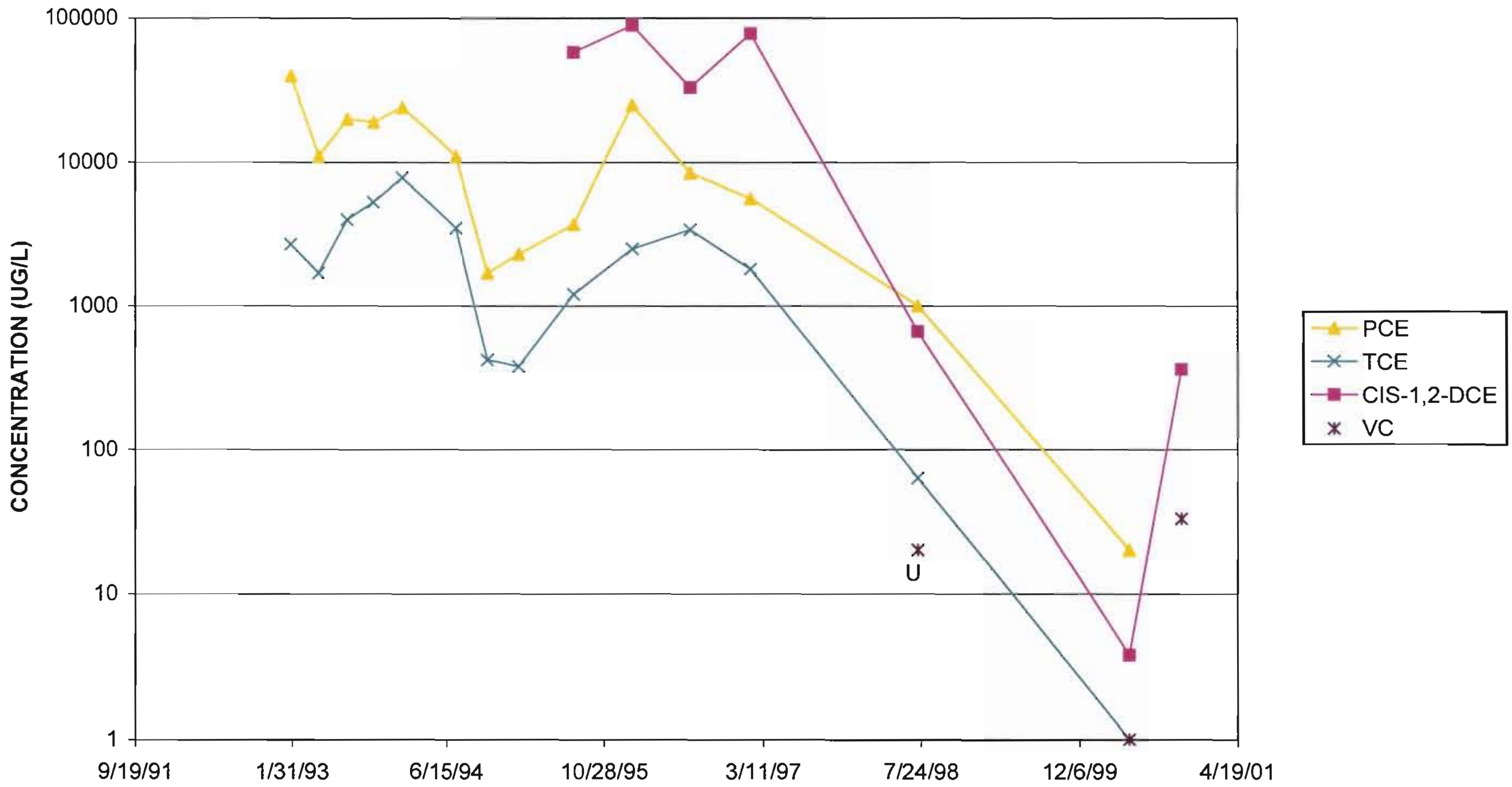
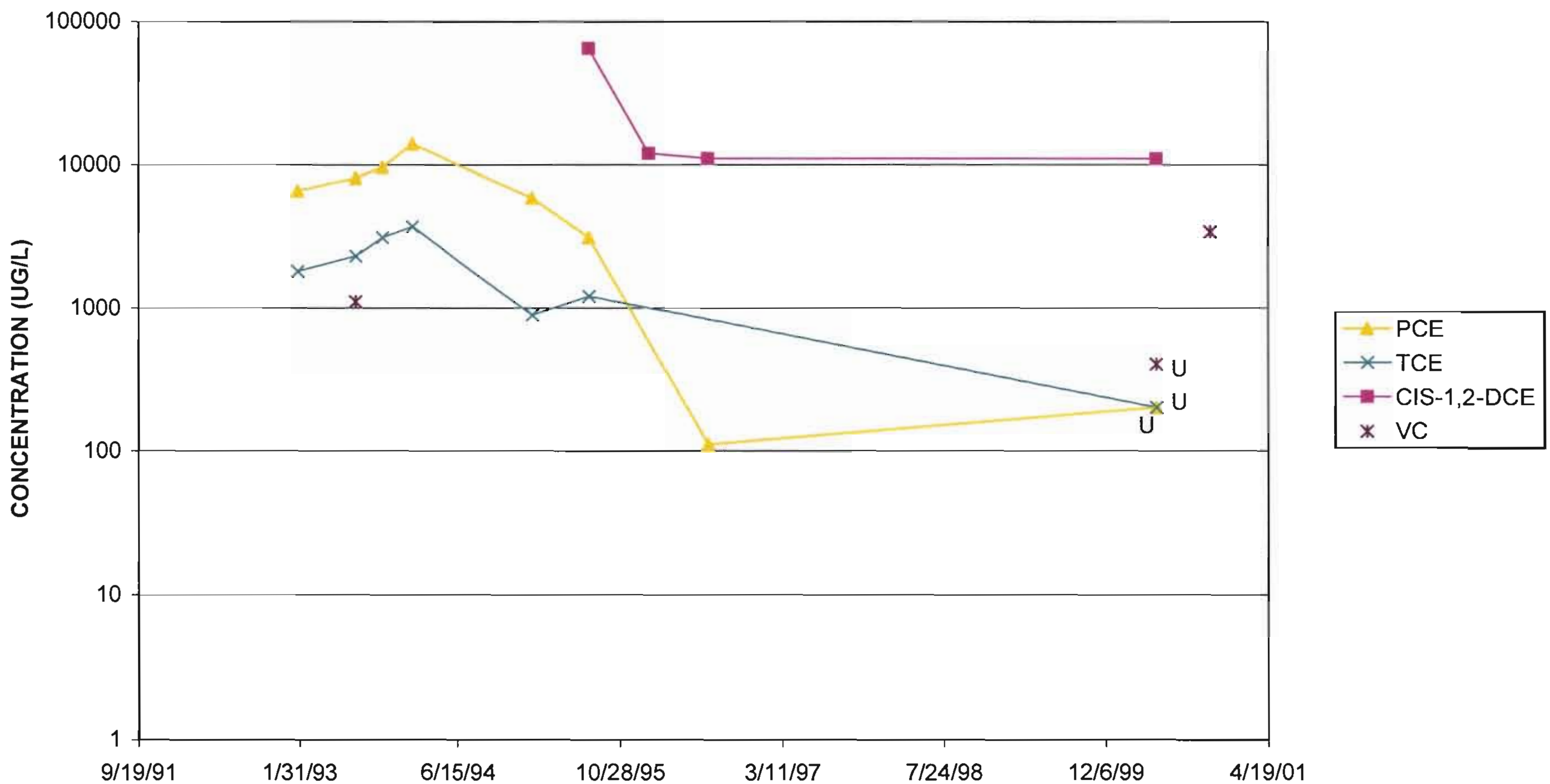
XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
MW-12



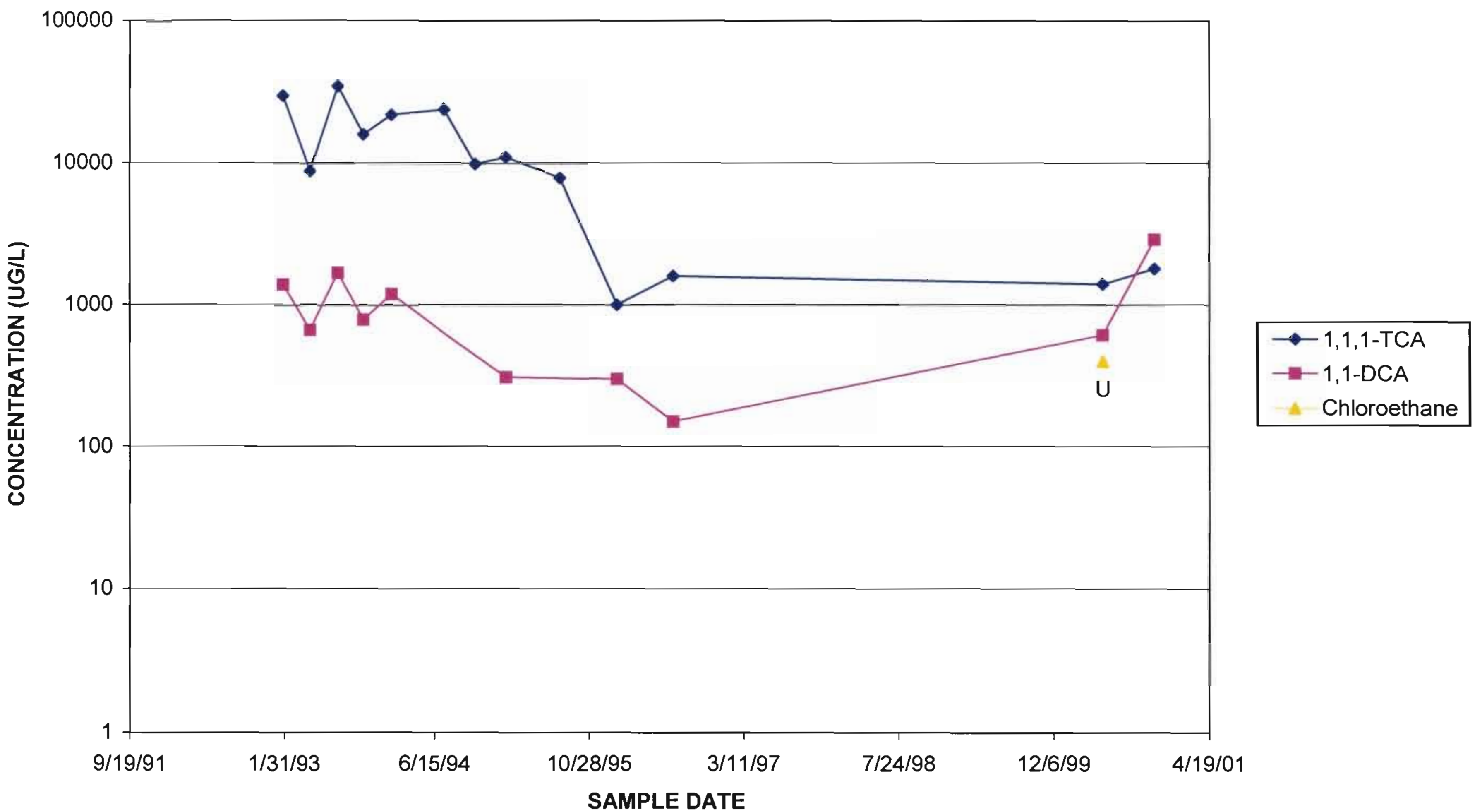
Note: U indicates a non-detect result.

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
MW-13



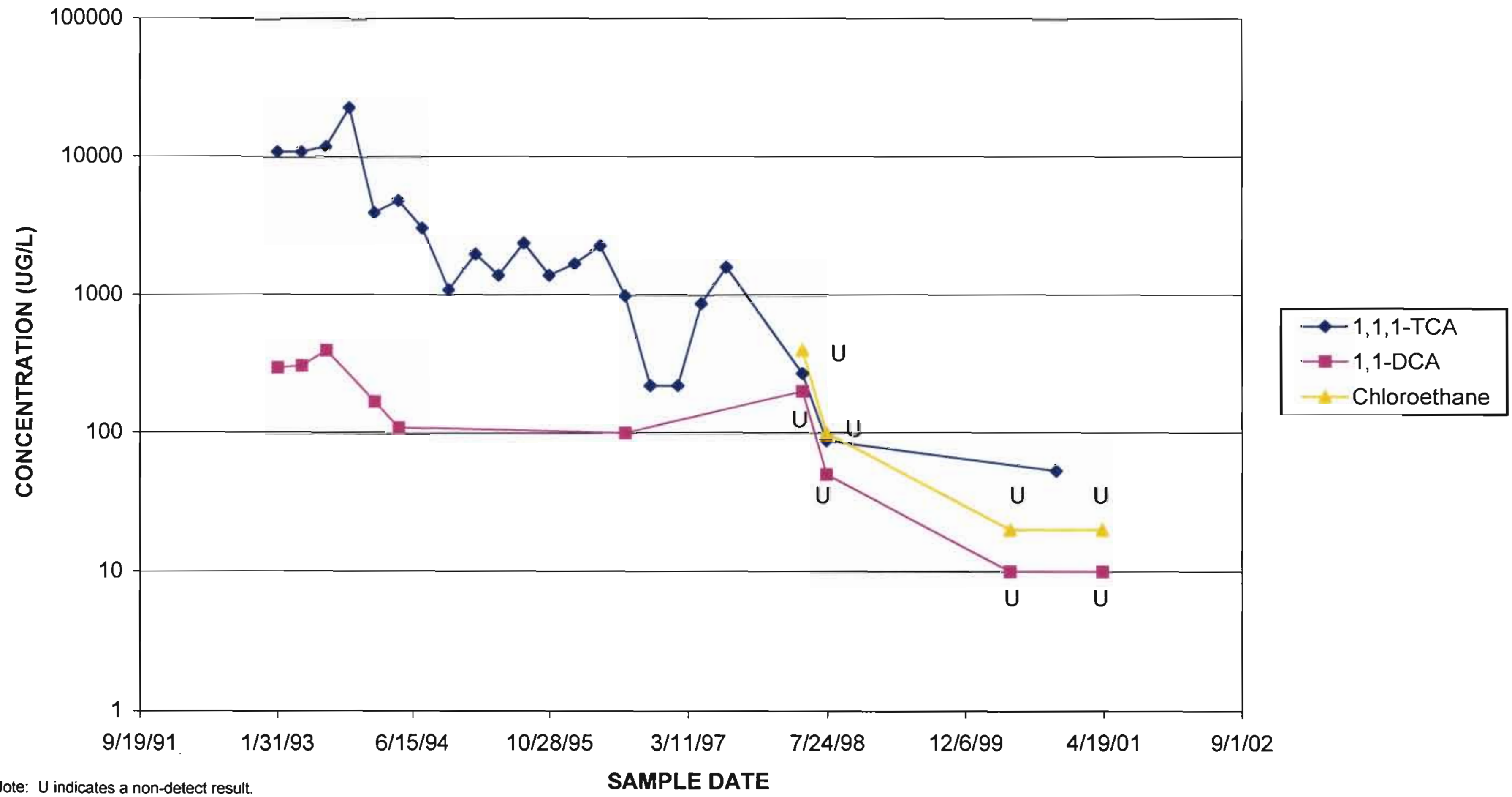
Note: U indicates a non-detect result.

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
MW-13



Note: U indicates a non-detect result.

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
PW-2



Note: U indicates a non-detect result.

Haley & Aldrich, Inc.

G:/Projects/70302/

XEROX CORPORATION
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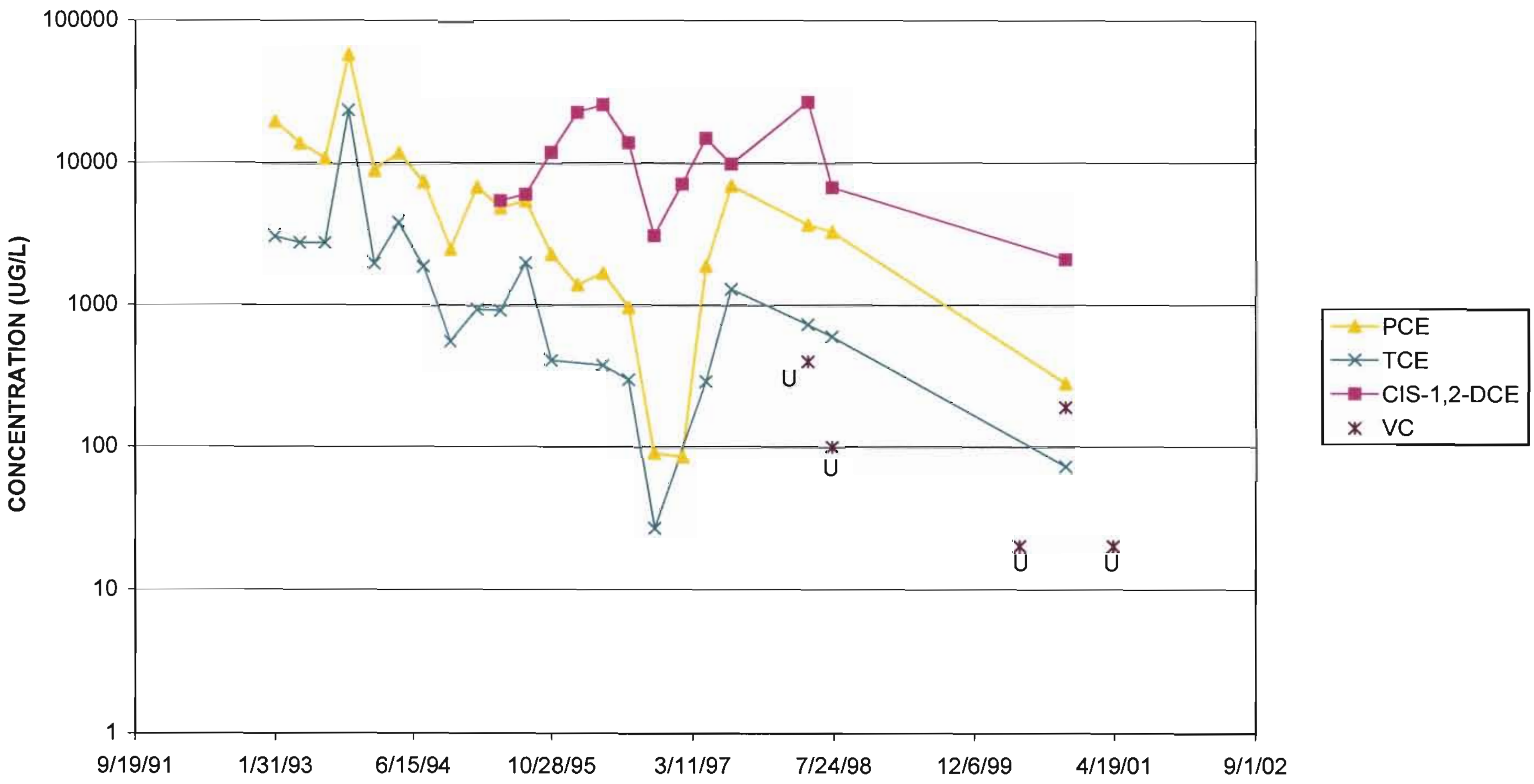
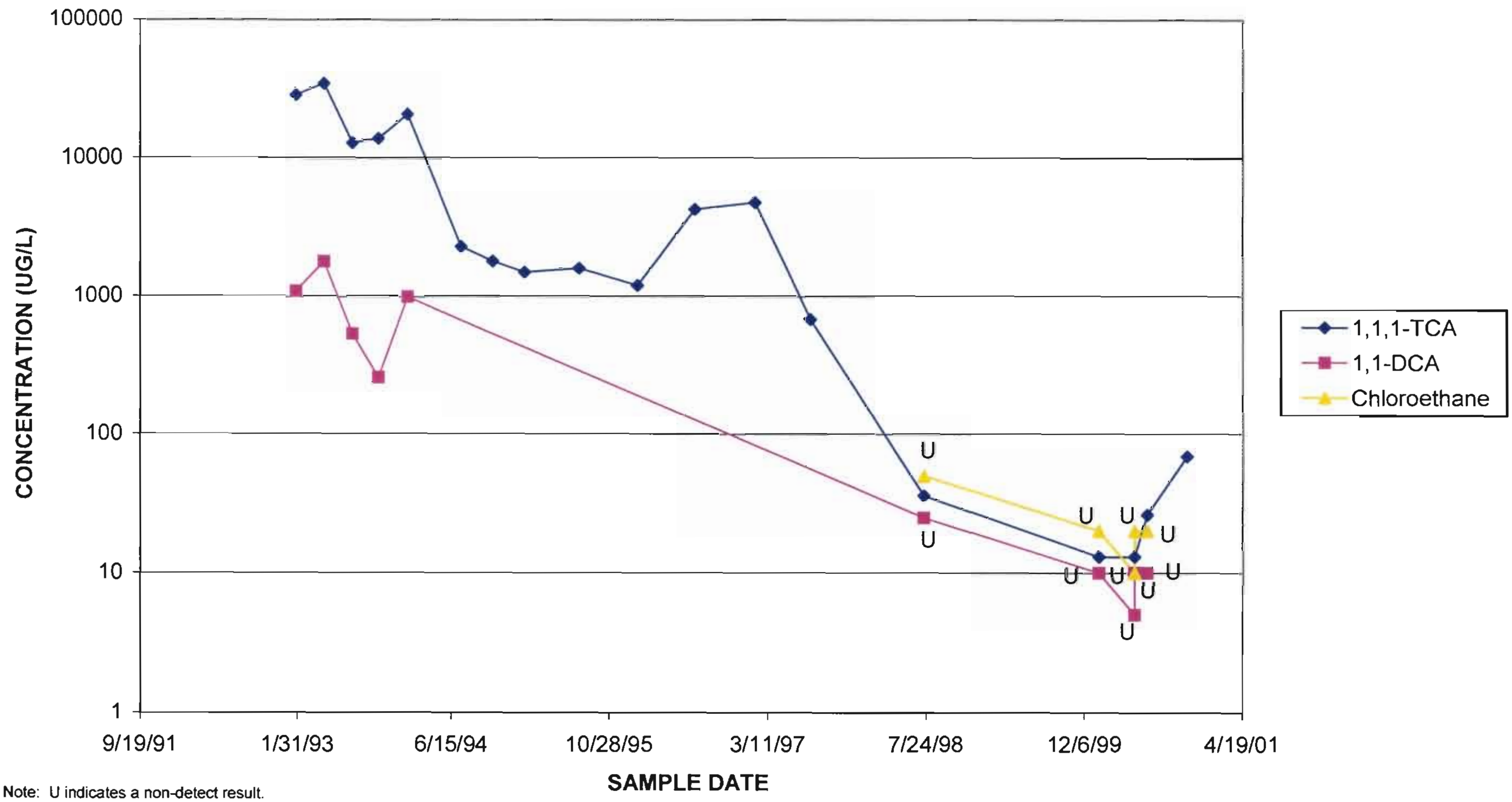
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
PW-2



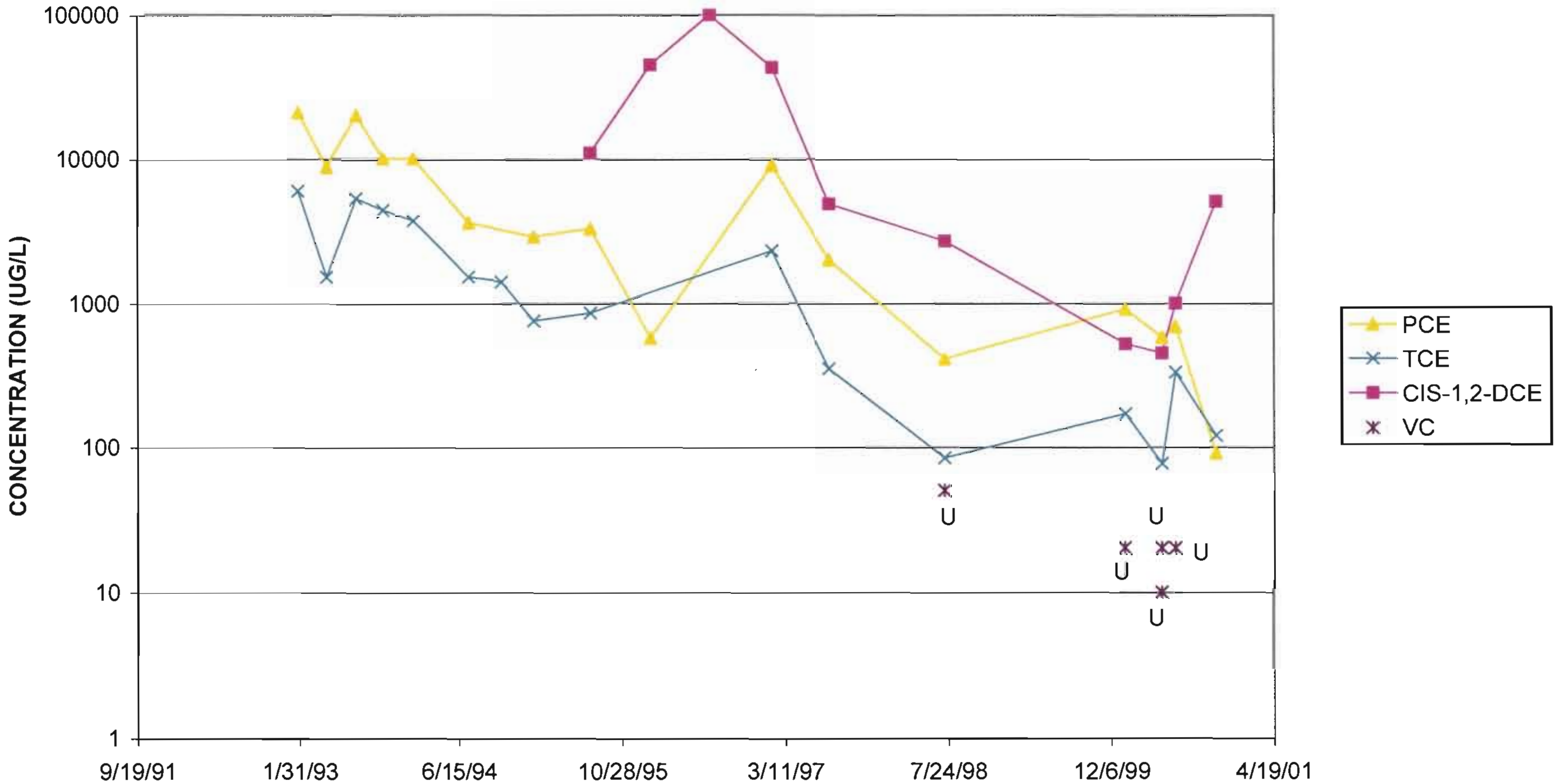
Note: U indicates a non-detect result.

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
W-1



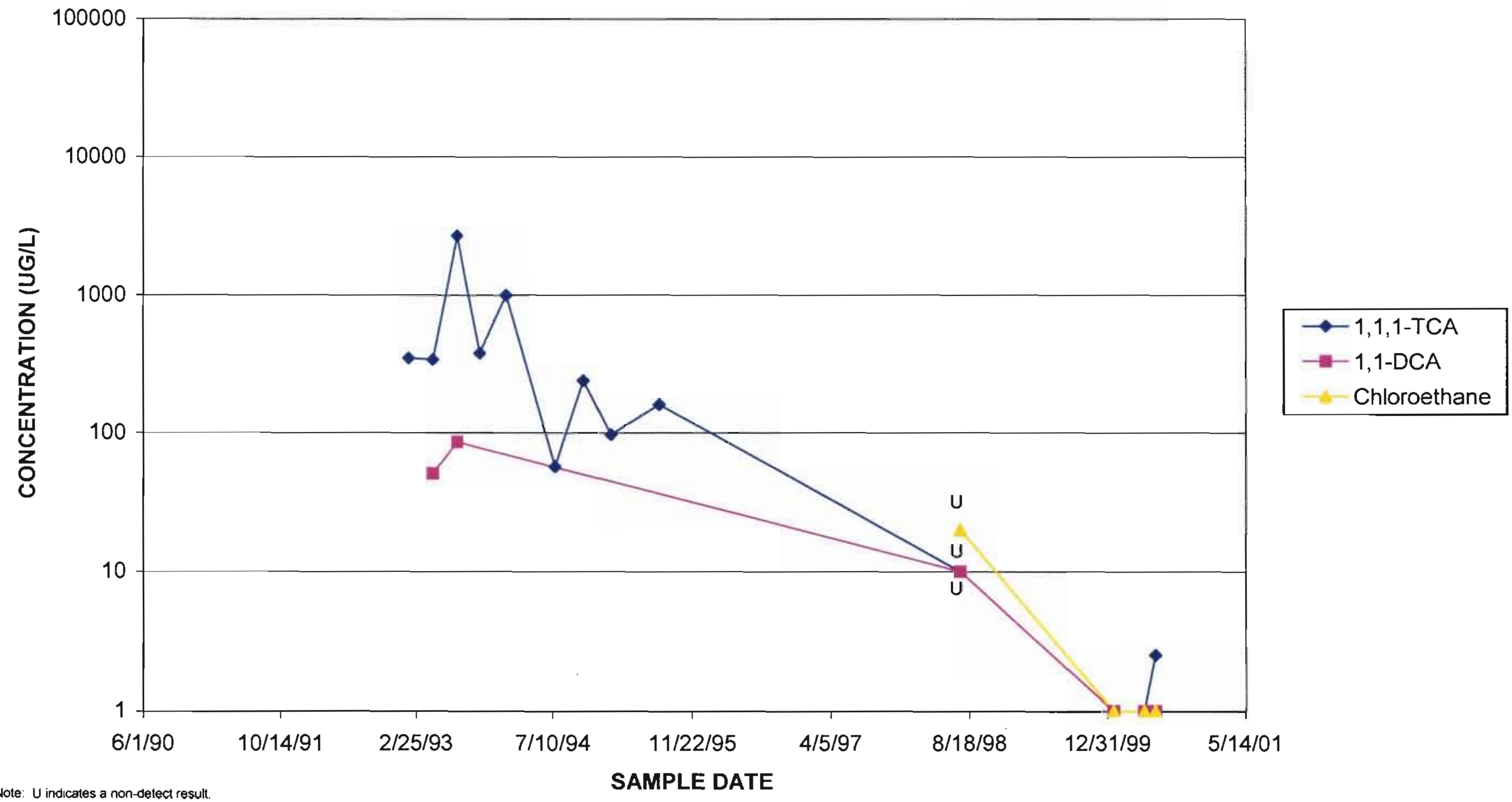
Note: U indicates a non-detect result.

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
W-1



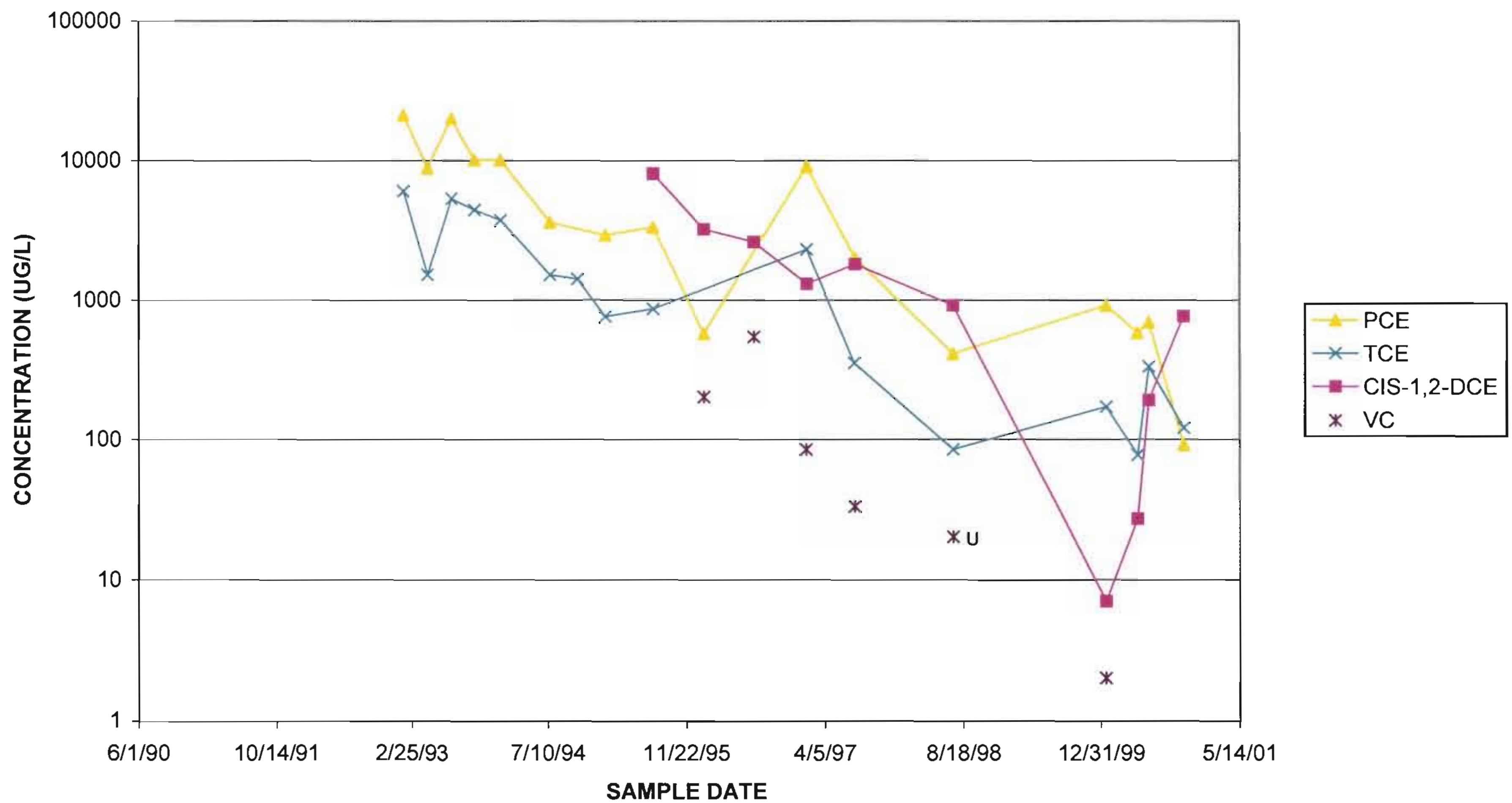
Note: U indicates a non-detect result.

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
W-2



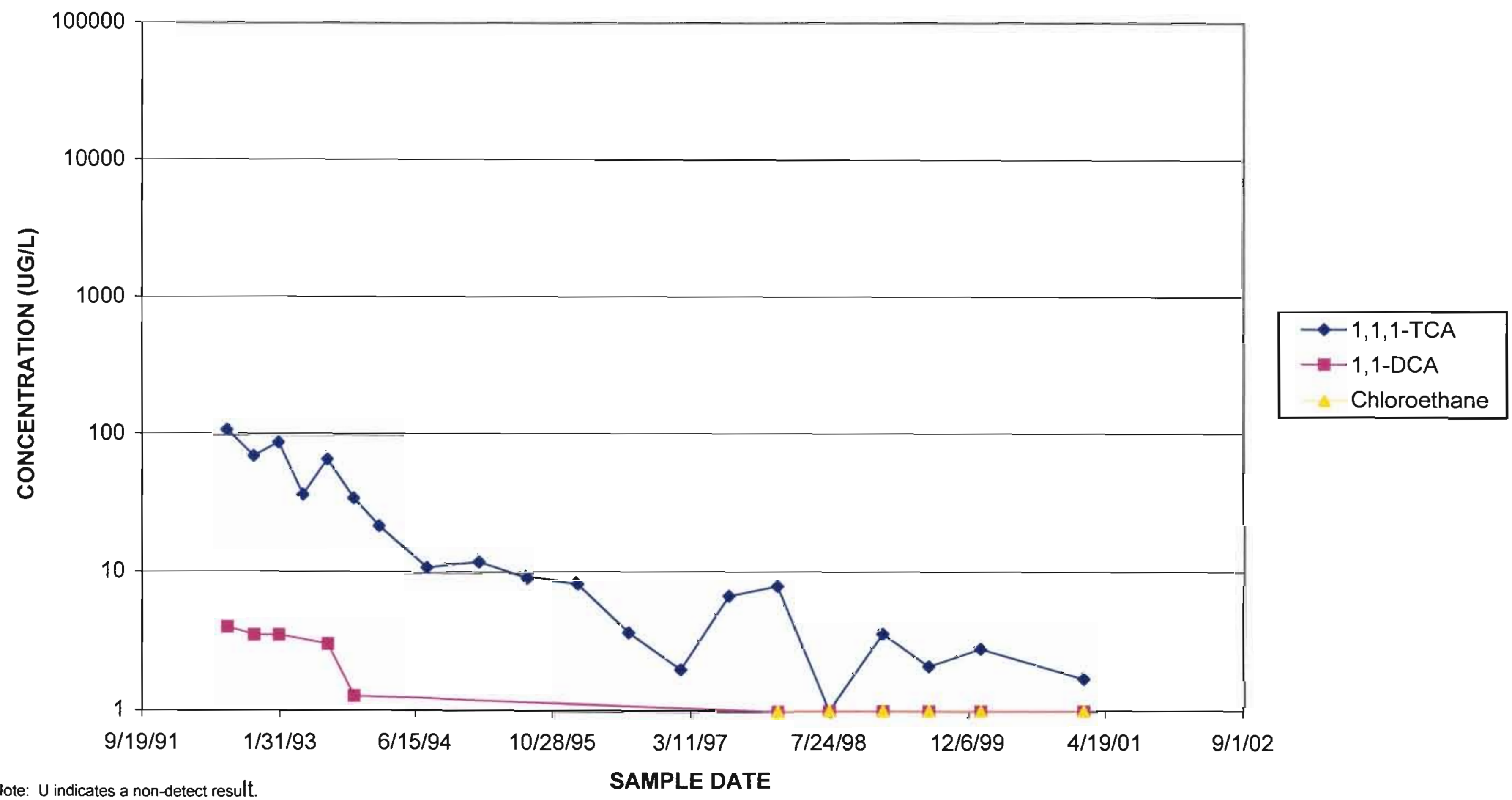
Note: U indicates a non-detect result.

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
W-2



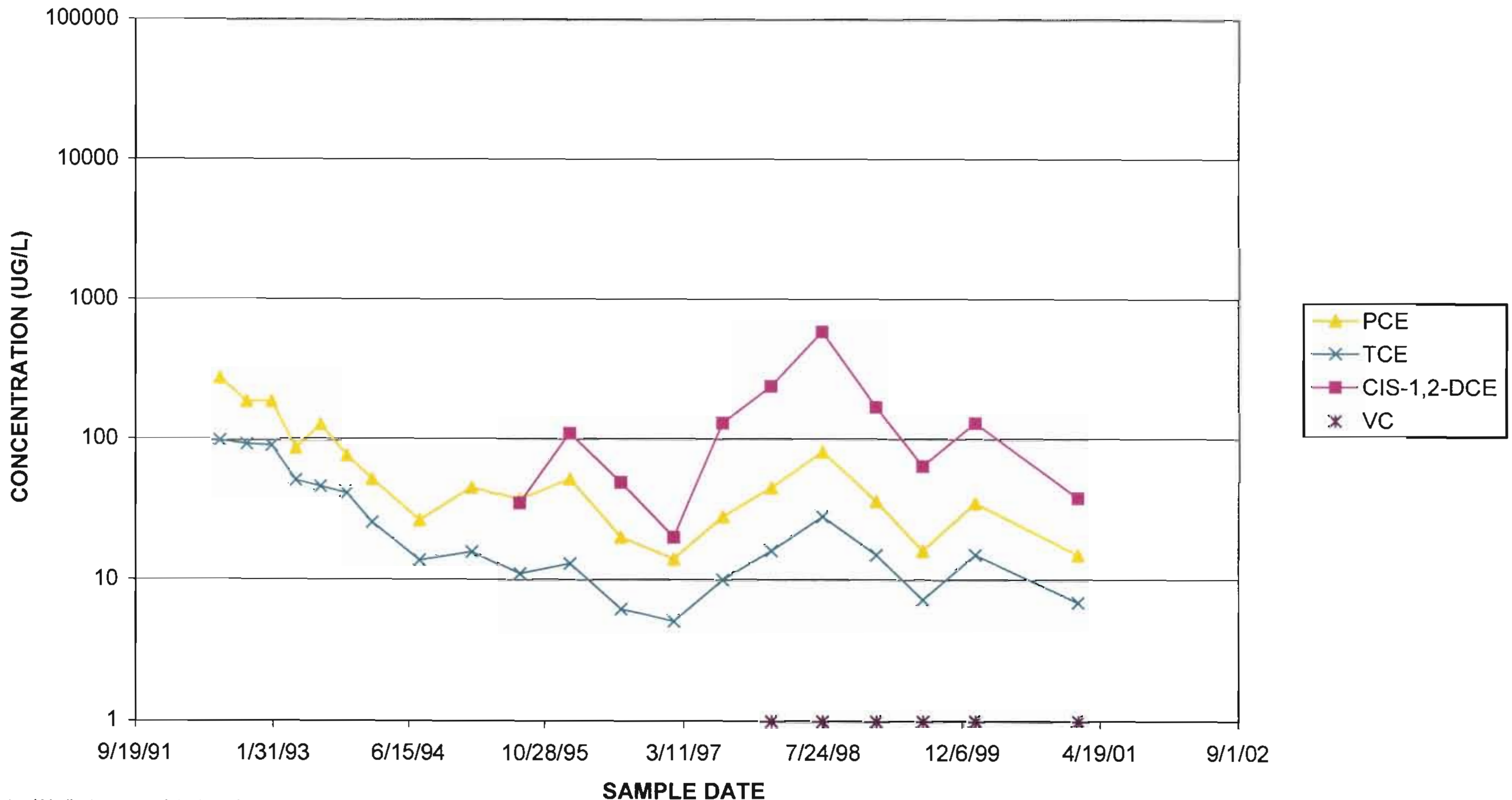
Note: U indicates a non-detect result.

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
OS-2R



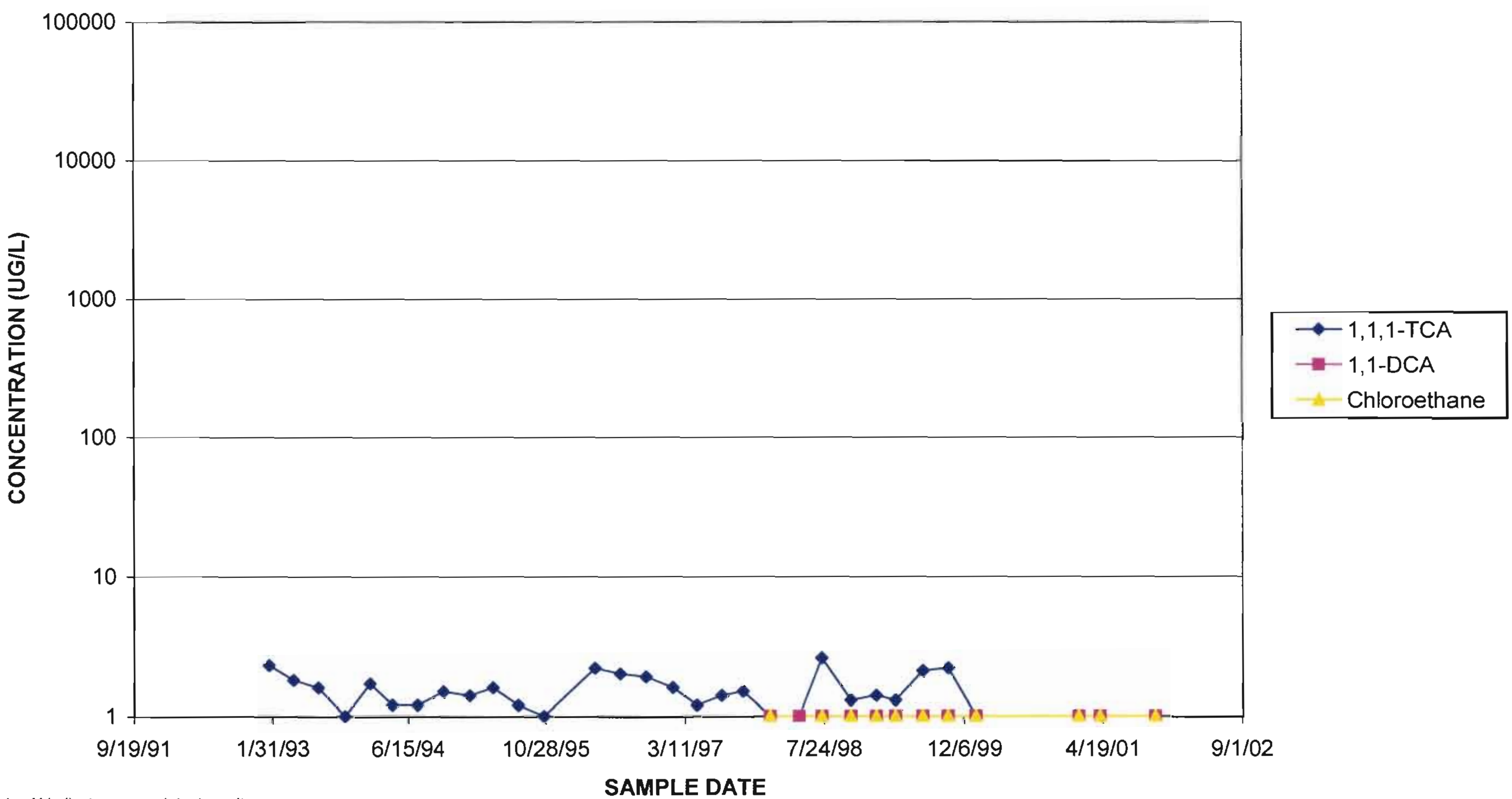
Note: U indicates a non-detect result.

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
OS-2R



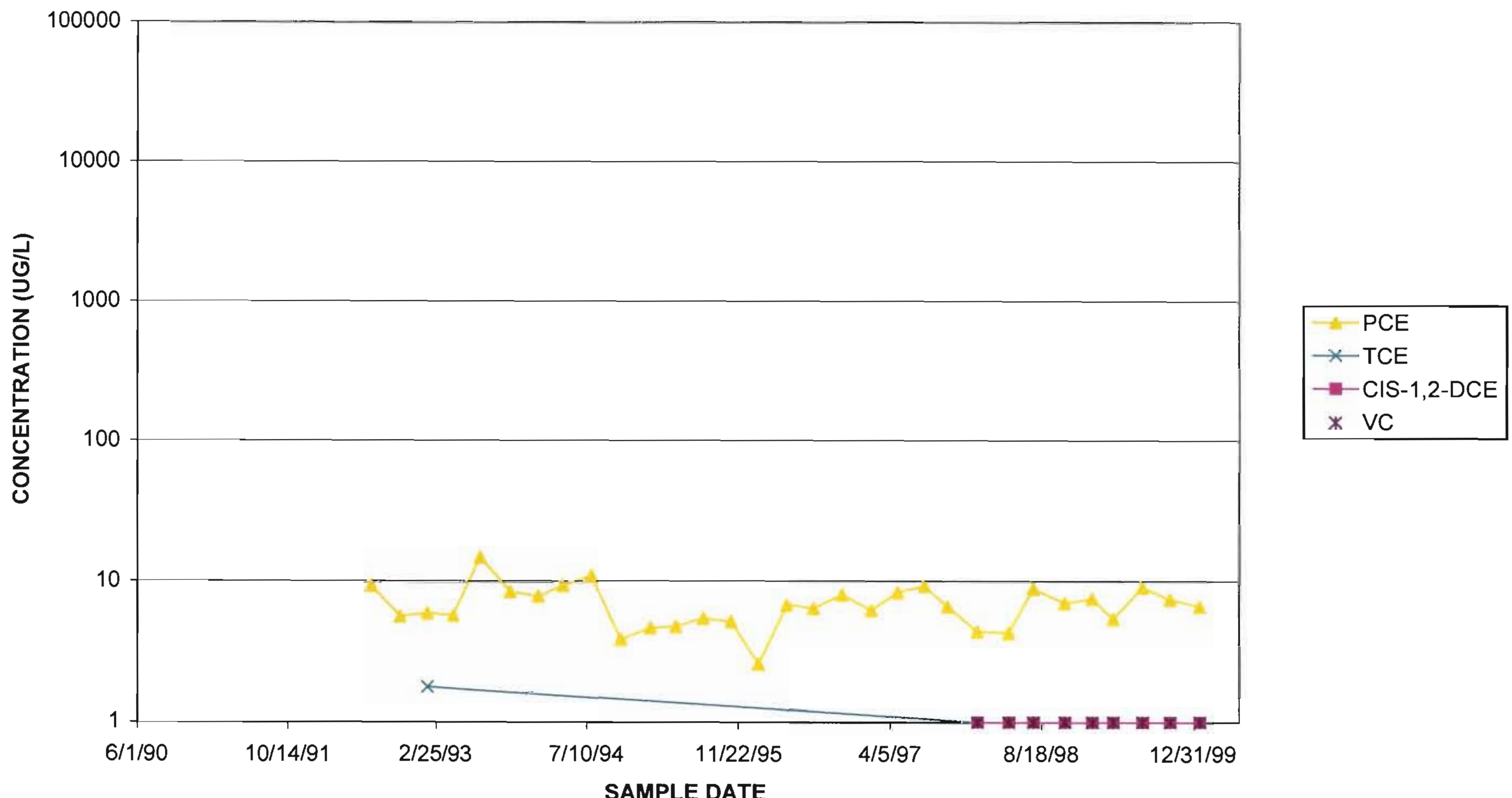
Note: U indicates a non-detect result.

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
OS-4R



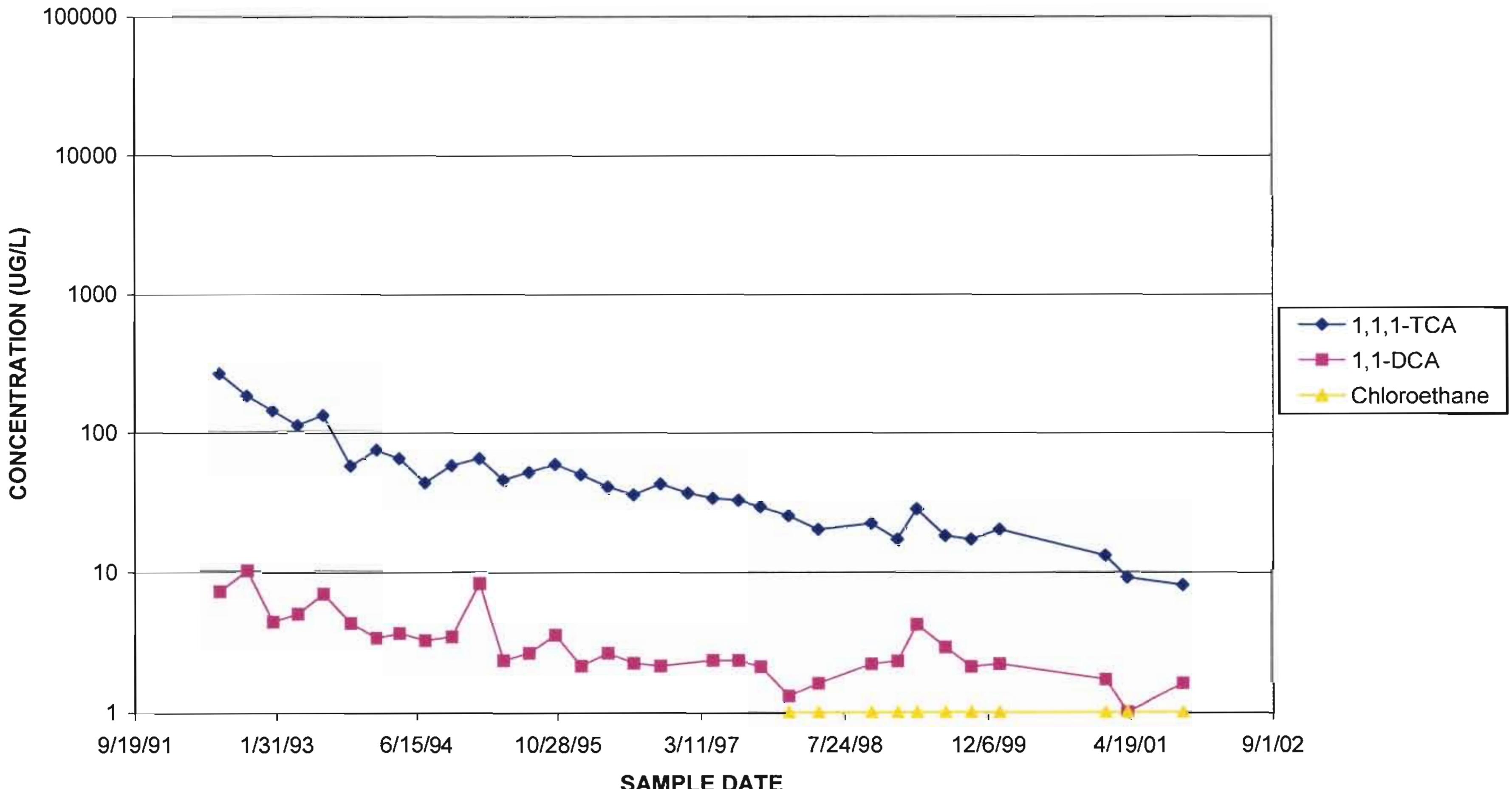
Note: U indicates a non-detect result.

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
OS-4R



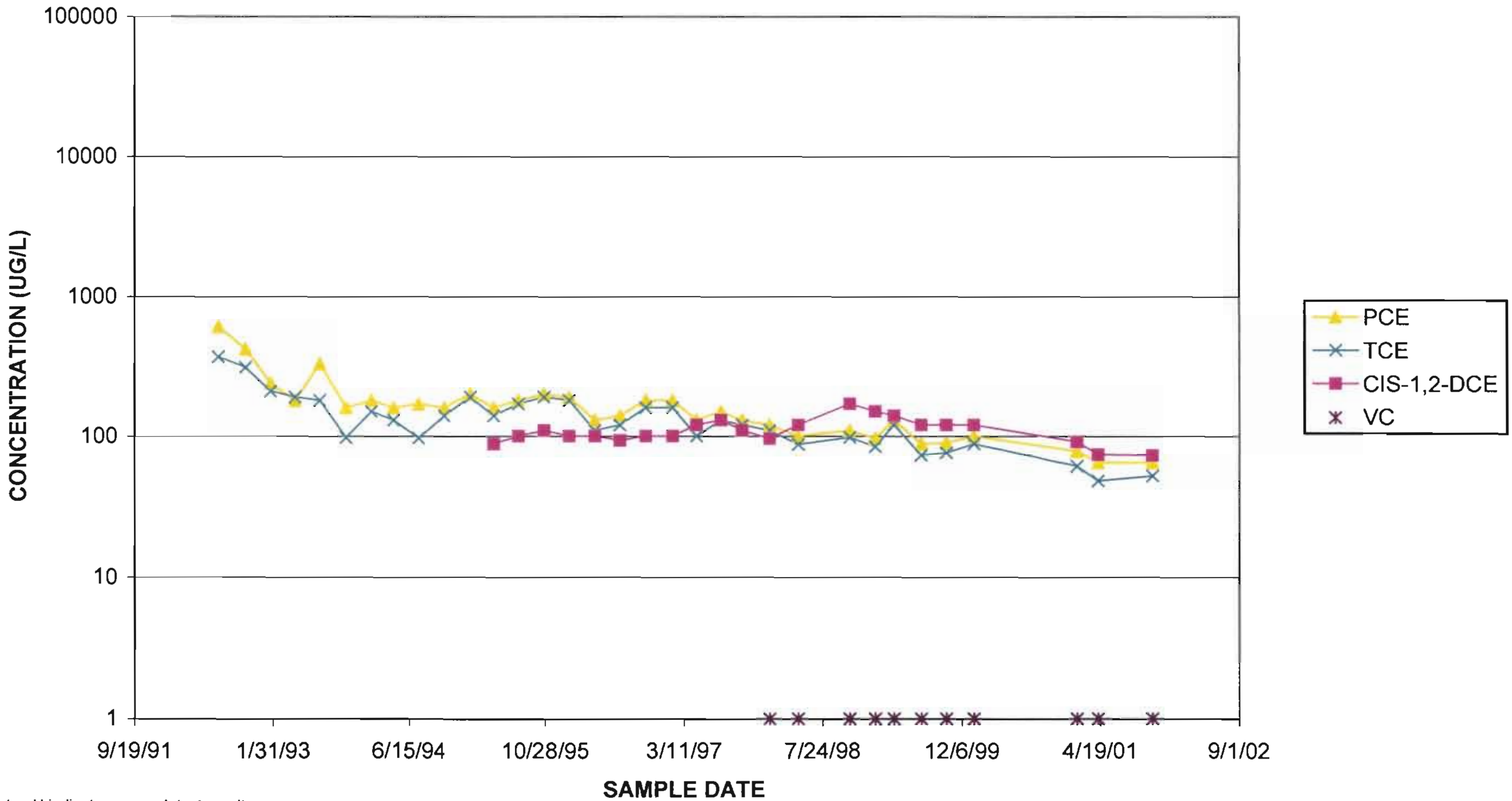
Note: U indicates a non-detect result.

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
OS-6R



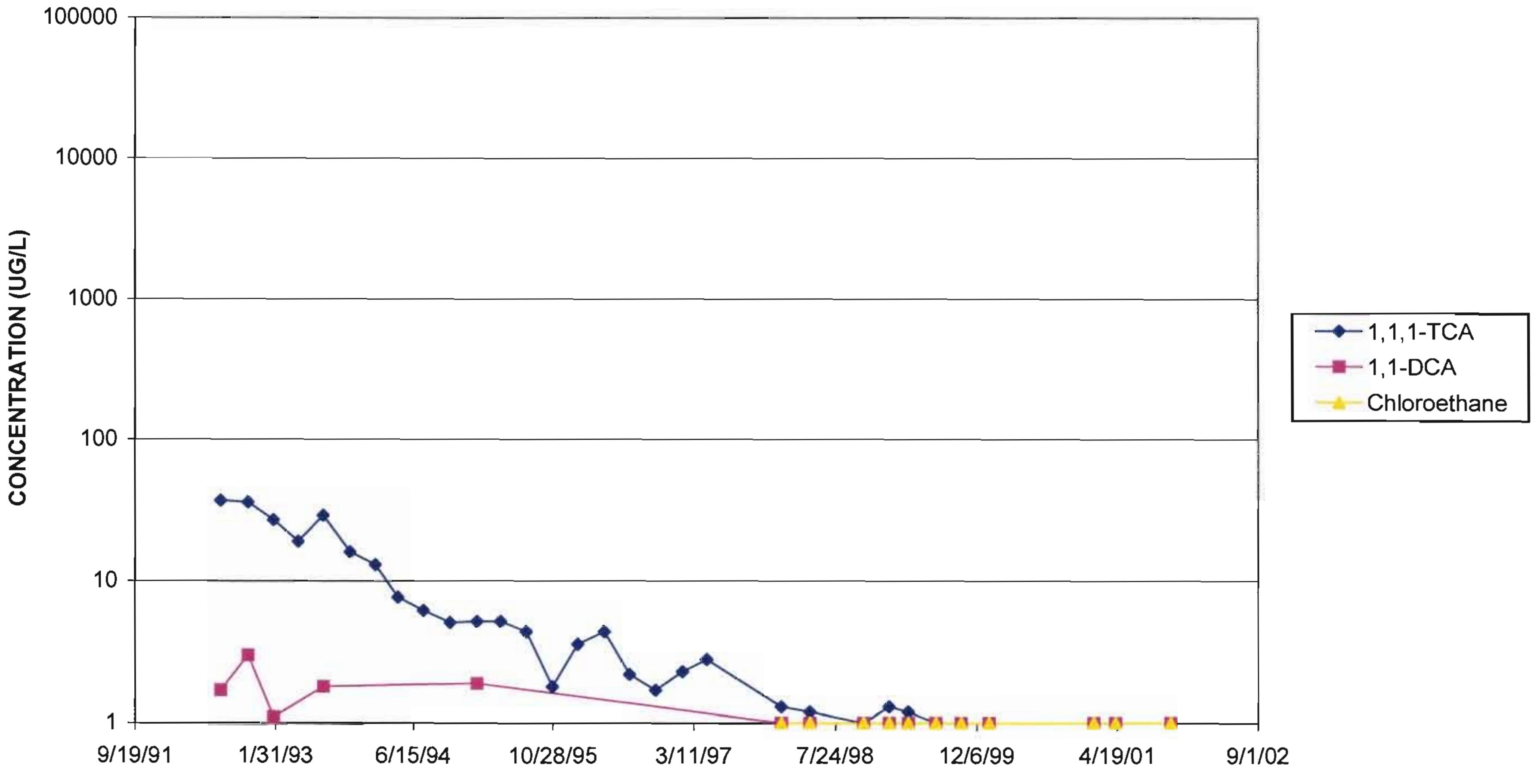
Note: U indicates a non-detect result.

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
OS-6R



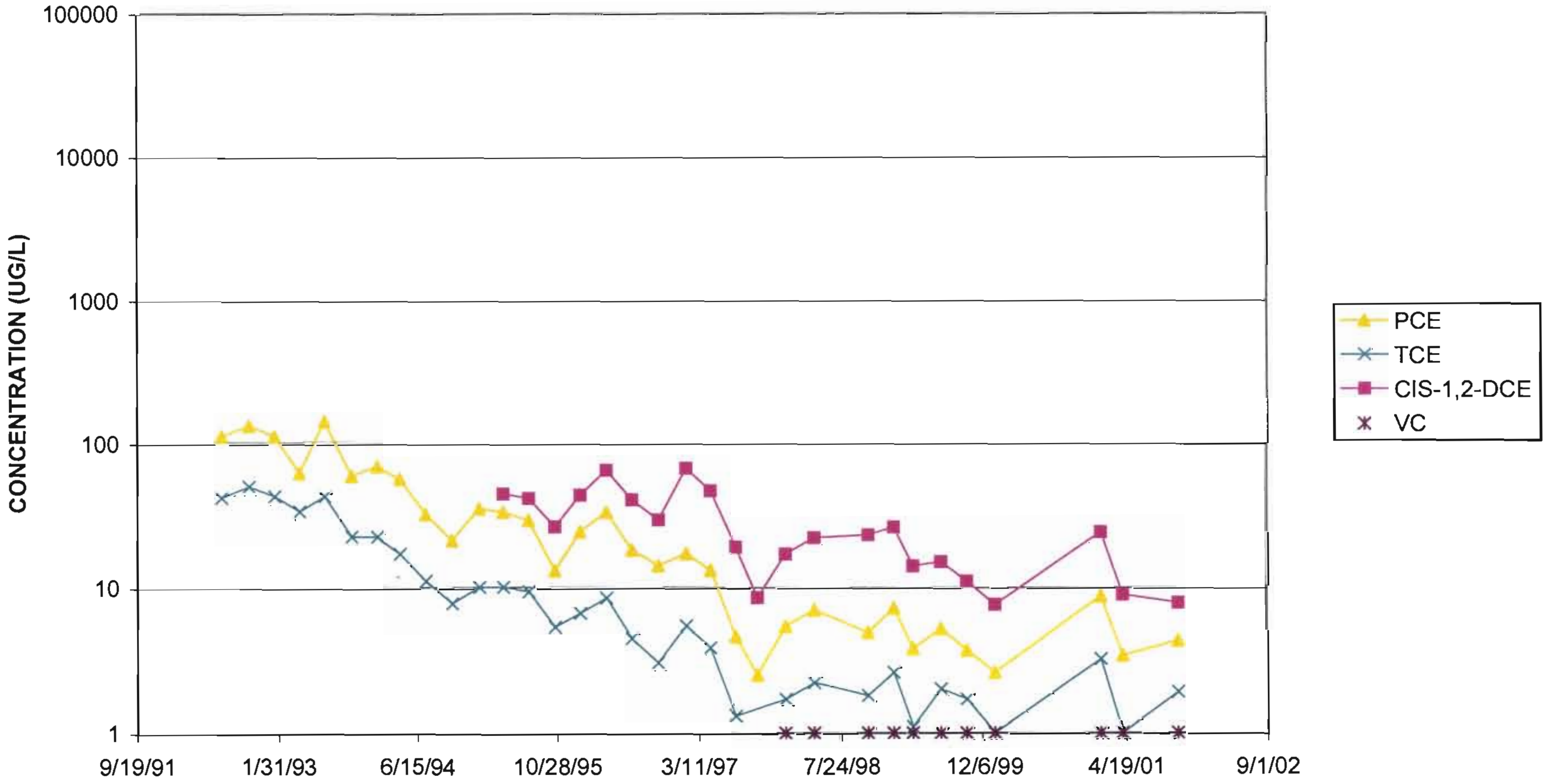
Note: U indicates a non-detect result.

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
OS-7R



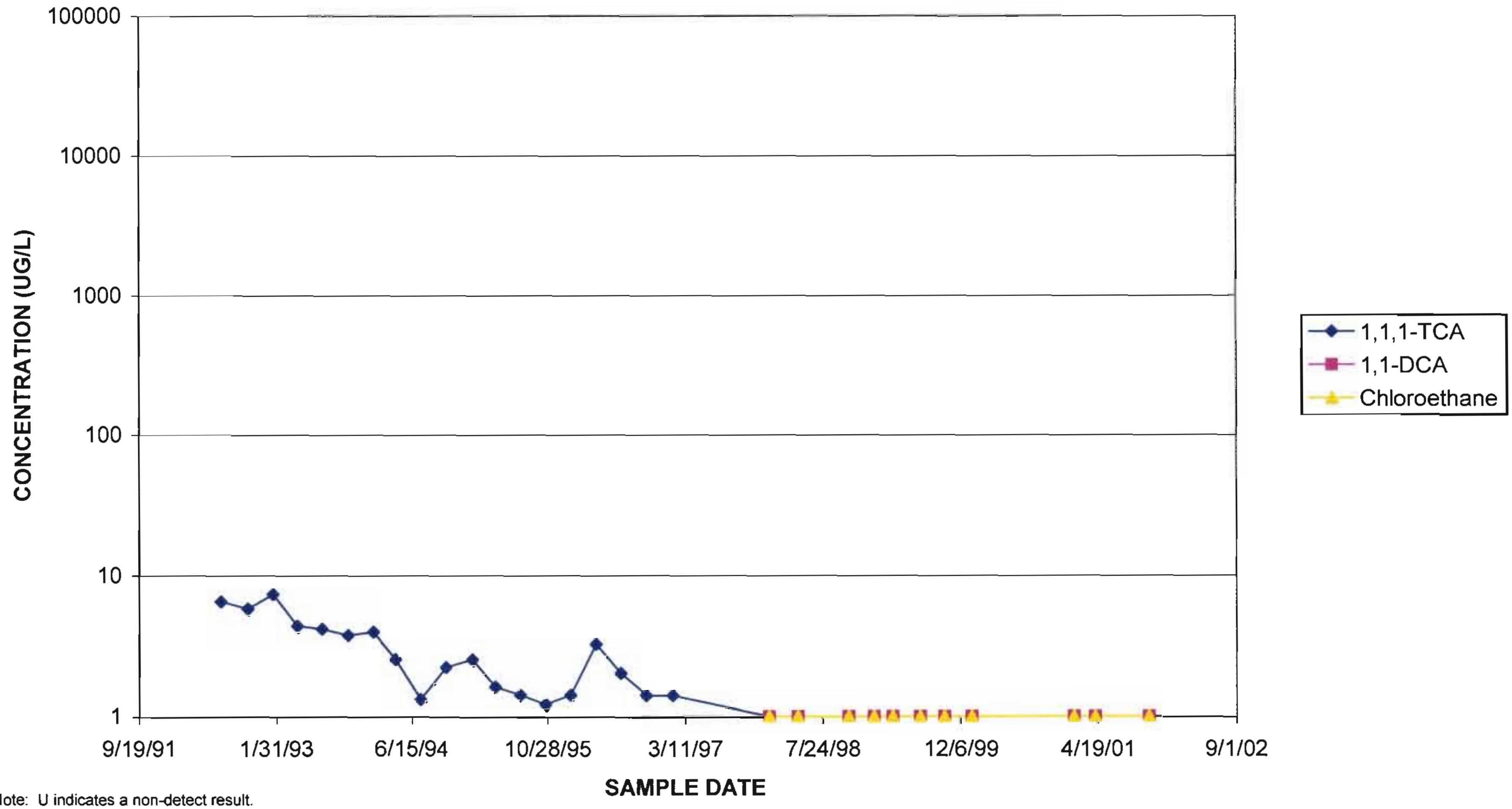
Note: U indicates a non-detect result.

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
OS-7R



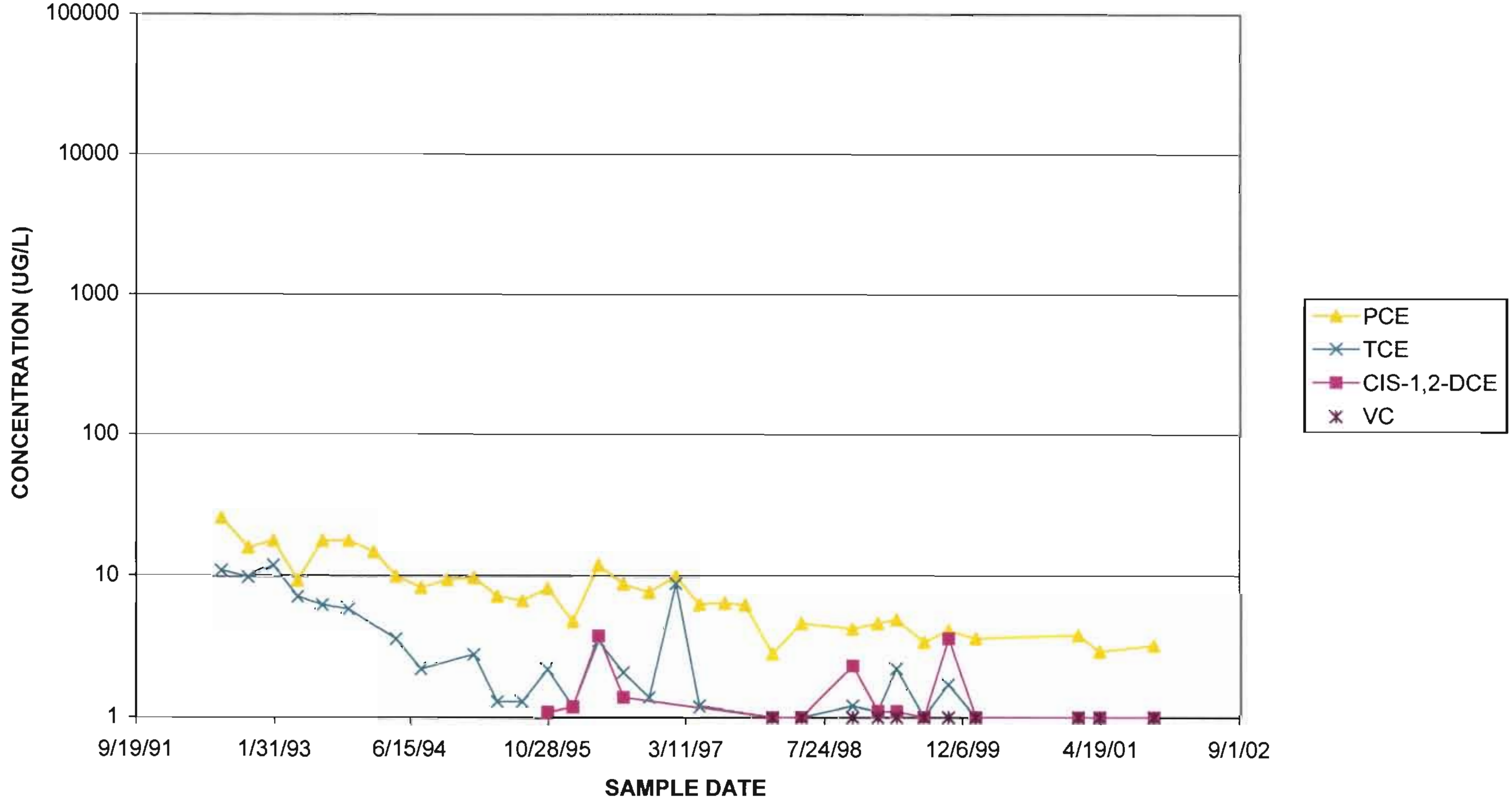
Note: U indicates a non-detect result.

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
OS-8R



Note: U indicates a non-detect result.

XEROX CORPORATION
BLAUVELT, NEW YORK
TARGET COMPOUND CONCENTRATIONS IN GROUNDWATER
OS-8R



Note: U indicates a non-detect result.