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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:

- **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).

- **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.

- **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.

- **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.

- **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.

- 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
Deputy Commissioner
Office of Environmental Remediation
New York State Department of Environmental Conservation

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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: Standards, 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.

Alternative 1: 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.

Alternative 2: 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.

Alternative 3: 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.

Alternative 4: 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:

- **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.

- **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.

- **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.

- **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.

- **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.

- 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.

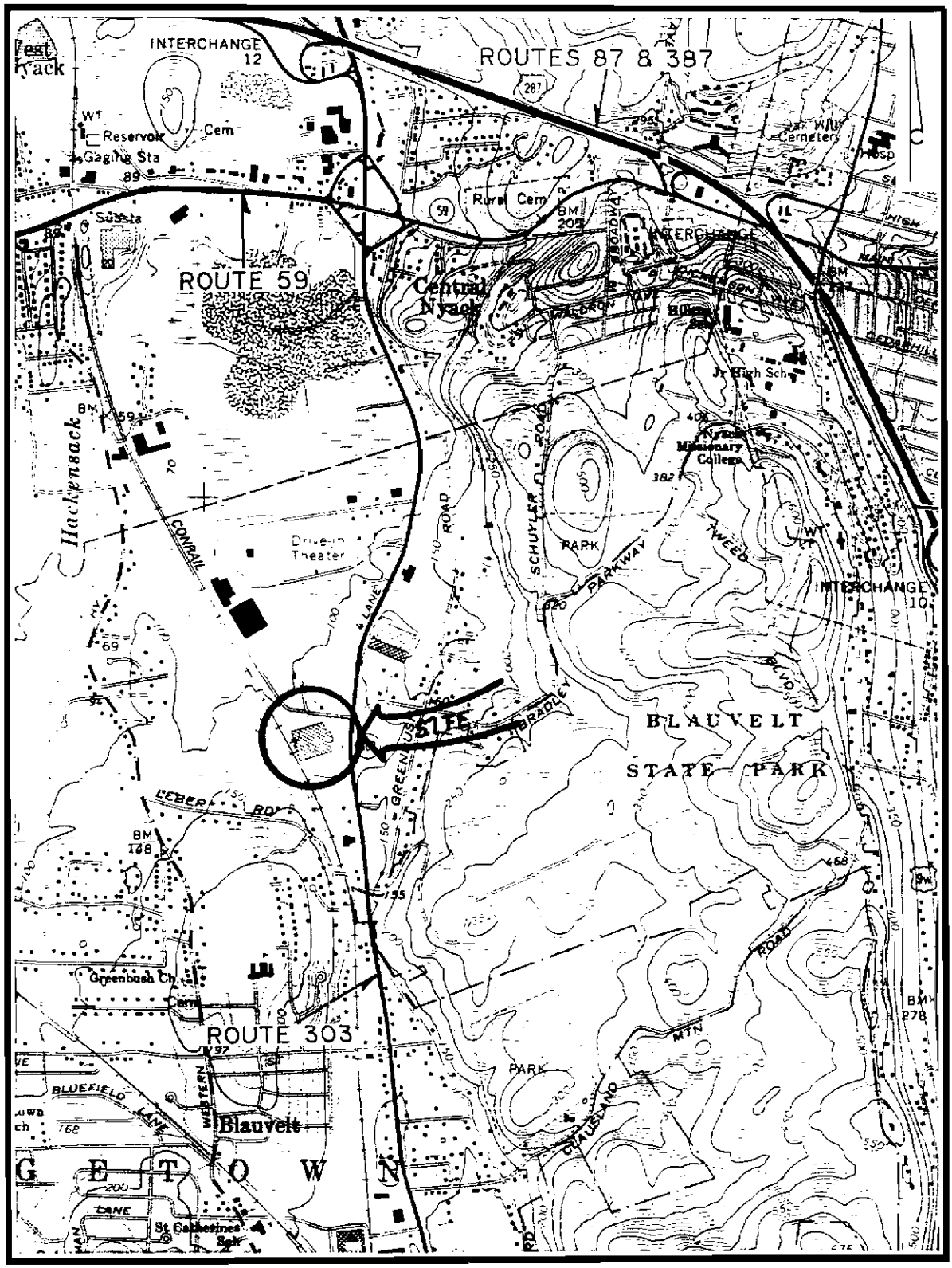
The NYSDEC has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a cost-effective manner for the site. Of those alternatives that are protective of human health and the environment and comply with ARARs, the State 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

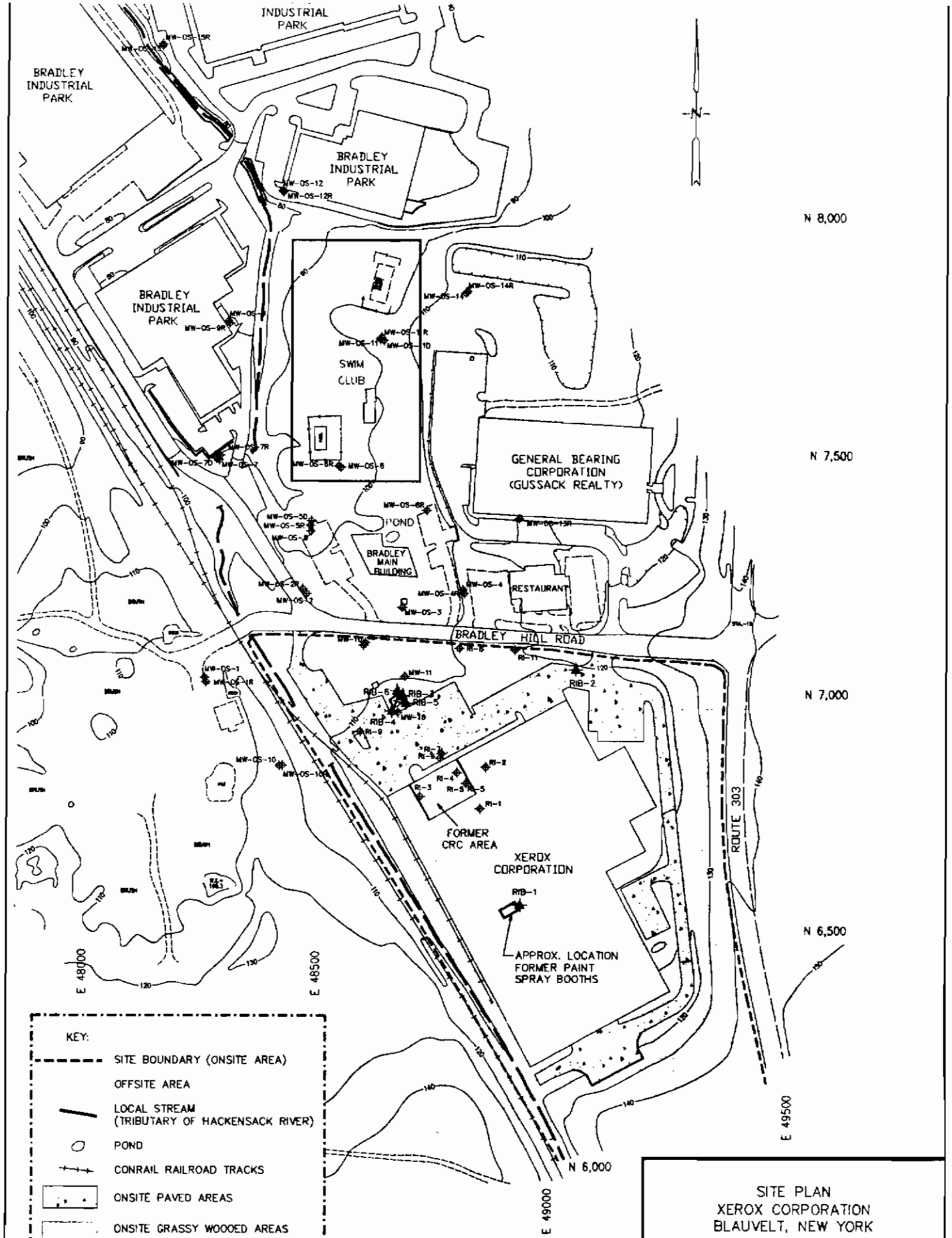
The principal element of the selected remedy is treatment of groundwater and soil. Contaminated soil will be treated with the vacuum extraction system. Contaminated groundwater will be extracted and treated by a combination unit operations including, as applicable, phase separation, air stripping, ultraviolet 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

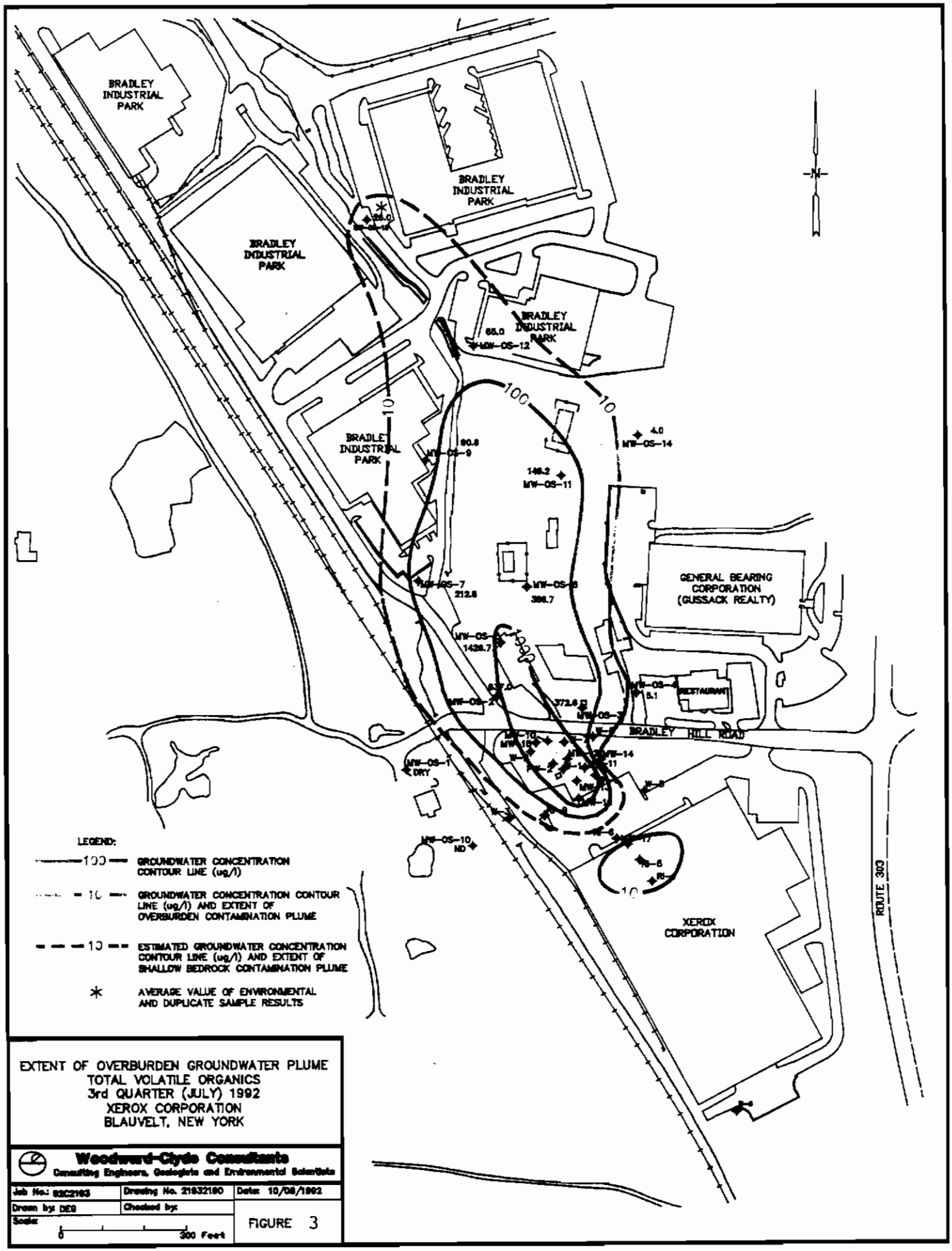


Rev. No.	Date	Type of Revision	Checked by:

SITE PLAN
XEROX CORPORATION
BLAUVELT, NEW YORK

Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Scientists

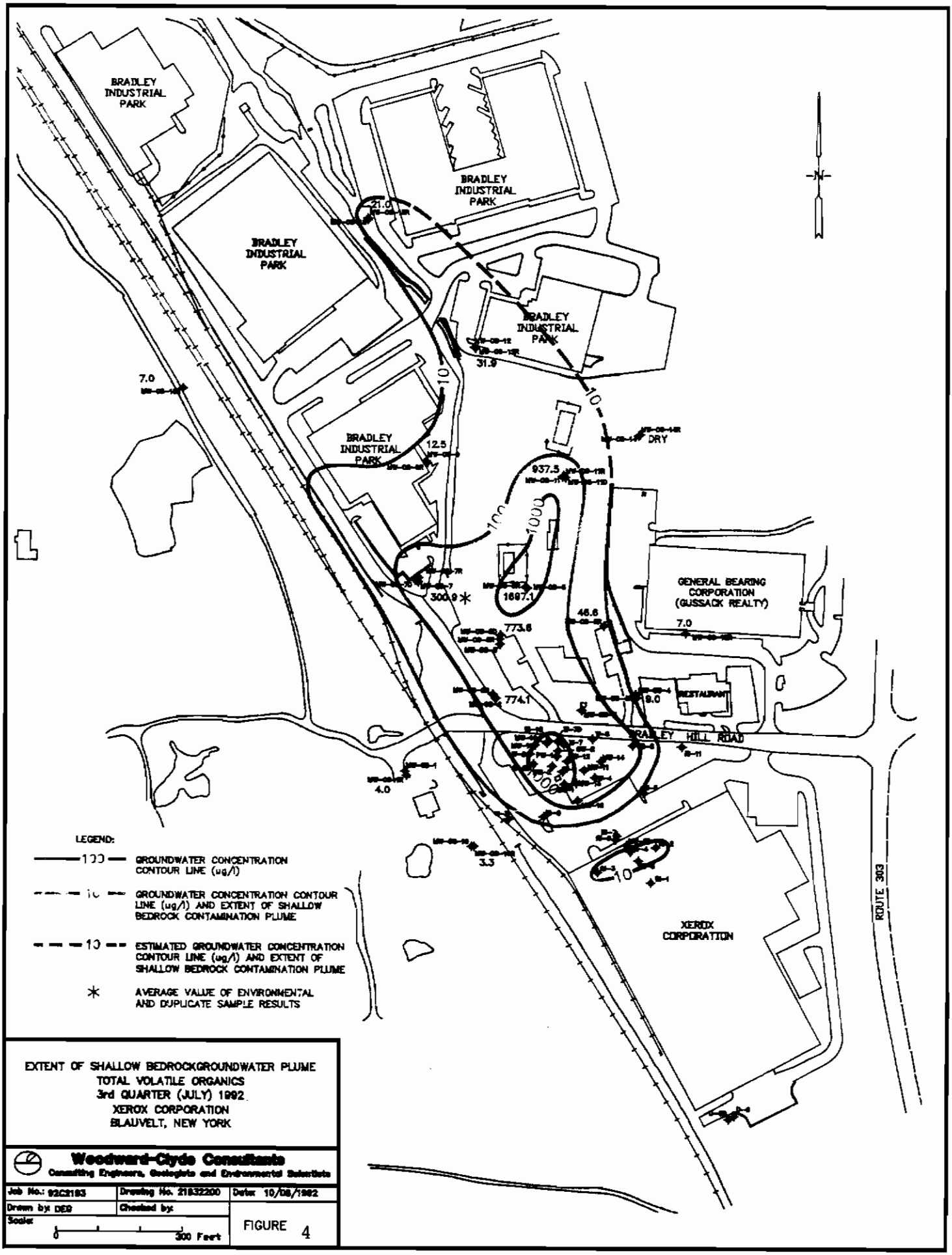
Job No.: 92C2193	Drawing No. 21830320	Date: 10/06/1992
Drawn by: DEG	Checked by: MEK	
Scale: 0 200 Feet		FIGURE 2



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

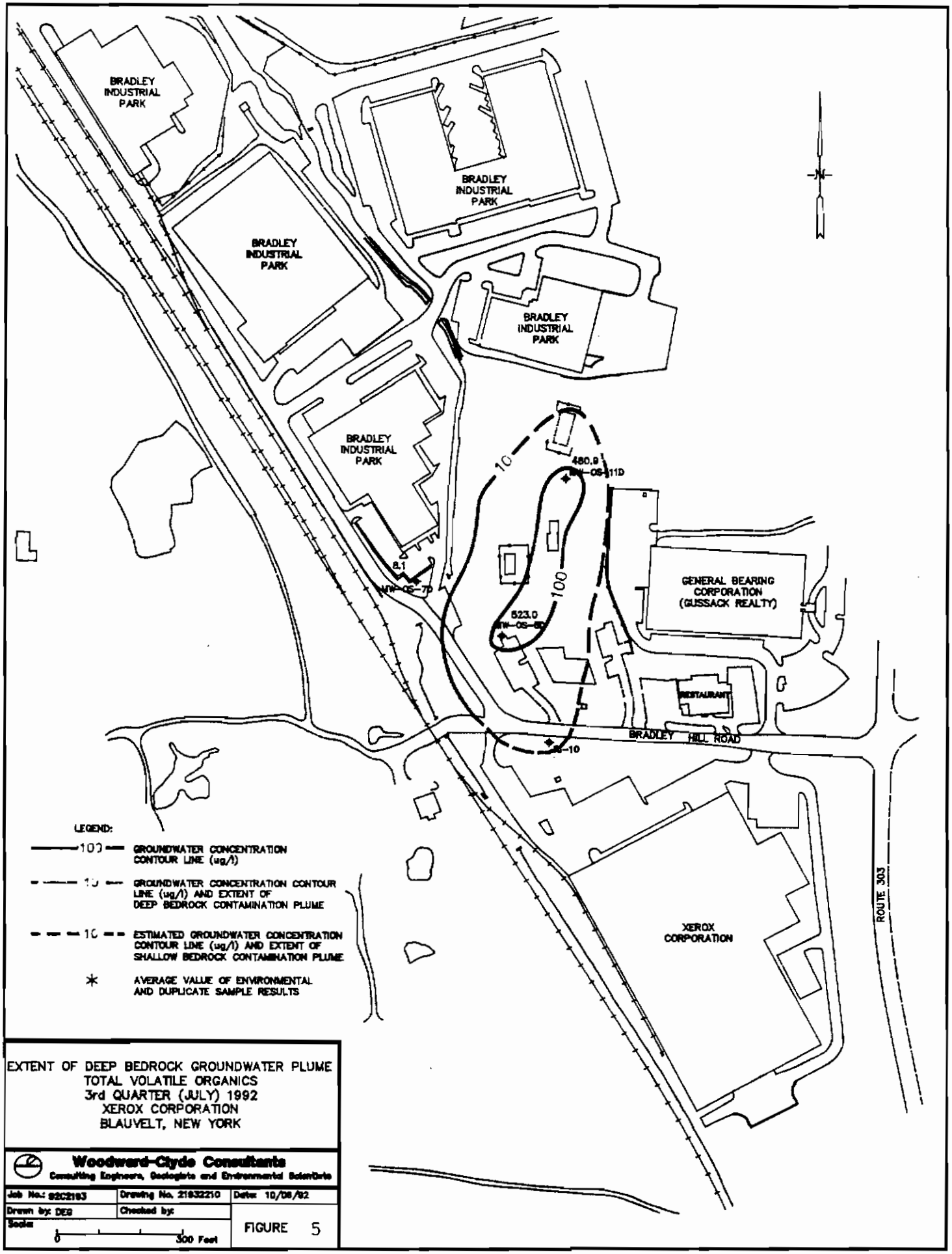
Job No.: 92C2163	Drawing No. 21932160	Date: 10/08/1992
Drawn by: DEB	Checked by:	FIGURE 3
Scale: 0 — 300 Feet		



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

Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Scientists

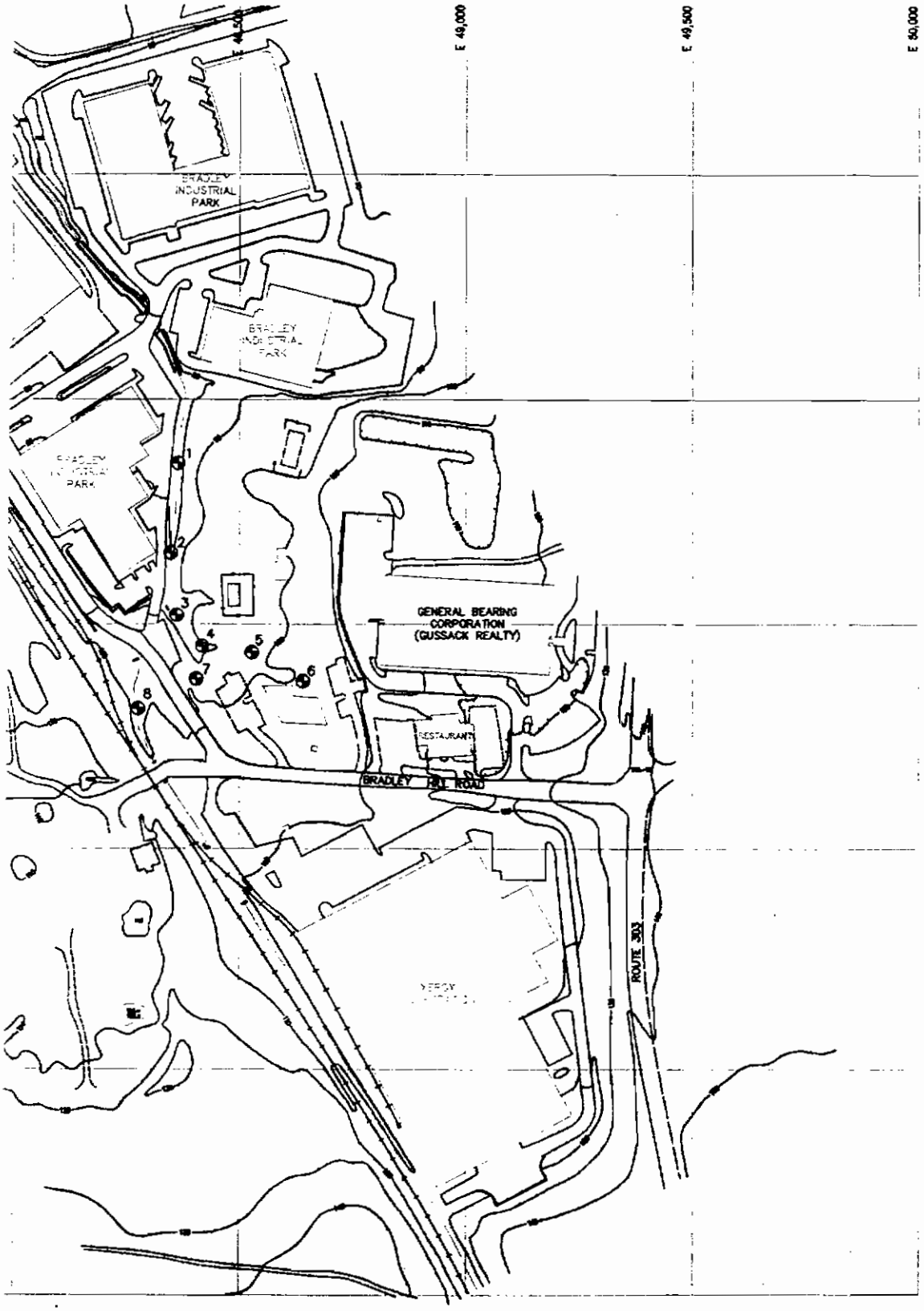
Job No.: 92C2183	Drawing No. 21832200	Date: 10/08/1992
Drawn by: DEB	Checked by:	
Scale: 0 — 300 Feet		FIGURE 4



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: 10/08/92
Drawn by: DEG	Checked by:	
Scale: 0 300 Feet		FIGURE 5



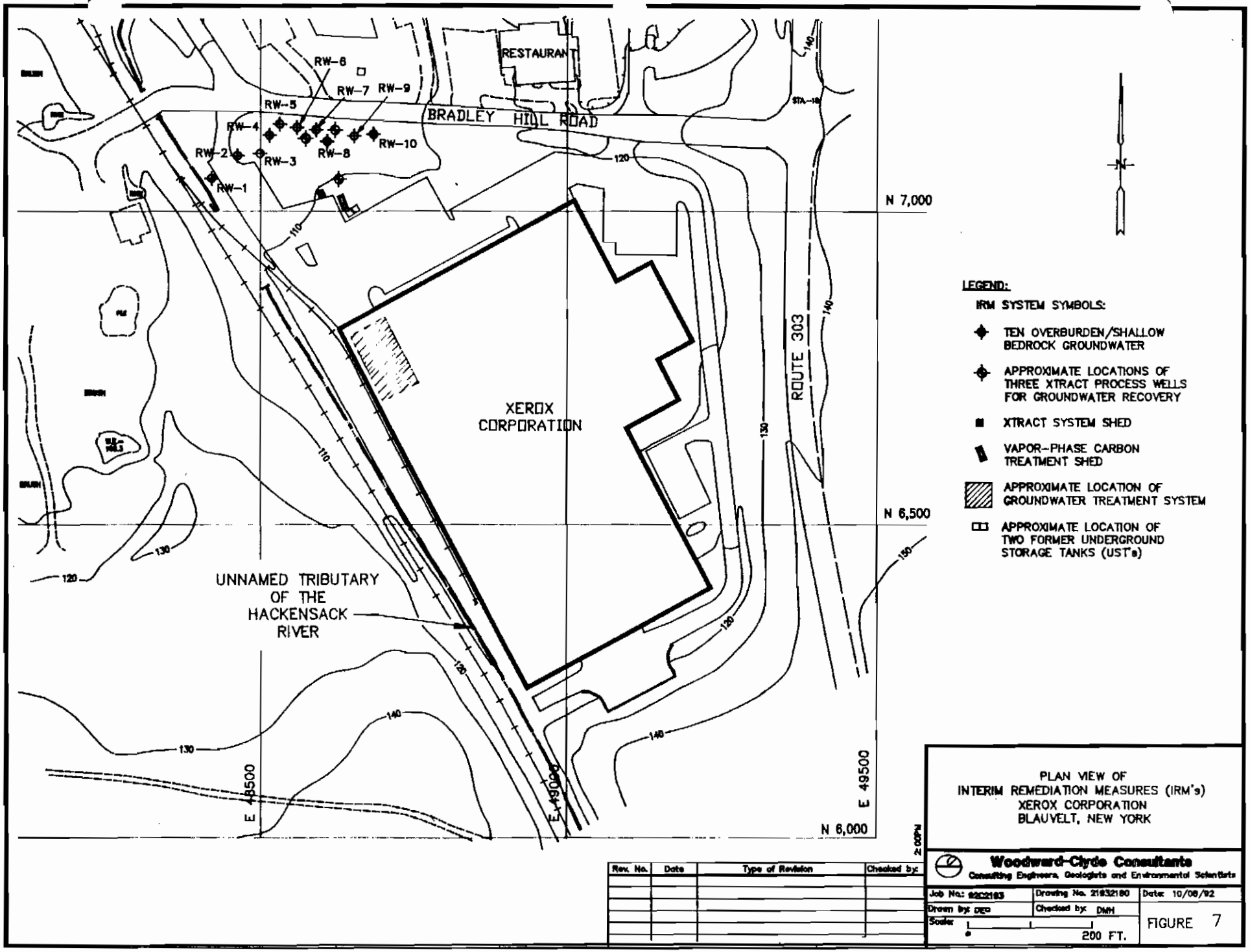
LOCATED APPROXIMATELY 500' UPSTREAM FROM SOUTH END OF XEROX CORP. BUILDING

Rev. No.	Date	Type of Revision	Checked by:

SURFACEWATER & SEDIMENT SAMPLING LOCA
XEROX CORPORATION
BLAUVELT, NEW YORK

Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Sci

Job No.: 92C2183	Drawing No. 21932130	Date: 10/08/1
Drawn by: DEG	Checked by:	
Scale: 0 300 Feet		FIGURE 6

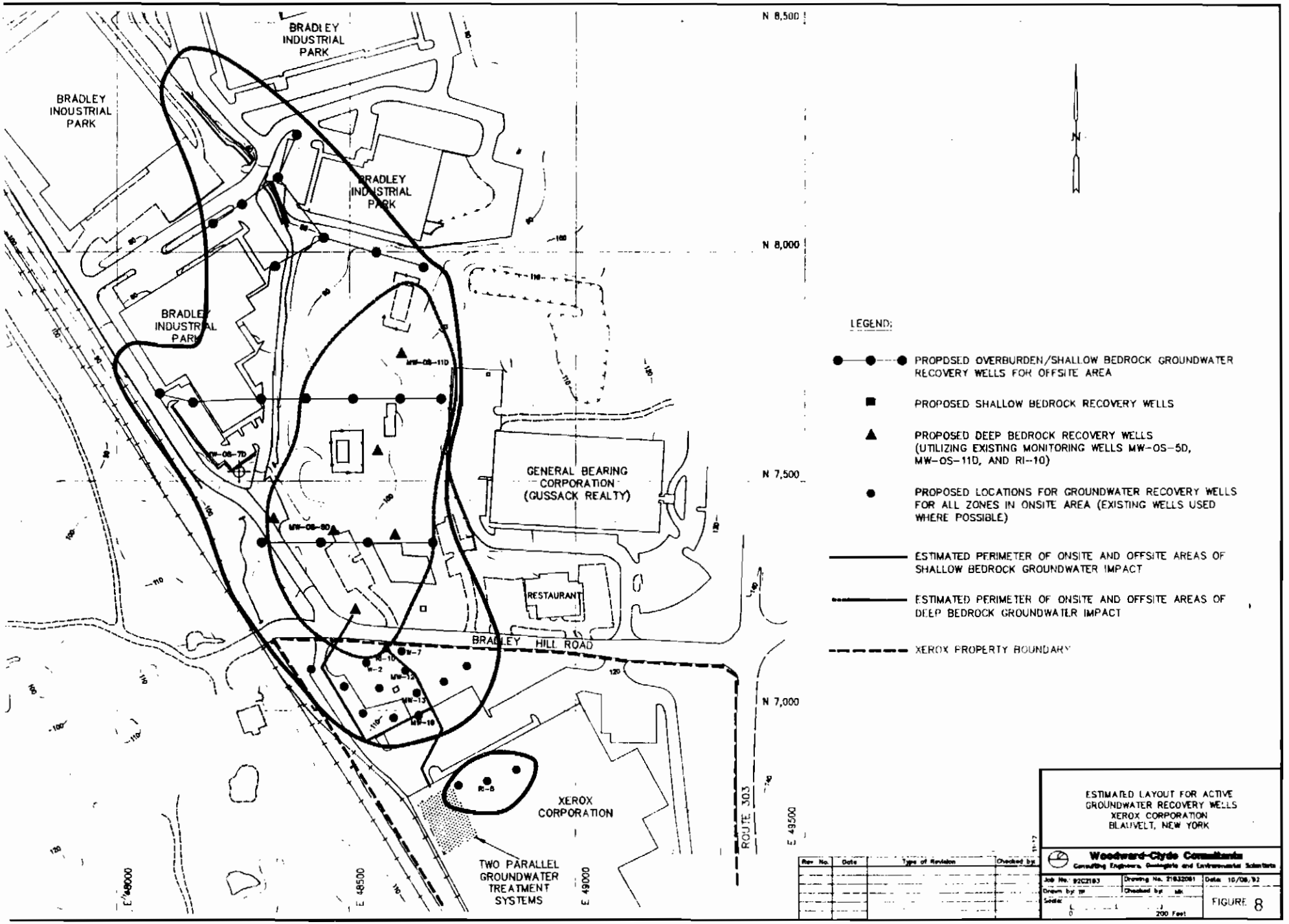


Rev. No.	Date	Type of Revision	Checked by:

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: 10/08/92
Drawn by: pgo	Checked by: DMH	FIGURE 7
Scale: 200 FT.		



ESTIMATED LAYOUT FOR ACTIVE GROUNDWATER RECOVERY WELLS
XEROX CORPORATION
BLAUVELT, NEW YORK

Rev. No.	Date	Type of Revision	Checked by

Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Scientists

Job No. 92C2183	Drawing No. 21832081	Date: 10/08/92
Drawn by: TP	Checked by: MH	
Scale: 0 200 Feet		FIGURE 8

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

TABLE 9
THE CONCENTRATIONS (μg/L) OF VOCs IN SURFACE WATER SAMPLES FROM THE BLAUVELT SITE

	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
		10/28/91	R91/4105,4106,4203, 42284265,4374,4412, 4424,4568,4666.
10/31/91	R91/4770		
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

EXHIBIT B

DIVISION OF HAZARDOUS WASTE REMEDIATION
INACTIVE HAZARDOUS WASTE DISPOSAL REPORT

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

NAME OF SITE : Xerox Corporation
STREET ADDRESS: Blauvelt Facility

TOWN/CITY:	COUNTY:	ZIP:
Orangetown	Rockland	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 TYPE	Suspected- QUANTITY (units)
Trichloroethylene, tetrachloroethylene, 1,1,1-trichloroethane, methylene chloride (F001)	unknown
Aliphatic hydrocarbons	unknown

SITE CODE: 344021

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:

- **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).

- **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.

- **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.

- **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.

- **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.

- 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. **Issues Regarding the Past Conditions at the Site:**

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. Letter Dated February 13, 1993 from V. Morgan, The Oratamin Club.

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.