

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Hooker Chemical/Ruco Polymer Superfund Site

City of Hicksville

Nassau County, New York

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Hooker Chemical/Ruco Polymer Superfund Site (Hooker/Ruco Site), which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) 40 CFR Part 400. This decision document explains the factual and legal basis for selecting the remedy for this Site.

The New York State Department of Environmental Conservation (NYSDEC) concurs with the selected remedy. A letter of concurrence from the NYSDEC is attached to this document (Appendix IV).

The information supporting this remedial action decision is contained in the administrative record for this Site. The index for the administrative record is attached to this document (Appendix III).

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Hooker/Ruco Site, if not addressed by implementing the response actions selected in this Record of Decision, may present an imminent and substantial endangerment to the public health or welfare, or to the environment.

DESCRIPTION OF THE SELECTED REMEDY

The remedial action described in this document addresses the downgradient commingled contaminated groundwater plume beyond the Hooker/Ruco Facility and also the contaminated groundwater beneath the Hooker/Ruco Facility which was previously included under OU-1.

The selected groundwater remedy includes in-situ treatment of the vinyl chloride monomer (VCM) subplume by bioremediation using biosparging (and supplemental nutrient addition, if deemed necessary).

The major components of the remedy include:

- The use of biosparging technology in an in-situ application to enhance the VCM degradation. Biosparging is a form of bioremediation that involves the introduction of air/oxygen into the aquifer to increase the dissolved oxygen content in the aquifer, which will enhance aerobic degradation of the VCM subplume.
- Vertical injection wells will be installed in the area of the VCM subplume to a depth of 200 to 400 feet below groundwater. Additives (air/oxygen, nutrients) will be forced into the formation using either static head within the well or using pump-supplied pressure.
- Vadose zone or unsaturated zone monitoring program will be implemented to ensure that air stripping of VOCs, particularly VCM is not occurring as a result of biosparging.
- If necessary, the selected remedy will also utilize a supplemental aerobic bioremediation technology following the biosparging treatment. Supplemental bioremediation would involve the injection of nutrients (potentially including nitrogen and phosphorus along with suitable carbon sources such as methane) to enhance the growth and metabolic activities of indigenous microbial populations to effect the degradation of VCM in the aquifer.
- A long-term monitoring program will be developed to monitor groundwater quality in the area of the VCM subplume and to evaluate the fate and migration of the VCM southward and westward beyond the VCM subplume. New monitoring wells would be added to the existing network of monitoring wells to increase the network's area of coverage. The objective of the long-term monitoring program is to evaluate the effectiveness of the selected remedy.

The selected remedy was based on the recognition that an existing groundwater extraction and treatment system which is operating as

an Interim Remedial Measure (IRM) at the downgradient Northrop/Grumman Aerospace Corporation (Northrop) Site is containing and remediating a commingled plume of trichloroethylene (TCE) and perchloroethylene (PCE) contamination from the Northrop, Naval Weapons Industrial Reserve Plant (NWIRP) and the Hooker/Ruco sites. EPA's selected remedy, for Operable Unit three, together with the IRM system, which is expected to continue to operate for at least the next thirty years, will prevent further migration of groundwater contamination beyond these systems. The selected remedy also recognizes the existing VOC removal treatment system at the downgradient Bethpage Water District well field.

If it is determined during the implementation and long-term monitoring of the selected remedy that the technology selected is not effective in adequately reducing the VCM concentrations in a reasonable time frame, then VCM subplume extraction and treatment would be implemented as a contingency remedy. Further, if the Northrop IRM ceases operation before the regional aquifer is restored or if the IRM is not capturing the contaminated groundwater from the Hooker/Ruco Facility, EPA would re-evaluate the protectiveness of the selected remedy.

The components of the contingency remedy include:

- Extraction and treatment of groundwater within the area of the VCM subplume with a goal of restoring the water quality of the aquifer to State drinking water standards or Federal maximum contaminant levels (MCLs).
- Extraction wells would be placed in the area of highest concentration of VCM and at the leading edge of the VCM subplume.
- The extracted water would be sent to a air stripping treatment system, which will be constructed within the vicinity of the Hooker/Ruco facility.
- The treated effluent would be discharged to a recharge basin on Hooker/Ruco facility.
- A long-term monitoring program will be developed to monitor groundwater quality in the area of the VCM subplume and to evaluate the fate and migration of the VCM southward and westward beyond the VCM subplume. New monitoring wells would

be added to the existing network of monitoring wells to increase the network's area of coverage. The objective of the long-term monitoring program would be to evaluate the effectiveness of the contingency remedy and to detect if VCM is migrating southward beyond the VCM source control wells at concentrations which may require supplemental VCM treatment at the Northrop IRM.

Selected Remedy.

The Remedial Action Objectives for groundwater are to protect human health from exposure (via ingestion, inhalation, and dermal contact) to VCM, TCE, PCE and tentatively identified compounds (TICs) in groundwater at concentrations in excess of New York State groundwater standards and Federal MCLs and also to restore the aquifer to meet New York State Groundwater Standards and New York State and Federal MCLs in a timely manner.

The remedial approach for the contaminated groundwater originating from the Hooker/Ruco Site is designed to primarily address the VCM subplume. This approach combined with the existing treatment system that is operated at the Northrop Site as an IRM will effectively address groundwater contamination emanating from the Hooker/Ruco Facility. EPA recognizes that the Northrop IRM, as it is currently designed, would be unable to treat the VCM subplume without the system exceeding its air discharge limitations. The regional plume is comprised of commingled PCE and TCE contamination originating from the Hooker/Ruco, Northrop and NWIRP sites. Nevertheless, the Northrop IRM is expected to effectively capture and treat the groundwater contamination emanating from the Hooker/Ruco Facility and is expected to require more than 30 years of operation to restore the aquifer to meet drinking water standards.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA §121, 42 U.S.C. §9621. It is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The selected remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that employ

treatment that reduces toxicity, mobility, or volume of contaminants as their principal element.

Because this remedy will result in hazardous substances remaining at the Site above levels that allow for unlimited use of and unrestricted exposure to the Site, a review will be conducted at least once every five years after commencement of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

The ROD contains the remedy selection information noted below. More details may be found in the Administrative Record file for this site.

- Chemicals of concern and their respective concentrations (see ROD, pages __);
- Baseline risk represented by the chemicals of concern (see ROD, pages __);
- Cleanup levels established for chemicals of concern and the basis for these levels (see ROD, pages __ and Appendix II);
- How source materials constituting principal threats are addressed (see ROD, page __);
- Current and reasonably-anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD (see ROD, page __);
- Potential land and groundwater use that will be available at the Site as a result of the selected remedy (see ROD, page __);
- Estimated capital, annual operation and maintenance, and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (see ROD, pages __); and
- Key factors that led to selecting the remedy (i.e., how the selected remedy provides the best balance of tradeoffs with

respect to the balancing and modifying criteria,
highlighting criteria key to the decision) (see ROD, pages
____).

Jeanne M. Fox
Regional Administrator

Date

RECORD OF DECISION

Hooker Chemical/Ruco Polymer
Superfund Site

City of Hicksville
Nassau County, New York

United States Environmental Protection Agency
Region II
New York, New York
September 2000

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SITE NAME, LOCATION AND DESCRIPTION

The Hooker Chemical/Ruco Polymer Site (Hooker/Ruco Site) is located off of New South Road in Hicksville, Town of Oyster Bay, Nassau County, New York, approximately 25 miles east of New York City (see Figure 1). The Hooker/Ruco Site includes an active chemical manufacturing facility in a heavily industrialized section of Hicksville. The facility, currently owned and operated by Sybron Chemicals Inc., contains six buildings for the manufacture and storage of chemical products (Plants 1,2,3, the Pilot Plant, a warehouse, and an administration building) (see Figure 2). The remainder of the 14-acre facility contains parking areas, chemical storage tanks, four recharge basins (sumps) and small ancillary buildings. The facility currently employs approximately 100 people and manufactures polyester, polyols and powder coating resins.

Historically, the two major industrial facilities in the area of the Hooker/Ruco Site were the Northrop Grumman Aerospace Corporation (Northrop) and the Naval Weapons Industrial Reserve Plant (NWIRP). The NWIRP is now shut down and the Northrop operations are substantially downsized. Northrop and the U.S Navy are both in the process of transferring parcels of their property to other parties. There are many other small industries, commercial operations, residential areas, utilities, transportation corridors, and storm-water management basins in the area. Figure 1 is a compilation of several United States Geological Survey (USGS) topographic maps showing the Hooker/Ruco Site and its surroundings. Figure 2 is a map showing major features of the Hooker/Ruco Facility.

Commerce Street and adjacent industrial development comprise the 880-foot northern Hooker/Ruco Facility boundary. Along the Facility's 1,000-foot eastern side is a large warehouse building formerly-owned by Northrop. A small portion of undeveloped land abuts the Hooker/Ruco Facility's 250-foot southern property boundary. Two active tracks of the Long Island Railroad parallel the Hooker/Ruco Facility's 940-foot southwestern property boundary. The Hooker/Ruco Facility is bounded on its 270-foot western boundary by New South Road. The property is enclosed by a chain-link fence. Four surface-water sumps are located on the Hooker/Ruco Facility along the eastern property boundary.

The area surrounding the Hooker/Ruco Site also includes residential complexes. Residential dwellings comprise

approximately 22 percent of the area and are located southwest of the Hooker/Ruco Facility. Approximately 65 percent of the area land use is industrial or commercial.

HOOKER/RUCO SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Hooker/Ruco Site was developed by the Rubber Corporation of America, a small, privately-held company. Operations at the Hooker/Ruco Site began in 1945 and included natural latex storage, concentration and compounding. Five years later the company began producing small volumes of plasticizers. These activities were expanded and modified throughout the years. In 1956, a polyvinyl chloride (PVC) plant was built and was initially operated under the name of Insular Chemical Corporation. At that time the two companies, Insular Chemical Corporation and the Rubber Company of America occupied the Hooker/Ruco Site. Although they were two separate corporations, they shared the same pilot plant. The two companies eventually merged into the Rubber Corporation of America. In 1965, the company was purchased by the Hooker Chemical Company (currently known as the Occidental Chemical Corporation or Oxy) and was known and operated as the Ruco Division. In 1982, the employees of the Ruco Division bought the company from Oxy and it became known as the Ruco Polymer Corporation (not affiliated with Oxy). In 1998, Sybron Chemicals Inc., acquired the Ruco Polymer Corporation. The facility is currently used for the production of various polymers, PVC, styrene/butadiene latex, vinyl chloride/vinyl acetate copolymer, and polyurethane, as well as ester plasticizers.

During Hooker/Ruco Site operations between 1956 and 1975, industrial process wastewater and storm water runoff from the facility was discharged to six (6) on-Site recharge basins or sumps. This wastewater contained, among other things, vinyl chloride, trichloroethylene, barium and cadmium soap, vinyl acetate, organic acids, and styrene condensate. Drums containing various chemicals were also stored on-Site where occasional spills would occur. As a result of these releases, groundwater beneath and downgradient from the Hooker/Ruco Site has been contaminated. Limited areas of residual soils contamination exist above levels that would be considered protective of groundwater quality. Currently, only non-contact cooling water is discharged into one sump (four) and a sump collects surface

water run-off (three). From 1975 to 1991, a concrete settling basin was used to store ester waste prior to being incinerated on-Site. Ester wastes are presently stored in an on-Site, above ground tank prior to off-Site disposal or incineration on-Site. Hazardous wastes are stored in drums on-Site until they are disposed of at a permitted off-Site facility.

From 1946 to 1978, the pilot plant used a heat transfer fluid called Therminol, which contained PCBs. During this period of operation of the facility, there was a release of PCBs to the soil adjacent to the pilot plant. Some of this contaminated soil was spread to surrounding areas by surface water run-off, sediment transport, and truck traffic.

Initial investigations were started at the Hooker/Ruco Site in 1978. Originally, efforts were directed towards understanding past manufacturing processes, waste generation and disposal. A Site background report was prepared in 1981. This report presented the Site in the context of its surroundings and examined waste disposal, regional geology and hydrogeology, regional water withdrawals and water quality. At that time the New York State Department of Environmental Conservation (NYSDEC) was the lead government agency. A work plan for conducting a soils and groundwater investigation was submitted to the NYSDEC in 1983. This work plan was approved in 1983 and the investigation commenced. The investigation consisted of installing and sampling six groundwater monitoring well clusters at locations downgradient of suspected areas of waste disposal, the drilling and sampling of two deep test borings in formerly active sumps, and drilling and sampling four shallow borings in the vicinity of the reported Therminol spill. The results of this study were presented in a report entitled "Report of Groundwater & Soils Investigation at the Former Ruco Division Plant Site, Hicksville, New York" dated August 1984.

These initial investigations led to the Hooker/Ruco Site being placed on the National Priorities List (NPL) in 1984.

From March 1985 to September 1988 a series of investigations were conducted in an attempt to define the nature and extent of the contamination at the Hooker/Ruco Site.

In July of 1988, EPA notified Oxy and Ruco Polymer of their potential liability and offered them the opportunity to conduct an Remedial Investigation and Feasibility Study (RI/FS).

Initially, EPA failed to reach a settlement with the potentially responsible parties (Oxy and Ruco Polymer) to conduct the RI/FS for the Hooker/Ruco Site. Therefore, EPA issued a work assignment to its contractor, Ebasco Services Inc., to prepare a work plan and conduct the RI/FS. In September 1988, Oxy agreed to perform the RI/FS and entered into an Administrative Order on Consent with EPA. In September 1989, RI/FS field work commenced. Field work was completed in February 1990 and a draft RI Report was submitted in April 1990. Portions of the RI Report pertaining to the PCB-contaminated areas were approved to expedite the remediation of those areas. Based on the RI Report, a Focused Feasibility Study (FFS) was approved in August 1989. A ROD for operable unit 2 (OU2) which addressed a PCB-contaminated area surrounding the pilot plant building and a portion of sump three, was issued by EPA on September 28, 1990. A Special Notice letter for implementation of the OU2 remedial design/remedial action (RD/RA) was sent to Oxy and Ruco Polymer on December 20, 1990. A Good Faith Offer to perform the RD/RA and to enter into a Consent Decree was received from Oxy on February 27, 1991. Ruco Polymer also expressed their willingness to cooperate with EPA and Oxy. (Oxy has assumed responsibility for environmental matters at the Hooker/Ruco Site).

Oxy formally rejected EPA's offer to enter into a Consent Decree to perform OU2 RD/RA in a letter dated June 5, 1991. An Administrative Order was issued unilaterally by EPA to Oxy and Ruco Polymer on June 27, 1991. Notices of Intent to Comply with the Order were submitted by both Oxy and Ruco Polymer on July 17, 1991.

Oxy has assumed responsibility for the OU2 RD/RA. Mobilization for the performance of the OU2 RA took place on May 4, 1992. Field operations for the work were monitored by an EPA oversight contractor. A notice of Final Inspection was received by EPA on July 22, 1992. AEPA inspected the Site on September 3, 1992 and concluded that the remedial action was completed.

Oxy's Remedial Action Report was approved on March 12, 1993. This concluded the activities associated with OU2. The final, complete RI report was approved in December of 1992.

In January 1994, also based on the results of the 1992 RI, EPA issued a second ROD (OU1) which called for additional soil sampling, excavation of shallow soils in limited areas and soil flushing with extraction and treatment of contaminated

groundwater beneath the Hooker/Ruco Facility. Oxy is performing this work under an administrative order issued unilaterally by EPA.

In April 1994, under EPA's direction, Oxy initiated a program to further investigate groundwater conditions beyond the Hooker/Ruco Facility which involved collecting additional groundwater data around and primarily west of the Hooker/Ruco facility. These activities are described in the document entitled "Work Plan for Groundwater Investigations Beyond the Hooker/Ruco facility, August 1994" and in a subsequent Addendum, dated September 1995.

Since the groundwater contamination associated with the Hooker/Ruco facility has commingled with groundwater contamination from the Northrop and NWIRP sites, in the Spring of 1995, EPA and NYSDEC agreed to proceed with a coordinated effort to evaluate and develop remedial alternatives to address the commingled plume.

The Northrop/Grumman Site

The Northrop site was initially more than 600 acres in area. However, as a result of several remedial activities taken at the The Northrop/Grumman Site, NYSDEC has reclassified some portions of the site and delisted other portions of the site from the New York State Registry of Inactive Hazardous Waste Disposal Sites.

The Northrop plant was established in the early 1930's and developed and manufactured a series of naval carrier aircraft, amphibious vehicles and space exploration vehicles. The main activities of this facility were the engineering, manufacturing, primary assembly and research, development and testing of a variety of military and aerospace crafts. The plant is presently undergoing closure operations. The facility included numerous buildings and 7 industrial production wells. The recharge basins located in the southern end of the property received treated industrial wastewater from the late 1940's until 1981. Since 1981, treated waste water has been discharged to a sanitary sewer and the recharge basins have been used to discharge only non-contact cooling water and storm water runoff. Discharges to the on-Site recharge basins are regulated in accordance with a State Pollutant Discharge Elimination System (SPDES) permit. Between 1996 and 1998, a soil vapor extraction (SVE) system was operating on a portion of the Northrop site in order to remediate the soil. An RI was conducted at the Northrop site between 1991

and 1994. The RI included the investigation of chemical and waste storage and disposal areas.

Naval Weapons Industrial Reserve Plant (NWIRP)

The NWIRP facility was established within the Northrop site during the early 1930's. Historically, this was a government-owned and contractor-operated facility with the mission of design engineering, research prototyping, testing, fabrication and primary and subassembly of various naval aircraft. Several waste source areas were identified at the site during the RI/FS phase, which was conducted from 1991 to 1995. Currently, air sparging technology and an SVE system are being operated at the NWIRP site for soil remediation.

Coordinated Groundwater Investigation

EPA and NYSDEC have identified that the regional groundwater aquifer in the area downgradient of the Hooker/Ruco Facility has also been contaminated by two adjacent sites, Northrop and the NWIRP. These two facilities are designated as NYSDEC hazardous waste sites. Northrop is a potentially responsible party (PRP) for the Northrop site and the National Division Naval Facilities Engineering Command (the U.S. Navy) is a PRP for the NWIRP site. Figure 3 provides an outline of the Hooker/Ruco, Northrop and NWIRP facilities. Northrop has signed a Consent Order and the U.S. Navy has signed a Memorandum of Understanding with NYSDEC for the performance of an RI/FS at their respective facilities. The RIs for the Northrop and NWIRP sites were completed in September 1994 and October 1993, respectively. Based on the findings of these reports, Northrop and the U.S. Navy have implemented two groundwater IRMs. One measure provides for VOC removal and treatment at the Bethpage Water District wells downgradient of the Northrop/NWIRP sites. The second measure consists of pumping and treatment of groundwater from four wells (GP-1, ONCT-1,2 &3) at the Northrop facility and includes a long-term groundwater monitoring program.

While EPA and NYSDEC have conducted independent investigations of the source areas at each of the three sites, the Agency and the State have coordinated the investigation of the regional groundwater contamination to avoid duplication of effort. The regional groundwater contaminant plume contains VOCs which are related to past waste disposal at each of the facilities and which have commingled. Based on the available data, the Northrop, NWIRP and Huco Ruco facilities are sources of TCE,

perchloroethylene (PCE), vinyl chloride monomer (VCM), semivolatile organic compounds (SVOCs) and inorganics. The main source of VCM, however, is attributed to historic wastewater discharges from the Hoer Ruco facility. In the Spring of 1995, EPA and NYSDEC agreed to proceed with a coordinated effort to evaluate and develop remedial alternatives to address the commingled plume. In November 1998, EPA directed Oxy to prepare an FS which addressed the VCM subplume within the regional groundwater plume and NYSDEC directed Northrop and NWIRP to prepare an FS to address the remainder of the regional VOC groundwater plume. It is noted that the decision to approach remediation of the regional plume in this manner was based on administrative and not technical considerations. In the fall of 2000, NYSDEC intends to issue a Proposed Plan which, in addition to addressing the regional groundwater contamination, will identify source control measures for the Northrop and NWIRP sites. The FS prepared by Oxy for addressing the VCM subplume was completed in July 2000.

The RI/FS Report for Operable Unit 3 (OU3), OU3 Proposed Plan and Responsiveness Summary, along with other Site-related documents, provide the basis for this Record of Decision.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The OU-3 RI/FS Reports and the Proposed Plan for the Site were released to the public for comment on July 28, 2000. These documents, as well as other documents in the Administrative Record (see Administrative Record Index, Appendix III) have been made available to the public at two information repositories maintained at the EPA Docket Room in Region II, New York and the Hicksville Public Library, located at 169 Jerusalem Avenue, Hicksville, NY 11801. A public notice announcing the public meeting on the Proposed Plan as well as the availability of the above-referenced documents was published in *Newsday* on July 28, 2000. The public notice established a thirty-day comment period.

The public meeting was held at the Oyster Bay Town Hall, located at 54 Audrey Avenue, Oyster Bay, New York to present the Proposed Plan to interested citizens and to address any questions concerning the Plan and other details related to the RI/FS Reports. Responses to the comments and questions received at the public meeting, along with other written comments received during

the public comment period, are included in the Responsiveness Summary (see Appendix V).

EPA subsequently received a request for an extension of the public comment period through September 12, 2000. The Agency's decision to extend the comment period was announced at the August 15, 2000 public meeting on the Proposed Plan, as well as publicized through mailings to more than 400 interested parties on the site mailing list.

SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

Site remediation activities are sometimes segregated into different phases, or operable units (OUs), so that remediation of different environmental media or areas of a site can proceed separately, resulting in an expeditious remediation of the entire site. EPA has designated three separate distinct phases or OUs for this site. The OUs for this Site are divided as follows:

- OU-1: Addresses the majority of the Ruco property soil contamination.
- OU-2: Addressed the PCB-contaminated soils.
- OU-3: Addresses the downgradient commingled contaminated groundwater plume beyond the Hooker/Ruco Facility and the contaminated groundwater beneath the Hooker/Ruco Facility which was previously included under OU-1.

Subsequent to EPA's issuance of the January 1994 ROD for OU-1, the IRM and the coordinated groundwater investigations were completed. Based on the results of the groundwater investigations, which included sampling and analysis of wells beyond the Hooker/Ruco Facility, EPA reevaluated the need to extract the groundwater at the Hooker/Ruco facility boundary. OU-3 now addresses the downgradient commingled contaminated groundwater plume beyond the Hooker/Ruco Facility and also the contaminated groundwater beneath the Hooker/Ruco Facility which was previously included under OU-1.

The primary objectives of the comprehensive remedial action described in this ROD are to reduce contaminant levels in groundwater, to minimize the migration of contaminants and to

protect human health and the environment from risks associated with the contaminated groundwater.

SUMMARY OF SITE CHARACTERISTICS

As discussed above, a RI was completed in December 1992. As part of the RI, a total of 32 monitoring wells in the immediate vicinity of the Hooker/Ruco Facility were sampled and analyzed. Based on the sampling conducted prior to, and during the RI, the evidence indicates that groundwater beneath the Hooker/Ruco facility contains chemical constituents above the New York State (NYS) drinking water standards, NYS groundwater quality standards and EPA maximum contaminant levels (MCLs). Groundwater containing VCM, PCE, DCE, TCE, TICs and arsenic is moving downgradient from the Hooker/Ruco property.

In April 1994, under EPA's direction, Oxy initiated a program to investigate groundwater conditions beyond the Hooker/Ruco Facility which involved collecting additional groundwater data around and primarily west of the Hooker/Ruco Facility. The activities were described in the document entitled "Work Plan for Groundwater Investigations Beyond the Hooker/Ruco Property, August 1994" and in a subsequent Addendum, dated September 1995.

Since the groundwater contamination associated with the Hooker/Ruco Facility has commingled with groundwater contamination from the Northrop and NWIRP sites, in the Spring of 1995, EPA and NYSDEC agreed to proceed with a coordinated effort to evaluate and develop remedial alternatives to address the commingled plume.

The additional groundwater investigations performed at the Hooker/Ruco Site included the following activities:

- ☐ collection and analysis of 133 hydropunch samples.
- ☐ collection and analysis of 14 wells installed during the Beyond Ruco Property (BRP) investigations at eight different locations plus two wells (MW-50J1 and MW-50J2) installed during the RI.
- ☐ Collection and analysis of groundwater samples from Northrop Wells GP-6, GP-8 and GP-14.
- ☐ Collection and analysis of 20 existing wells on and in close proximity to the Hooker/Ruco Facility to determine current groundwater chemical concentrations.

- Collection and analysis of groundwater samples from seven wells to determine whether destructive natural attenuation processes (e.g., biodegradation) are contributing to the reduction of groundwater chemical concentrations.

Physical Site Conditions

The 14 acre triangular shaped Hooker/Ruco facility is composed of parking areas, undeveloped land, industrial buildings and chemical storage structures. As shown on Figure 2, Commerce Street and adjacent industrial development comprise the 880 foot northern Site boundary. Along the facility's 1,000 foot eastern side is a large warehouse building owned by Northrop. A small portion of undeveloped Northrop land abuts the facility's 250 foot southern property boundary. Two active tracks of the LIRR parallel the facility's 940 foot southwestern property boundary. The facility is bounded on the 270 foot western boundary by New South Road. The property line is demarcated by a chain-link fence which completely encompasses the Hooker/Ruco facility.

Vehicular access to the Site is via New South Road. South and southeast of the parking lot area is approximately 3 acres of undeveloped land. Access to the active plant site is along a paved roadway passing a security building and freight scales. The paved roadway extends to the central, eastern and southern portions of the Site.

In addition to vehicular traffic, a spur of the LIRR enters the property's southwestern boundary. The rail spur, once on the facility, splits into two diverging sidings, one that progresses east toward the corners of Plants 2 and 3, and the other siding angling south between Plant 1 and the warehouse.

Plant 1, located in the south/central portion on the facility, is the largest structure, comprising approximately 44,800 square feet. The single story brick building, built in 1945, consists of manufacturing and latex storage. A small office complex was added to the building's front side in 1964 and houses the plant's engineering division. The northern portion of Plant 1 contains a small laboratory.

Adjacent to, but south of Plant 1, is a warehouse, constructed of sheet metal, installed in 1952 covering approximately 12,000 square feet. The warehouse is used for storage of raw and

finished stock. A loading dock for shipping and receiving is located in the northern portion of the building.

Northeast of Plant 1 is a small, approximately 2,300 square foot, brick and sheet metal structure, termed the Pilot Plant. The Pilot Plant, installed in 1945, is an independent facility used to pilot test new/emerging products prior to full production.

The Plant 2 complex is located in the north/central portion of the Site and is composed of Plant 2, the adjacent tank farm and cold room building. Plant 2, built in 1956, is composed of the filter storage and reactor buildings covering approximately 11,000 square feet. The filter storage building in the southern portion of Plant 2 contains offices, a small laboratory and maintenance, with the rotary drier associated with production in the rear of the building. Adjacent, in the northern half of Plant 2, are a series of chemical reactors used in the production stages of manufacturing. Because of the reactor's dimensions, the northern half of Plant 2 is a two story building.

North of Plant 2 is an above-ground tank farm, previously used to store raw plastic stocks, and currently storing solvents and alcohols. The tank farm consists of a 30,000 gallon, two 25,000 gallon and three 15,000 gallon above-ground horizontal storage tanks. These storage tanks are surrounded and separated by a 5 foot earthen dike. Just to the east of the tank farm is a small, 300 square foot refrigerated building, termed the cold room. The cold room was an integral part of the discontinued plastic manufacturing process.

Plant 3 is an approximately 10,800 square foot, two story, sheet metal building, located in the central portion of the facility. Plant 3 is primarily used for raw and finished stock storage. Adjacent to Plant 3, along the building's south side, are five 100,000 gallon silos used for product storage.

The administration building is approximately 7,700 square feet and is located along the Site's northern boundary. The administration building, formerly the plastic research and development complex, has been converted from a laboratory to offices for corporate accounting and production personnel. Use of the rear of the building was discontinued in 1975. With the exception of the ester tank farm, all of the structures on the facility are currently in use.

Four surface water sump basins are located along the facility's eastern property boundary. Sumps one and two are located in the

southern portion of the facility, southeast of Plant 1. Sump 1 is approximately 5 feet deep, has been partially backfilled and contains a series of six concrete settling basins. Sump 2 is adjacent to sump 1. Sump 3, installed in 1968, is located east of the pilot plant and contains surface water derived from plant runoff. Sump 4, located east of Plant 2, also contains standing surface water. The interior of Sump 4 has been subdivided into three substructures by an earthen dike.

Sumps 5 and 6 have been backfilled to grade surface and are not topographically represented. Sump 6 was approximately 5,000 square feet and square in shape. The sump was located adjacent to sump four in the area between Plant 2 and the cold room. Sump 5 was a rectangular shaped sump along the Site's northeastern-most boundary and covered approximately 8,000 square feet.

Water supply at the Site is now derived from city water mains running beneath the Site from New South Road. A 150,000 gallon tank and two 400 square feet cooling water towers are located along the facility's eastern boundary. Miscellaneous structures, including a pump house and two maintenance garages, are located in the vicinity adjacent to sump three. Off-Site electrical power is brought on-Site via above-ground utility poles and below grade electrical lines. Three transformer vaults distribute the electricity to individual buildings. The transformer vault, adjacent to Plant 1, consists of three transformer banks. The facility is currently served by a public sanitary sewer system. In the past, septic waste was discharged to on-Site septic systems.

The surface of the Site slopes gently to the south and is primarily permeable except for the presence of the buildings and limited paved areas. Surface water from precipitation drains from the buildings, paved areas and other areas of the Site into a recharge basin (Sump 3) located along the eastern edge of the Site.

Geology and Hydrogeology

There are three major aquifers underlying the Site. These are: the unconfined Upper Glacial aquifer; the semi-confined Magothy aquifer; and, the confined Lloyd Sand aquifer. The total thickness of these three aquifers beneath the Site is approximately 1,200 feet. The two aquifers of environmental concern for this Site are the Upper Glacial and the Magothy; the Lloyd Sand is a deep aquifer (1000 feet) and is not hydrogeologically connected to the above aquifers. Studies have

indicated that the Upper Glacial and Magothy aquifers are hydrogeologically connected under the Site. The Magothy aquifer is totally dependent upon downward percolating rainfall and recharge from the overlying Upper Glacial deposits for its replenishment.

The Raritan Formation is an Upper Cretaceous age coastal plain deposit which lies unconformably on the bedrock below and consists of two members. The lower member is the Lloyd Sand, the top of which is about 750 feet below sea level. This is a stratified deposit of sand, gravel, sandy clay, silt and clay generally occurring in discontinuous and lenticular beds. The upper member is the Raritan Clay, which is composed of primarily silt and clay, but which has some lenses of sand and clayey sand. The Raritan Clay functions as an aquiclude, separating the ground water within the Lloyd Sand from the ground water within the overlying Magothy Formation. Beneath the Site, the Lloyd Sand is approximately 200 to 300 feet thick and the relatively impermeable Raritan Clay is approximately 160 feet thick. The total formation thickness ranges from 300 to 600 feet and is the deepest unconsolidated deposit beneath the Site.

The Magothy Formation is a thick sequence of Upper Cretaceous age sediments which were deposited upon the underlying Raritan Formation. At the Site, the Magothy Formation is approximately 680 feet thick and is composed of marine and terrestrially deposited, stratified, coastal plain sediments. The sediments are primarily fine sand, clayey sand, silt and clay, but may also contain discontinuous lenses of coarse sand and gravel.

Lying unconformably on the Magothy Formation are glacio-fluvial outwash deposits from the Quaternary Age. These Pleistocene deposits which comprise the Upper Glacial aquifer deposits are approximately 30 to 50 feet thick directly under the Site. The Upper Glacial sediments consist of horizontally stratified beds of fine to coarse sands and gravel. The Magothy and the Upper Glacial aquifers have historically been distinguished by differences in sediment color, texture and composition.

The direction and relatively rapid rate of shallow (near the water table) groundwater flow beneath the Site is southerly. The water table at the Site was found to be between 50 to 60 feet below the surface. Deeper into the Magothy aquifer, the groundwater flow is to the south with an easterly component of flow that results from the influence of high pumping rates at the Grumman facility adjacent to the Site.

Groundwater supplies the public and private needs of the entire population of Nassau County. The two most commonly tapped aquifers for water supply purposes are the Upper Glacial and the Magothy. The Magothy aquifer is the primary source of potable drinking water in the area of the Site. Water is pumped from municipal supply wells to the homes and businesses in the vicinity of the Site. The Hicksville, Bethpage and Levittown Water Districts supply the businesses and residents in the vicinity of the Site as well as areas to the south. All of the local public supply wells are advanced to and completed within the Magothy aquifer. The nearest municipal well field is located upgradient at 2,000 feet to the north of the Site (Hicksville supply wells). The groundwater flow in this area is to the south. Other municipal supply wells are located 3,500 feet to the west (Hicksville supply well) and 6,000 feet to the east of the Site (Bethpage supply well). Municipal well fields located downgradient are 5,500 feet southwest (Hicksville and Levittown) and approximately 10,000 feet south-southeast of the Site (Bethpage supply wells).

The industrial area, including the Site, as well as the surrounding residential areas are above the groundwater aquifer that supplies the surrounding communities with water. This aquifer is designated as a sole source aquifer.

Ecology

The Hooker/Ruco Facility is fully developed as an industrial facility and is surrounded by industrial and residential properties. There are no natural surface water bodies, wetlands, or sensitive flora or fauna within the Site. The only observed animal life on-Site were Canadian geese, that are nesting in known contaminated areas. However, they are not expected to be part of a higher food chain, and therefore any impacts to the geese on-Site are not expected to affect the area wildlife population.

The contaminants of concern are located in the groundwater starting at a depth of approximately 50 feet below ground surface. A screening evaluation of ecological risk was conducted as part of the RI. Through this evaluation, EPA has determined that there are no significant ecological resources in the area of the site, and no evident pathways by which Site contaminants could migrate and create ecological risk concerns.

Groundwater Contamination

As a result of the field work and sampling exercises performed during and after the RI at Hooker/Ruco Facility and adjacent Northrop and NWIRP sites, the nature and extent of chemical contamination was further defined at these properties. A general discussion of these findings is presented below. For a more complete examination of the analytical results of the RI/FS, please see **TABLES 1** through **4**.

The groundwater sampling and analyses conducted as part of the RIs for the Northrop, NWIRP and Hooker/Ruco sites indicated that past activities at each of the sites have resulted in the contamination of groundwater resources within the Upper Glacial aquifer and Magothy aquifer. Sampling demonstrated that the groundwater beneath the Site, specifically underlying the south eastern portion of the Site, and the Northrop and NWIRP sites, contains chemical constituents above the NYS drinking water standards, NYS groundwater quality standards and EPA MCLs. The NYSDEC and EPA have determined that the primary groundwater contaminants of concern in the region of the three sites are VOCs (primarily TCE, PCE and VCM). The secondary contaminants are SVOCs and inorganics which are associated with the three sites as noted below:

- 1) Hooker/Ruco: tentatively identified compounds referred to as TICs (including glycols and acids) and metals;
- 2) Northrop: inorganics including arsenic, cadmium, and chromium, and;
- 3) NWIRP: SVOCs including: bis[2-ethylhexyl]phthalate, di-n-butylphthalate, di-n-octylphthalate, 2-methylphenol, 4-methylphenol, 2,4-dimethylphenol, naphthalene, acenaphthylene, fluoranthene, benzo[b]fluoranthene, pyrene and TICs including polyaromatic hydrocarbons, substituted benzenes, alkanes, substituted phenols, and carboxylic acids; and inorganics including cadmium, chromium and thallium.

The most prevalent VOCs and their corresponding maximum concentrations detected in the groundwater in the vicinity of the sites were as follows: TCE at a concentration of 58,000 parts per billion (ppb) at NWIRP (see Figure 4.9 of Final Remedial Investigation Report, NWIRP, May 1992); 25,000 ppb at the Northrop facility; and 1100 ppb at the Hooker/Ruco Facility. The highest concentrations of PCE detected were 490 ppb at the Northrop site and 350 ppb at the Hooker/Ruco Facility.

Similarly, the highest concentrations of VCM detected were 6,400 ppb at the Hooker/Ruco Facility in the area of monitoring well 52 (MW-52 area) and 550 ppb at Northrop. The highest concentrations of total SVOCs and VOC TICs detected at the Hooker/Ruco Facility were 4200 ppb and 493 ppb, respectively. Individual TIC concentrations ranging from 2 ppb to 800 ppb were detected in two of the wells located at the downgradient boundary of the Hooker/Ruco Facility. In addition, antimony and arsenic were detected at the Hooker/Ruco Facility at concentrations as high as 22 ppb and 83 ppb, respectively. Please refer to the Hooker/Ruco RI/FS Reports for OU-1 (August 1992) and OU-3 (July 2000) and the Northrop RI/FS Reports for a detailed evaluation of the analytical results obtained to date for the three sites. Based on the computer generated groundwater plume modeling developed as part of the Northrop RI Report (prepared by Geraghty and Miller (G&M) in 1994) and the report entitled "Regional Groundwater Feasibility Study," prepared by G&M in March 1998, VOC-impacted groundwater beneath and downgradient of each of the three sites is estimated to be approximately 12,100 feet long (along its north-south axis) 9,600 feet wide (along its east-west axis) and 580 feet deep (at its deepest point). The Northrop FS addresses this plume in detail. Similarly, using G&M's computer-generated groundwater plume modeling (see Appendix A of Ruco FS, July 2000), the area of the VCM subplume is estimated to be 2000 feet long (at its longest point), by 1350 feet wide (at its widest point), by 430 feet deep.

In general, the regional direction of the shallow horizontal groundwater flow is to the south/southeast away from the sites. Because of the direction of groundwater flow, the fact that a total of 14 production wells at these sites have historically pumped as high as 12 to 14 million gallons a day and that recharge occurs at the Northrop and NWIRP sites, much of the VOC-impacted groundwater from all three sites has been drawn onto and/or beneath the Northrop and NWIRP sites. However, because the degree of hydraulic containment obtained from the production wells was not 100 percent, some of the VOC-impacted groundwater has migrated downgradient. In addition, available data indicates that several public supply wells from the Bethpage Water District have been affected by VOCs which are likely attributed to all three sites. These supply wells, however, have been equipped with VOC treatment units provided by Northrop and NWIRP. The water fed to these distribution systems continues to meet all New York State and Federal drinking water standards. Currently, there are no private drinking water supply wells in the residential areas surrounding the sites. A Nassau County ordinance, Public Health Ordinance Article IV, prohibits the

installation of new private drinking water wells in areas served by public water. As discussed in the above Section titled as Geology and Hydrogeology, the public water supply is obtained from the sole source groundwater aquifer.

SUMMARY OF SITE RISKS

Based upon the results of the RI, EPA conducted a baseline risk assessment to estimate the potential risks associated with current and future exposure to Hooker/Ruco Site contaminants. Since this operable unit is focused on groundwater, the baseline assessment estimates the human health and ecological risk which could result from exposure to the contaminated groundwater at the Hooker/Ruco Site if no remedial actions were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action.

Human Health Risk Assessment

The Hooker/Ruco Site is currently zoned industrial with residential neighborhoods in close proximity. Currently, there are no private drinking water wells on the Hooker/Ruco Site or in the adjacent residential areas surrounding the Hooker/Ruco Site. EPA believes that, based on the historical uses of the Hooker/Ruco Site, the most reasonably anticipated future land use of the Hooker/Ruco Site is most likely to be commercial/industrial. However, a resident was assumed to live at the downgradient property line and use the sole source aquifer as a water supply. Therefore, the baseline risk assessment focused on potential future health effects for both adults and children, in a residential setting, that could result from potential exposure to groundwater via ingestion, inhalation, and dermal contact.

A four-step process is utilized for assessing Site-related human health risks for a reasonable maximum exposure scenario: *Hazard Identification*--identifies the contaminants of concern at the site based on several factors such as toxicity, frequency of occurrence, and concentration. *Exposure Assessment*--estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed. *Toxicity Assessment*--determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and

severity of adverse effects (response). *Risk Characterization*--summarizes and combines results of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks.

Hazard Identification

In this step, the contaminants of concern (COCs) at the Hooker/Ruco Site in groundwater were identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation. Several inorganic chemicals and organic compounds meeting appropriate QA/QC requirements were selected as COCs because of the potential hazard they pose to human health and the environment under current and future conditions. The COCs in the groundwater at the Hooker/Ruco Site include organic compounds and metals such as VCM, tetrachloroethene, PCE, TCE, bis(2-ethylhexyl) phthalate, arsenic, antimony, and beryllium. Of these chemicals, arsenic and VCM are classified as Class A carcinogens; known to cause cancer in humans.

Tables 1 to 3 summarize the chemicals detected in the groundwater at the Hooker/Ruco Site. The tables include the range of concentrations detected for each chemical (minimum and maximum), the mean concentration, and the 95% upper confidence limit on the mean concentration.

Exposure Assessment

In this step, the different exposure pathways through which people might be exposed to the contaminants identified in the previous step are evaluated. Factors relating to the exposure assessment include, but are not limited to, the concentrations that people might be exposed to and the potential frequency and duration of exposure. Using these factors, a "reasonable maximum exposure" scenario, which portrays the highest level of human exposure that could reasonably be expected to occur, is calculated.

At the Hooker/Ruco Site, the complete exposure pathways evaluated were groundwater ingestion, inhalation, and dermal contact. The potentially exposed populations evaluated were future residential adults and children.

The exposure parameters representing such values as exposure frequency, exposure duration, body weight, groundwater ingestion

rate, etc. are found in Tables 4 and 5. These values are used in the exposure equations to calculate chronic daily intakes.

Toxicity Assessment

In this step, the types of adverse health effects associated with chemical exposures, and the relationship between the magnitude of exposure (dose) and severity of adverse effects (response) are determined. Potential health effects are chemical-specific and may include the risk of developing cancer over a lifetime or other non-cancer health effects, such as changes in the normal functions of organs within the body (e.g., changes in the effectiveness of the immune system.) Some chemicals are capable of causing both cancer and non-cancer health effects.

Oral and inhalation cancer slope factors and oral and inhalation reference doses were used to estimate the carcinogenic risks and noncarcinogenic hazards associated with Hooker/Ruco Site contaminants. The chronic toxicity information for the COCs based on information in the Integrated Risk Information System (IRIS), the 1997 Health Effects Assessment Summary Tables, and from EPA's National Center for Environmental Assessment Superfund Technical Support Team is found in Table 6.

A number of chemicals lack adequate toxicity information to quantify the potential risks and hazards associated with exposure. A list of the chemicals not quantitatively evaluated are provided in the Hooker/Ruco Site documents. Lack of data to quantify risks and hazards for these chemicals may cause the risks and hazards at the Hooker/Ruco Site to be under estimated.

Risk Characterization

This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of Hooker/Ruco Site risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for noncancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to Hooker/Ruco Site contaminants under the conditions explained in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk to a reasonably maximally exposed individual in the range of 10^{-4} to 10^{-6} (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk.) Action is generally

warranted when excess lifetime cancer risk exceeds one-in-ten-thousand (10^{-4} .)

For noncancer health effects, a hazard index (HI) equal to or less than 1.0 is considered an acceptable exposure. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses. The Reference Dose (RfD) represents a level that an individual may be exposed to that is not expected to cause any deleterious effects. The ratio of exposure to toxicity is represented as a Hazard Quotient. Hazard Quotients less than 1 indicate that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The HI is the sum of multiple chemical exposures across multiple routes. The key concept for a noncancer HI is that a "threshold level" (measured as an HI of less than 1) exists below which noncancer health effects are not expected to occur. An HI greater than 1.0 indicates a potential for noncarcinogenic health effects.

The results of the baseline risk assessment indicate that the current use of groundwater at the Hooker/Ruco Site is not a risk since no one uses the groundwater for domestic purposes. The future residential groundwater use scenario showed unacceptable risks to human health. Future groundwater ingestion exposures yielded carcinogenic risks to adults of 2.2×10^{-3} and 8.8×10^{-4} for children. The groundwater inhalation exposure to adult residents in the future use scenario results in a potential carcinogenic risk of 5.0×10^{-4} . Tables C-1 and C-2 of the Risk Assessment and Table 2.1 of the Feasibility Study Report show that the majority of the carcinogenic risk (65 to 99 percent) can be attributed to potential exposure to the VCM. Potential groundwater ingestion by adults and children also yielded HIs of 4.89 and 10.2, respectively. The cancer risk values and noncancer hazard indices for the residential adult and child can be found in Tables 7 and 8, respectively.

The groundwater risk calculations were prepared using the data set from the Remedial Investigation which showed a maximum VCM concentration of 560 ug/l. More recent groundwater sampling has shown higher VCM concentrations with a maximum value of 6,400 ug/l. These more recent sampling results showing higher VCM concentrations would produce carcinogenic risks estimates from exposure to groundwater greater than the risks listed above and would also be considered unacceptable.

The results of the risk assessment indicate that the potential for carcinogenic risks and noncarcinogenic hazards exists for

future adult and child residents through exposure to contaminated groundwater at the Hooker/Ruco Site especially from the VCM. Remedial action is warranted to address the unacceptable groundwater cancer risks greater than 10^{-4} and noncancer HIs greater than 1.0.

Ecological Risk Assessment

As discussed in above in the section titled Ecology, the Hooker/Ruco Site is fully developed as an industrial facility and is surrounded by industries and residential properties. The media of concern for this operable unit is groundwater. Since there are no natural surface water bodies or wetlands within the Hooker/Ruco Site vicinity, there is no potential for the migration of contaminated groundwater to impact ecological resources. The only observed animal life at the Hooker/Ruco Site were transient Canada geese, which would not come into contact with contaminated groundwater. The results of this evaluation indicate that the contaminated groundwater at the Hooker/Ruco Site does not pose an unacceptable ecological risk.

Discussion of Uncertainties in Risk Assessment

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis;
- environmental parameter measurement;
- fate and transport modeling;
- exposure parameter estimation; and
- toxicological data.

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the

concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the Risk Assessment provides upper-bound estimates of the risks to populations near the Hooker/Ruco Site, and is highly unlikely to underestimate actual risks related to the Site.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the Risk Assessment Report.

Actual or threatened releases of hazardous substances from this Hooker/Ruco Site, if not addressed by the selected alternative or one of the other remedial measures considered, may present an imminent and substantial endangerment to the public health, welfare, and the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), site-specific risk-based levels and the most reasonably anticipated future land use for the Hooker/Ruco Site for example, industrial, commercial or residential use.

The Risk Assessment has identified a number of contaminants of concern (COCs) in the groundwater. As stated previously, the COCs in the groundwater of the Hooker/Ruco Site include organic compounds and metals such as vinyl chloride, tetrachloroethene, PCE, TCE, bis(2-ethylhexyl) phthalate, arsenic, antimony, and beryllium. The contaminants in the groundwater pose a future carcinogenic and noncarcinogenic health risk to residents who may reside at the downgradient (southern) Hooker/Ruco Facility boundary. These contaminants in groundwater are subject to a number of regulations for cleanup and discharge. These regulations include the New York State Water Quality Regulations, specifically, 6 NYCRR and 10 NYCRR as well as MCLs. A complete list of the ARARs for the Hooker/Ruco Site is included in Table

1. The specific ARARs identifying the groundwater cleanup and discharge criteria are presented in Tables 2 and 3 respectively. The treatment of groundwater will also address compounds which are not COCs, but exceed the ARARs.

The following remedial action objectives were established for the Hooker/Ruco Site:

- 1) Protect human health from exposure (via ingestion, inhalation, and dermal contact) to VCM, TCE, PCE and TICs in groundwater at concentrations in excess of New York State groundwater standards and Federal MCLs.
- 2) Restore the aquifer to meet New York State Groundwater Standards and New York State and Federal MCLs in a timely manner. If the aquifer cannot be restored to meet standards, then, minimize further migration of VCM, TCE, PCE and TICs to prevent adverse impact on downgradient public and private users.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected remedy be protective of human health and the environment, be cost-effective, comply with other statutory laws, and utilize permanent solutions, alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

The remedial approach for the contaminated groundwater originating from the Hooker/Ruco Site is designed to primarily address the VCM subplume. VOC's other than VCM would be addressed by the existing treatment system being operated by Northrop as an IRM. EPA recognizes that the IRM as it is currently designed, would be unable to treat the VCM subplume without the system exceeding its air discharge limitations. This treatment system is expected to require more than 30 years of operation to restore the aquifer to meet drinking water standards.

The remedial alternatives developed to address the VCM subplume at the Hooker/Ruco Site are presented in detail below.

The construction time for each alternative reflects only the time required to construct or implement the remedy and not the time required to design the remedy, negotiate its performance by the

parties responsible for the contamination, or procure contracts for design and construction.

SUMMARY OF GROUNDWATER REMEDIATION ALTERNATIVES

ALTERNATIVE 1: NO-FURTHER ACTION

Capital Cost:	\$0
Annual Monitoring Cost:	\$6000
Construction Time:	N/A
30-Year Present Worth Monitoring Cost (7% discount factor):	\$74,000

The Superfund program requires that the "No-Action" Alternative be considered as a baseline level to which other remedial technologies and alternatives can be compared.

The No-Further Action Alternative does not include any remedial measures to address the contamination at the Hooker/Ruco Site. It is recognized, however, that the regional VOC plume is being addressed by the extraction and treatment of contaminated groundwater at the Northrop Facility which has been demonstrated to contain and prevent further migration of the plume that remains upgradient of the extraction system.

Because this alternative would result in elevated concentrations of VCM contamination remaining at the Hooker/Ruco Site above health-based levels, CERCLA requires that the remedy be reviewed every five years to evaluate groundwater conditions.

This alternative would include a long-term groundwater monitoring program. Under this monitoring program, groundwater samples would be collected and analyzed semi-annually.

The No-Further Action Alternative would also include the development and implementation of a public awareness and education program for the residents in the area surrounding the Hooker/Ruco Site. This program would include the preparation and distribution of informational press releases and circulars and convening public meetings. These activities would serve to enhance the public's knowledge of the conditions at the Hooker/Ruco Site.

ALTERNATIVE 2: VCM SUBPLUME EXTRACTION, TREATMENT AND DISCHARGE TO ACHIEVE GROUNDWATER ARARS

Capital Cost:	\$ 4,195,000
Annual O&M Cost:	\$ 722,000

Construction Time: 12-18 Months
Present worth cost
(operating period
of 30 years at a
discount factor of 7%): \$13,200,000

Alternative 2 involves extraction and treatment of groundwater within the area of the VCM subplume with a goal of restoring the water quality of the aquifer to State drinking water standards or Federal MCLs. The State drinking water standard and EPA's MCL for VCM is 2 ppb. The treatment system would be built in the immediate vicinity of the Hooker/Ruco Facility. Conceptually, one extraction well would be placed approximately 500 feet downgradient of the MW-52 area (where current VCM concentrations exceed 1000 ppb) with two additional wells located 1000 feet downgradient of the MW-52 area (where current VCM concentrations range between 10 and 100 ppb). The exact locations of the extraction wells would be determined during remedial design. The three extraction wells were estimated to pump at a combined flow rate of 1000 gallons per minute. The effluent from the treatment system would be discharged to recharge basins on the Hooker/Ruco Site. Based on the hydrogeologic modelling presented in Appendix A of the FS, it is projected that the VCM concentrations in the VCM subplume would be reduced to levels below the MCL of 2 ppb in approximately 30 years. By containing and treating the VCM within the VCM subplume, supplemental VCM treatment would not be required at the downgradient treatment system which Northrop is operating as an IRM.

Alternative 2 relies on the continued operation of the groundwater extraction and treatment system at the Northrop Facility which is preventing its further migration of the regional VOC plume beyond the Northrop IRM. This system is expected to operate for the next 30 years. Alternative 2 also relies on the VOC removal treatment at the Bethpage Water District municipal wells.

A long-term sampling program would be developed to monitor groundwater quality in the area of the VCM subplume. New monitoring wells would be added to the existing network of monitoring wells to increase the network's area of coverage. The objective of the long-term monitoring program would be to evaluate the effectiveness of the groundwater extraction and treatment remedy and to detect if VCM is migrating southward beyond the VCM source control wells at concentrations which may require supplemental VCM treatment at the Northrop IRM.

If the long-term monitoring program identifies the migration of the VCM subplume farther southward of the Hooker/Ruco Site beyond the VCM source control wells at concentrations which may require supplemental VCM treatment at the Northrop IRM, additional extraction and treatment wells at the Hooker/Ruco Site may be required.

**ALTERNATIVE 3: IN SITU TREATMENT OF VCM
SUBPLUME BY BIOREMEDIATION USING BIOSPARGING (PLUS SUPPLEMENTAL
NUTRIENT ADDITION, IF DEEMED NECESSARY)**

Capital cost:	\$1,260,000
O&M costs (per year):	\$319,000
Construction Time:	6-8 Months
Present worth cost for 10 years of biosparging and 2 years of nutrient addition (using a discount factor of 7%):	\$3,800,000

This alternative utilizes in-situ biosparging technology to treat the VCM subplume. Biosparging is a form of bioremediation and involves the introduction of air/oxygen into the aquifer to increase the dissolved oxygen content in the aquifer, which would enhance aerobic degradation of VCM. This alternative is designed to remove and reduce the concentration of VCM to a level whereby supplemental treatment for VCM at the groundwater extraction and treatment system at the Northrop IRM is not required. Aerobic conditions in the aquifer would result in an increased microbial population which would also enhance the degradation of TICs. Aerobic conditions will not enhance the degradation of PCE, and will enhance the degradation of TCE only when sufficient quantities of a suitable carbon source such as methane is present; therefore, the effect of biosparging on TCE and PCE would be limited.

If deemed necessary, this alternative would also utilize a supplemental bioremediation technology following the biosparging treatment. Supplemental bioremediation would involve the injection of nutrients (possibly nitrogen and phosphorus, along with suitable carbon sources such as methane) to enhance the growth and metabolic activities of indigenous microbial populations to effect the degradation of VCM in the aquifer. The addition of nutrients to stimulate the microbial population would also enhance the degradation of TCE, PCE and TICs. It is estimated that the nutrient addition would occur over a two-year period. The exact nutrient requirement is dependent on the presence of other constituents in groundwater and would be determined through treatability studies.

Conceptually, twelve injection wells would be installed in the area of the VCM subplume to a depth of 200 to 400 feet below ground water using common drilling techniques. Additives (air/oxygen, nutrients) would be forced into the formation using either static head within the well or using pump-supplied pressure. Increasing or decreasing the number of air/oxygen and nutrient injection locations and the rate of injection, would also affect the duration. Periodic injections (monthly, bimonthly, quarterly) are suitable for biosparging. The exact locations of the injection wells and the treatment scenario would be determined after conducting appropriate pilot studies during remedial design. Although the goal of in-situ biosparging is to reduce the concentration of VCM to 2 ppb, because it is considered an innovative technology, the performance criteria by which we would measure the effectiveness of this technology at the Hooker/Ruco Site would be developed during remedial design.

Similar to Alternative 2, to ensure that the regional groundwater VOC plume is adequately addressed, Alternative 3 also relies on the ongoing and anticipated long-term operation of the groundwater extraction and treatment system at the Northrop facility and treatment at the Bethpage Water District wells.

Alternative 3 also would include the same long-term monitoring program described for Alternative 2. Similarly, Alternative 3 also acknowledges the possible need to expand the biosparging system to ensure that the Northrop treatment system will meet its air discharge limitations for vinyl chloride.

EVALUATION OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria. These nine criteria are as follows: overall protection of human health and the environment; compliance with applicable or relevant and appropriate requirements; long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; short-term effectiveness; implementability; cost; and State and community acceptance. The evaluation criteria are described below.

Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

Compliance with applicable or relevant and appropriate requirements (ARARs) addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes and requirements, or provide grounds for invoking a waiver. Other federal or state advisories, criteria or guidance are To-be-Considered (TBCs). TBC are not required by the NCP, but may be very useful in determining what is protective for a site or how to carry out certain actions or requirements.

Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. This criteria also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.

Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

Cost includes estimated capital and operation and maintenance (O&M) costs, and net present worth costs.

State acceptance indicates whether, based on its review of the RI/FS and Proposed Plan, the State concurs with, opposes, or has no comment on the preferred remedy.

Community acceptance is assessed in the ROD and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports.

Comparative Analysis of Groundwater Remedial Alternatives

Overall Protection of Human Health and the Environment

Alternative 1, No Further Action, would be the least effective of the alternatives in protecting human health and the environment

because no active remedial measures are included under this alternative. Furthermore, Alternative 1 would allow the VCM subplume to migrate to the Northrop IRM which would cause this system to release unacceptable levels of vinyl chloride to the environment. Alternatives 2 and 3 would be protective of human health and the environment as these would remove a sufficient mass of contamination from the VCM subplume so that supplemental treatment for VCM at the Northrop IRM would not be required. Alternative 2 would be more protective than Alternative 3 because Alternative 2 would remove all VOCs to levels that would restore the aquifer to drinking-water quality in the area of the VCM subplume.

Compliance with ARARs

Alternatives 2 and 3, but not Alternative 1, would comply with chemical-specific ARARs, which consist primarily of Federal and State MCLs for groundwater. In time, Alternative 1 would result in the downgradient Northrop IRM exceeding its permit limitations for vinyl chloride.

Alternative 2 would reduce the contaminant concentrations in the VCM subplume to achieve MCLs which are the regulatory requirements for the sole source aquifer under Long Island. The discharge of treated groundwater to recharge basins under Alternative 2 would also meet groundwater discharge standards. Both Alternatives 2 and 3 would reduce the concentration of the VCM subplume to the level that supplemental treatment for VCM at the Northrop IRM would not be required. For a complete listing of ARARs, see Tables __ of Appendix __ of this document.

Long-Term Effectiveness and Permanence

Alternative 1 would not be effective in protecting human health and the environment. In fact, Alternative 1 would result in the downgradient Northrop IRM exceeding its permit limitation for VCM. Both Alternatives 2 and 3 would be effective over the long-term in protecting public health and the environment. Both alternatives require long-term operation and both rely on the continued operation of the IRM. However, they are permanent remedies for the restoration of the aquifer to its productiveness as a source of drinking water.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative 1 would provide no additional reduction of toxicity, mobility or volume of the contaminants at the Hooker/Ruco Site

except as provided by the Northrop IRM. Alternative 2 would be most effective in reducing the toxicity, mobility and volume of all VOC contaminants, as this alternative would be designed to restore the aquifer to drinking water quality in the area of the VCM subplume. Alternative 3 would reduce the toxicity and mass of VCM and other VOCs and TICs through the introduction of air/oxygen, and possibly substrates and nutrients to promote aerobic in-situ bioremediation. Alternative 3 would reduce the VCM subplume to a level that supplemental treatment at the Northrop IRM would not be required in order to comply with the air discharge limitation for vinyl chloride. Further, under Alternative 3, any residual contamination that would not be treated by biosparging or bioremediation would be captured and treated by the Northrop IRM.

Short-Term Effectiveness

Alternative 1 would not involve any remediation and therefore would not pose any short-term impacts to the Hooker/Ruco Site workers or the community. Over the long-term, however, Hooker/Ruco Site workers and the community would be at potential risk under Alternative 1 because of exposure to VCM at levels that are likely to exceed the air discharge limitations at the Northrop IRM. Although Alternative 2 would have potential short-term impacts to the Hooker/Ruco Site workers during the construction of the groundwater extraction and treatment system, these impacts would be minimized by following appropriate health and safety measures. Risks to operators of the treatment system would be minimized by following appropriate operation and maintenance procedures and adhering to personal safety measures. Under Alternative 2, catalytic oxidation would be used to treat the off-gas air stream from the treatment of the VCM in order to protect the on-Site workers and the community. Because there would be fewer construction activities, Alternative 3 would pose less short-term risk to Hooker/Ruco Site workers than Alternative 2. Risks during installation of the air/oxygen delivery systems would be minimized by following appropriate health and safety measures. Risks to operators of the system would be similarly be minimized.

A benefit of Alternative 3 when compared to Alternative 2 is that groundwater is not extracted or discharged from/to the aquifer. This will ensure less stress to the environment and less chance of exposure to contaminants. Additionally the construction of the treatment system, recharge basins and force mains will not be required. Alternative 3 will degrade a sufficient mass of the VCM so that supplemental treatment of VCM at the Northrop IRM

would not be required to ensure compliance with the air discharge limitations.

Implementability

Alternative 1 would be the easiest alternative to implement as it does not include any remedial measures. Alternative 2 would be readily implementable as it is a widely used and proven treatment technology. However, Alternative 2 would take longer to implement than Alternative 1 and 3, because it would require the construction of a groundwater extraction and treatment system. Alternative 3 would involve installation of a delivery system for providing air/oxygen (and also nutrients, if necessary) for the in-situ treatment of the VCM and would be easier to implement than Alternative 2 because it would have fewer construction activities.

Cost

The present-worth cost of the alternatives are calculated using a discount factor of seven percent and a 30-year time interval for Alternative 2 and 12-year interval for Alternative 3. The estimated capital, operation, maintenance and monitoring (O&M) and present-worth costs for each of the alternatives are presented below:

Alt.	Capital Cost	Annual O&M Cost*	Present-Worth Cost
Alt-1	\$0	\$6000	\$74,000
Alt-2	\$4,195,000	\$722,000	\$13,200,000
Alt-3	\$1,260,000	\$319,000	\$3,800,000

* Alternative 1 includes monitoring cost only.

As can be seen by the cost estimates, Alternative 1 would be the least costly alternative to implement. Alternative 2 would be the most costly alternative to implement. The high cost of implementing this alternative is due to the construction and long-term O&M and monitoring of a groundwater extraction and treatment system.

State Acceptance

NYSDEC concurs with the selected remedy. A letter of concurrence is attached (Appendix IV).

Community Acceptance

Community acceptance of the proposed remedy for groundwater was assessed during the public comment period. EPA believes that the community generally supports this approach. Specific responses to public comments are addressed in the Responsiveness Summary (Appendix V).

PRINCIPAL THREAT WASTES

Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. Contaminated groundwater generally is not considered to be source material; accordingly, there are no source materials defined as principal threat wastes at the Hooker/Ruco Site.

SELECTED REMEDY

Based upon the results of the RI/FS and other investigative reports and after careful evaluation of the various alternatives and considering community acceptance of the proposed remedy, EPA and NYSDEC have selected Alternative 3 - In-Situ Treatment of the VCM Subplume by Bioremediation using Biosparging (Plus Supplemental Nutrient Addition, if deemed necessary) as the selected remedy for the Hooker/Ruco Site groundwater remediation.

Summary of the Rationale for the Selected Remedy

The preferred alternative would provide the best balance of trade-offs among the alternatives with respect to the evaluating criteria as described below:

Alternative 3 is being selected because it is a cost-effective and reliable measure to significantly decrease the VCM concentrations within the center of the subplume in a relatively short time frame, compared to other treatment alternatives, such as pump and treat.

It will permanently mitigate the threat posed by VCM, and will result in less disruption of the Hooker/Ruco facility than Alternative 2. Alternative 3 will remove and reduce the

concentration of VCM to a level whereby supplemental treatment for VCM at the Northrop IRM will not be required.

A benefit of Alternative 3 when compared to Alternative 2 is that groundwater is not extracted from or discharged to the aquifer. Additionally, the construction of treatment system, recharge basins and force mains will not be required.

Alternative 3 relies on that much of the regional VOC plume is captured by the groundwater extraction and treatment at the Northrop facility. This system, which is expected to operate for the next thirty years, will also prevent the plume's further migration. Alternative 3 also relies on the ongoing treatment of the regional VOC plume at the Bethpage Water District municipal wells.

The goal of the remediation is to reduce the concentration of VCM in the aquifer to achieve the MCL of 2 ppb. However, because in-situ bioremediation is an innovative technology which may not be fully effective, the performance criteria, which will measure the effectiveness of the technology at the Hooker/Ruco facility, will need to be developed during the remedial design.

The Selected Remedy would be protective of human health and the environment, would comply with ARARs, would be cost effective, and would utilize permanent solutions and treatment technologies to the maximum extent practicable.

Description of Selected Remedy

The selected remedy is Alternative 3: In-Situ Treatment of VCM Subplume by Bioremediation Using Biosparging (Plus Supplemental Nutrient Addition, If Deemed Necessary). The components of Alternative 3 include the use of biosparging technology in an in situ application to enhance the VCM degradation. Biosparging is a form of bioremediation and involves the introduction of air/oxygen into the aquifer to increase the dissolved oxygen content in the aquifer, which would enhance aerobic degradation of VCM. This alternative is designed to remove and reduce the concentration of VCM to a level whereby supplemental treatment for VCM at the Northrop IRM is not required. Aerobic conditions in the aquifer would result in an increased microbial population which would also enhance the degradation of TICs. Aerobic conditions will not enhance the degradation of PCE, and will enhance the degradation of TCE only when sufficient quantities of a suitable carbon source such as methane is present; therefore, the effect of biosparging on TCE and PCE would be limited.

If deemed necessary, this selected remedy would also utilize a supplemental bioremediation technology following the biosparging treatment. Supplemental bioremediation would involve the injection of nutrients (potentially including nitrogen and phosphorus along with suitable carbon sources such as methane) to enhance the growth and metabolic activities of indigenous microbial populations to effect the degradation of VCM in the aquifer. The addition of nutrients to stimulate the microbial population would also enhance the degradation of TCE, PCE and TICs. It is estimated that the nutrient addition would occur over a two-year period to effectively enhance the degradation of the VOCs. The exact nutrient requirement is dependent on the presence of other constituents in groundwater, and would be determined through treatability studies.

Conceptually, twelve injection wells would be installed in the area of the VCM subplume to a depth of 200 to 400 feet below ground water using common drilling techniques. Additives (air/oxygen, nutrients) could be forced into the formation using either static head within the well or using pump-supplied pressure. Increasing or decreasing the number of air/oxygen and nutrient injection locations, and the rate of injection, would also affect the duration. Periodic injections (monthly, bimonthly, quarterly) are suitable for biosparging. The exact locations of the injection wells and the treatment scenario will be determined after conducting appropriate pilot studies during remedial design. Although in-situ biosparging has been used effectively at other sites, because it is considered an innovative technology, the performance criteria used to measure the effectiveness of this technology at the Hooker/Ruco Site will also need to be developed during the remedial design phase. A Vadose zone or unsaturated zone monitoring program will be implemented to ensure that air stripping of VOCs, particularly VCM, is not occurring as a result of biosparging.

As stated previously, OU-3 addresses the downgradient commingled contaminated groundwater plume beyond the Hooker/Ruco Facility and the contaminated groundwater beneath the Hooker/Ruco Facility which was previously included under OU-1. If the monitoring program identifies deficiencies in ensuring that the selected remedy adequately address the OU-3 groundwater contamination, the need for additional engineering controls will be evaluated and implemented, as necessary.

A long-term monitoring program will be developed to monitor groundwater quality in the area of the VCM subplume. New monitoring wells will be added to the existing network of

monitoring wells to increase the network's area of coverage. The objective of the long-term monitoring program will be to evaluate the effectiveness of the groundwater extraction and treatment remedy and to detect if VCM is migrating southward beyond the VCM source control wells at concentrations which may require supplemental VCM treatment at the Northrop IRM. Similarly, Alternative 3 acknowledges the possible need to expand the biosparging system to ensure that the Northrop IRM will meet its air discharge limitation for vinyl chloride.

In order to ensure that the regional groundwater plume is adequately addressed, the selected remedy also relies on the ongoing and anticipated long-term operation of the Northrop IRM and recognizes the VOC removal treatment at the Bethpage Water District wells. If the Northrop IRM and the treatment at the Bethpage Water District wells ceases operation before the aquifer is restored or if the IRM is not capturing the groundwater contamination emanating from the Hooker/Ruco Facility, EPA would re-evaluate the protectiveness of the proposed remedy.

Although the goal for the selected remedy is to reduce the concentration of the VCM subplume to 2 ppb, because the selected remedy is considered an innovative technology, the performance criteria which will measure the effectiveness of this technology at the Hooker/Ruco Site will be developed during the remedial design phase. If it is determined during the implementation and long-term monitoring of the selected remedy that the technology selected is not effective in reducing the VCM concentrations in a reasonable time frame, then VCM Subplume Extraction and Treatment, Alternative 2 would be implemented as a contingency remedy. Further, if the Northrop IRM ceases operation before the regional aquifer is restored, EPA would re-evaluate the protectiveness of the selected remedy.

The components of the contingency remedy include extraction and treatment of groundwater within the area of the VCM subplume with a goal of restoring the water quality of the aquifer to State drinking water standards or Federal MCLs. The State drinking water standard and EPA's MCL for VCM is 2 ppb. The treatment system would be built at the southwest corner of the Hooker/Ruco Site. Conceptually, one extraction well would be placed approximately 500 feet downgradient of the MW-52 area (where current VCM concentrations exceed 1000 ppb) with two additional wells located 1000 feet downgradient of the MW-52 area (where current VCM concentrations range between 10 and 100 ppb). The exact locations of the extraction wells will be determined during remedial design. The three extraction wells will pump at a

combined flow rate of 1000 gallons per minute. The effluent from the treatment system would be discharged to recharge basins on the Hooker/Ruco Site. Based on the hydrogeologic modelling presented in Appendix A of the FS, it is projected that the VCM concentrations in the VCM subplume would be reduced to levels below the MCL of 2 ppb in approximately 30 years. By containing and treating the VCM subplume, supplemental VCM treatment would not be required at the downgradient Northrop IRM.

Summary of the Estimated Remedy Costs

The estimated present worth cost to implement the selected remedy is \$ 3,800,000. The capital cost for the remedy is estimated to be \$1.2 million and the estimated average annual O&M costs are approximately \$319,000 (bioparging). The present worth costs are calculated using a discount factor of seven percent and a 12 year interval. The present worth cost includes the possible requirement of using enhanced aerobic bioremediation for 2 years during the 10-year of bioparging period.

The estimated present worth cost to implement the contingency remedy (pump and treat) is \$13,200,000. The capital cost for the remedy is estimated to be \$4,195,000 and the estimated average annual O&M cost are approximately \$722,000 (pump and treat). The present worth costs are calculated using a discount factor of seven percent and a 30-year operating period.

The information in this cost estimate summary is based on the best available information regarding the anticipated scope of the remedial alternatives. These are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent of the actual cost of the project. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the components of this remedial alternative. Major changes may be documented in the form of a memorandum in the administrative record file, an Explanation of Significant Differences (ESD), or a ROD amendment.

Expected Outcomes of Selected Remedy

The selected remedy will reduce the toxicity and mass of VCM, and other VOCs and TICs to a cleanup level that would not require supplemental treatment at the downgradient Northrop IRM in order to comply with air discharge limitations for VCM. Further, under the selected remedy, any residual contamination that would not be treated by bioparging or bioremediation would be captured and treated by the Northrop IRM. The selected remedy, together with

the Northrop IRM is expected to effectively capture and treat the groundwater contamination emanating from the Hooker/Ruco Facility and to restore the aquifer in the immediate vicinity of the Hooker/Ruco, Northrop and the US. Navy sites to its beneficial use._

The selected remedy poses very few short-term risks to site workers when compared to Alternative 2 (under which catalytic oxidation would be used to treat the off-gas air stream from the treatment of the VCM) because there will be very few construction activities under this remedy. Further, the selected remedy will be easier to implement than Alternative 2 because it will have fewer construction activities.

Design and construction of the selected remedy system is expected to take approximately six to eight months.

STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete, the selected remedial action for this Hooker/Ruco Site must comply with applicable, or relevant and appropriate environmental standards established under Federal and State environmental laws unless a waiver from such standards is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource-recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous substances, as available. The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy is protective of human health and the environment. The selected remedy is designed to reduce the concentration of VCM to a level whereby supplemental treatment for VCM at the Northrop IRM is not required. To ensure that the regional VOC groundwater plume is adequately addressed, the selected remedy recognizes and relies on the ongoing and anticipated long-term operation of the groundwater extraction and

treatment system at the Northrop facility and it recognizes the VOC removal treatment at the Bethpage Water District municipal wells. The selected remedy also recognizes that the Northrop system is expected to continue to prevent further migration of the plume it contains and that the system is expected to operate for the next thirty years. As the Northrop and NWIRP sites are NY State-lead sites, EPA and NYSDEC agreed to undertake a coordinated effort to address the commingled plume. This approach acknowledges that there are both jurisdictional and technical considerations behind the division of responsibility for components of the remedial work so as to avoid duplication of efforts and the resulting expense to all parties involved. As such, EPA's and the State's remedies will each target different facilities and different contaminants; when conducted together, these components will eventually result in the groundwater meeting the drinking water standards.

Available data indicate that several public supply wells from the Bethpage Water District have been affected by VOCs attributable to the commingled plume emanating from the three sites."

These supply wells, however, have been equipped with VOC treatment units provided by Northrop and the U.S. Navy. The water fed to these distribution systems continues to meet all New York State and Federal drinking water standards. Currently, there are no private drinking water supply wells in the residential areas surrounding the three sites. A Nassau County ordinance, Public Health Ordinance Article IV, prohibits the installation of new private drinking water wells in areas served by public water.

Compliance with ARARS

The NCP (§§300.430(f)(5)(ii)(B) and (C)) requires that the selected remedy attain Federal and State ARARs. The remedy will comply with the following action-, contaminant- and action-specific ARARs identified for the Hooker/Ruco Site and will be demonstrated through monitoring, as appropriate.

Action-Specific ARARs:

- 40 CFR Part 61 - National Emissions Standards for Hazardous Air Pollutants
- 42 U.S.C. §§ 7401 et. seq., Clean Air Act
- 40 CFR Part 254.25 - Excavation and Fugitive Dust Emissions
- 42 U.S.C. Section 6901 et seq., 40 CFR Parts 260-268 - Resource Conservation and Recovery Act (RCRA) Standards for Handling, Transportation and Disposal of Hazardous Waste, including Land Disposal Restrictions

- CERCLA off-Site policy (NCP §300.440)
- 6 NYCRR Part 200.6 - Ambient Air Quality Standards
- 6 NYCRR Parts 370-376 - New York State Standards for Handling, Transportation and Disposal of Hazardous Waste DOT transportation regulations
- Small System Compliance Technology List for the Surface Water Treatment Rule (EPA 815-R-97-002), Small System Compliance Technology List for the Surface Water Treatment Rule and Total Coliform Rule (EPA 815-R-98-001), Small System Compliance Technology List for the Non-Microbial Contaminants Regulated Before 1996 (EPA 815-R-98-002)
- Variance Technology Findings for Contaminants Regulated Before 1996 (EPA 815-R-98-003)

Chemical-Specific ARARs:

- 40 CFR Part 141 - Federal Safe Drinking Water Act Maximum Contaminant Levels (MCLs)
- 42 U.S.C. §§ 300F et. seq., Safe Drinking Water Act
- 6 NYCRR Part 703, Groundwater Standards for Class GA Groundwater
- 33 U.S.C. §§ 1251-1387, Clean Water Act
- 10 NYCRR Part 5 - New York State Sanitary Code for Drinking Water

To-Be-Considered:

- Air Guide I - NYSDEC Control of Toxic Ambient Air Contaminants
- NYC 1905 Water Supply Act
- Local Law Filing, New York State Department of State, re: flows in new water districts

Cost Effectiveness

A cost-effective remedy is one whose costs are proportional to its overall effectiveness (NCP §300.430(f)(1)(i)(B)). Overall effectiveness is based on the evaluations of: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Based on the comparison of overall effectiveness to cost, the selected remedy meets the statutory requirement that Superfund remedies be cost effective (NCP §§300.430(f)(1)(ii)(D)).

Each of the alternatives has undergone a detailed cost analysis. In that analysis, capital costs and O&M costs have been estimated and used to develop present-worth costs. In the present-worth

cost analysis, annual costs were calculated for 30 years (estimated life of an alternative) using a seven percent discount rate (consistent with the FS and Proposed Plan). For a detailed breakdown of costs associated with the selected remedy, please see TABLE B.3, Appendix B - Alternative Cost Summary from the Hooker/Ruco Site FS, dated July 2000.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

EPA has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at this Site. The selected remedy (biosparging and enhanced bioremediation) utilizes permanent solutions to address the groundwater contamination by reducing the toxicity and volume of the VCM subplume at the Hooker/Ruco Site. The selected remedy represents the most appropriate solution for the Hooker/Ruco Site because it provides the best balance of trade-offs among the alternatives with respect to the evaluation criteria. The contingency remedy also provides for the same level of permanence and treatment.

Preference for Treatment as a Principal Element

The statutory preference for remedies that employ treatment as a principal element is satisfied through the use of the innovative treatment measures (biosparging) to reduce the volume and mobility of contaminated groundwater in the aquifer.

Five-Year Review Requirements

Because this remedy will result in hazardous substances remaining at the Hooker/Ruco Site above levels that allow for unlimited use of and unrestricted exposure to the Hooker/Ruco Site, a review will be conducted no less often than once every five years after commencement of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes from the preferred remedy presented in the Proposed Plan.

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STATE LETTER OF CONCURRENCE

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RESPONSIVENESS SUMMARY

RECORD OF DECISION

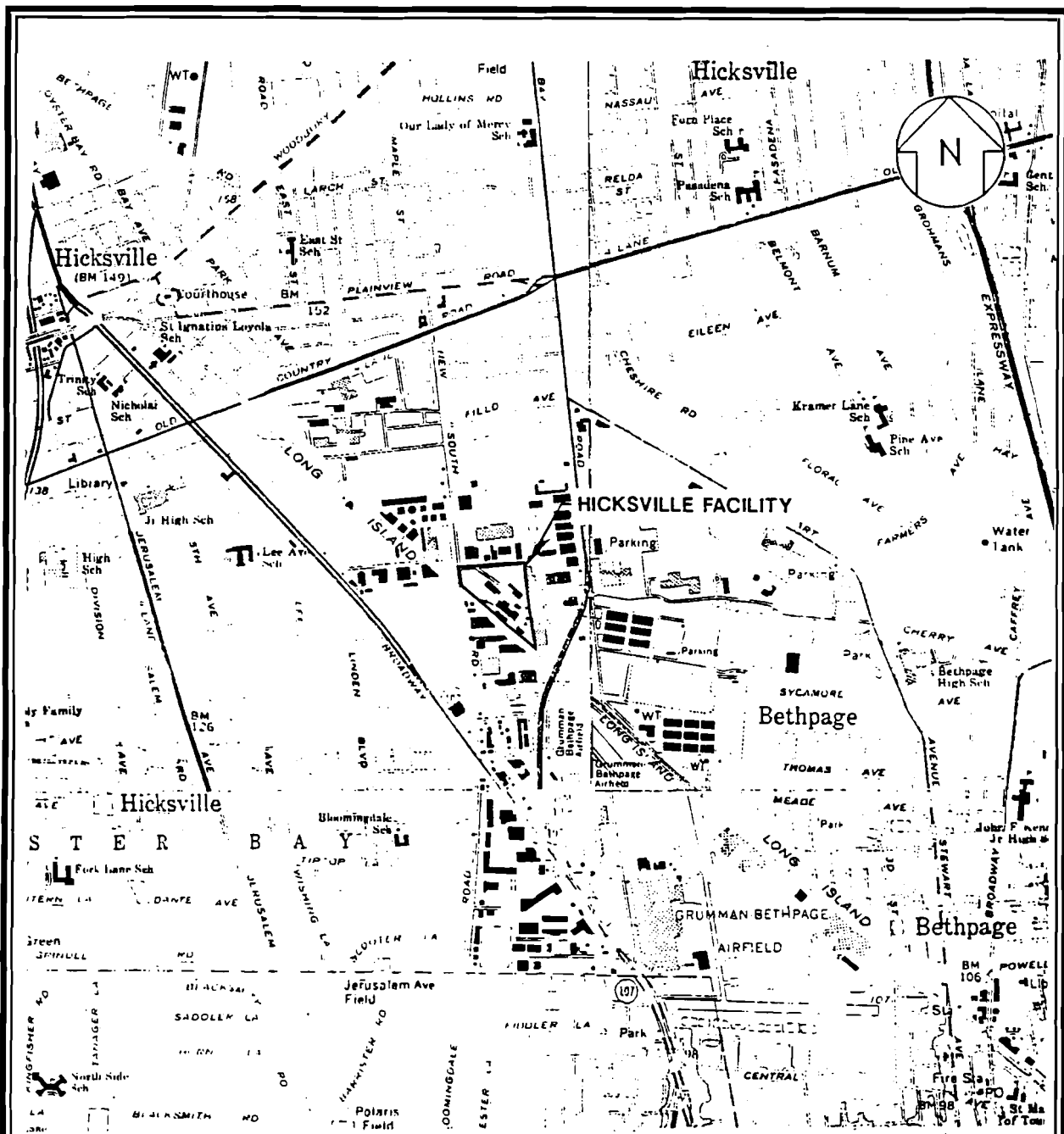
HOOKER CHEMICAL/RUCO POLYMER SUPERFUND SITE

APPENDICES

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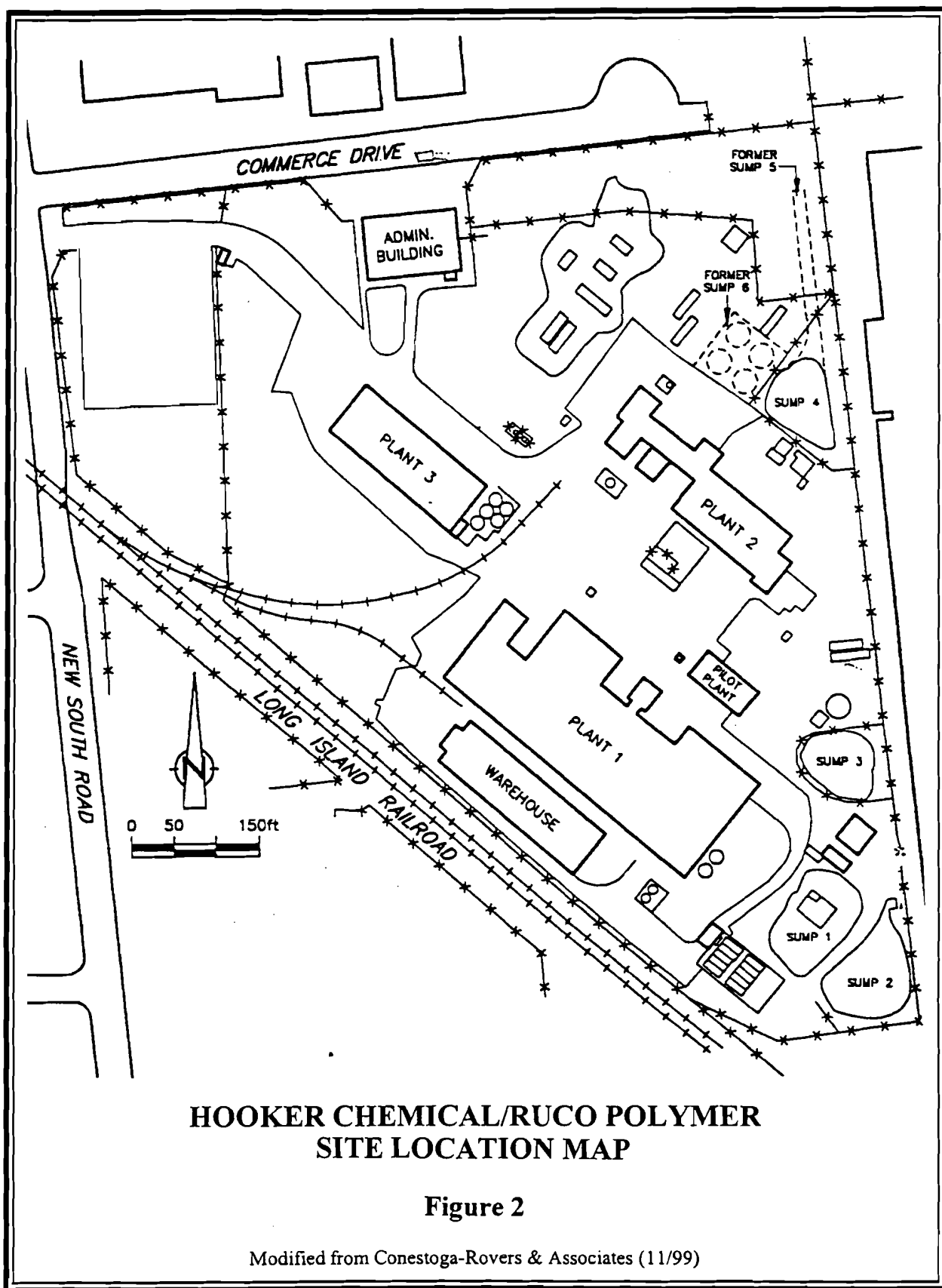


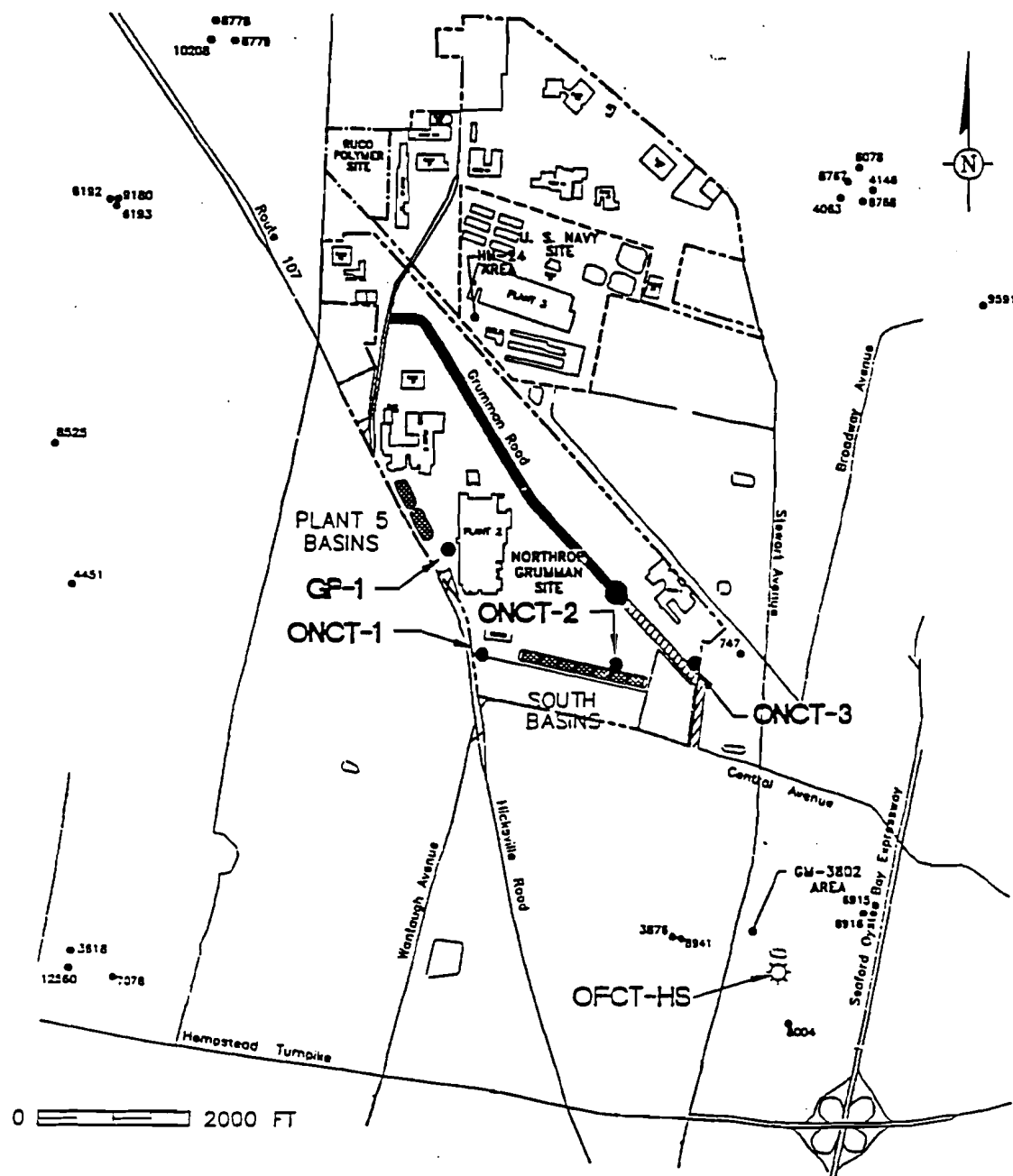
SOURCE: USGS TOPOGRAPHIC QUADRANGLES HICKSVILLE, N.Y., FREEPORT, N.Y.,
HUNTINGTON, N.Y. AND AMITYVILLE, N.Y.

HOOKER CHEMICAL/RUCO POLYMER SITE LOCATION MAP

Figure 1

Modified from LBG Engineering Services Inc. (2/93)

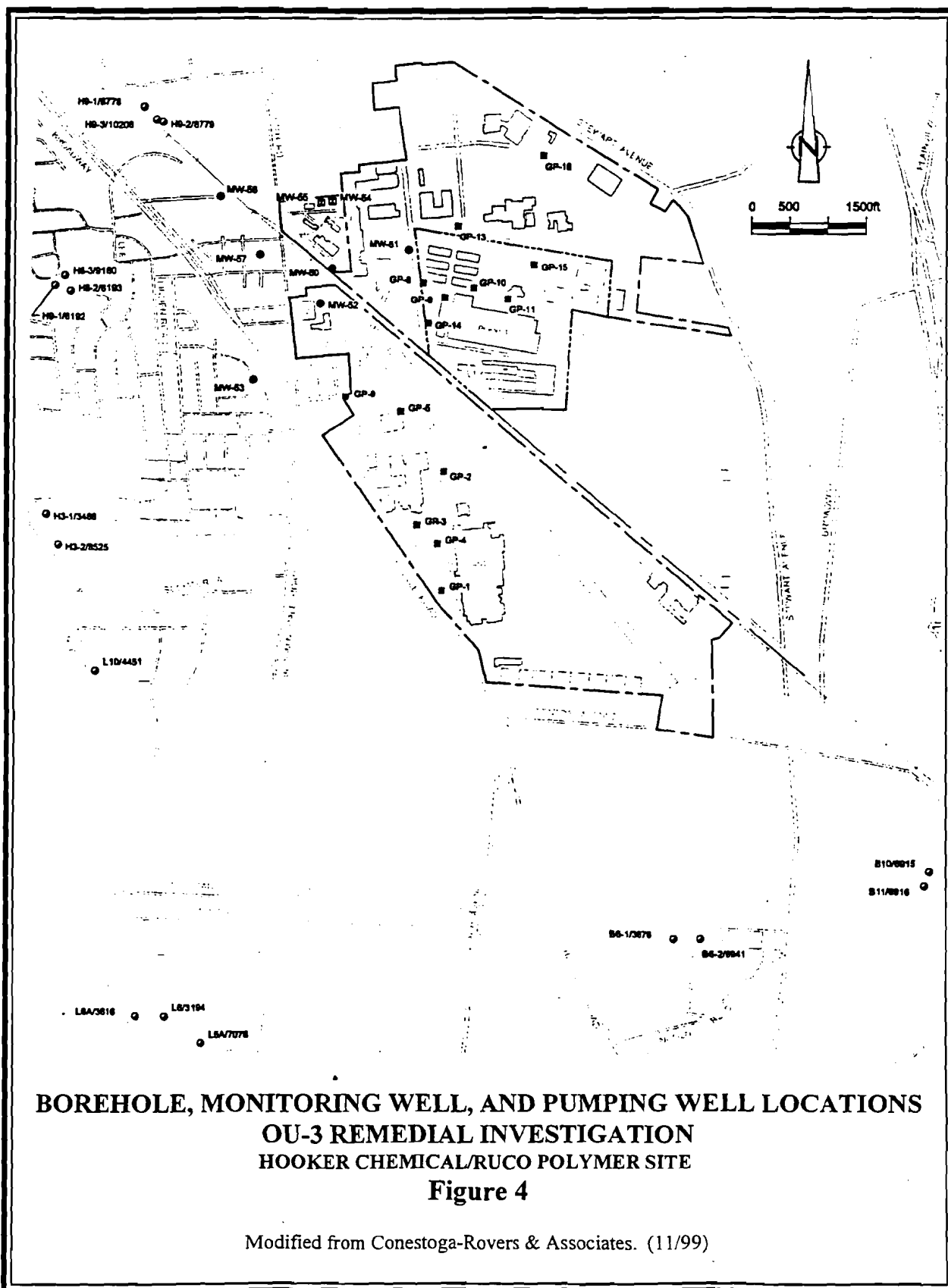




**NORTHROP/GRUMMAN AEROSPACE CORPORATION, HOOKER
CHEMICAL/RUCO POLYMER SITE AND AND NAVAL WEAPONS
INDUSTRIAL RESERVE PLANT SITES**

Figure 3

Modified from ARCADIS Geraghty & Miller



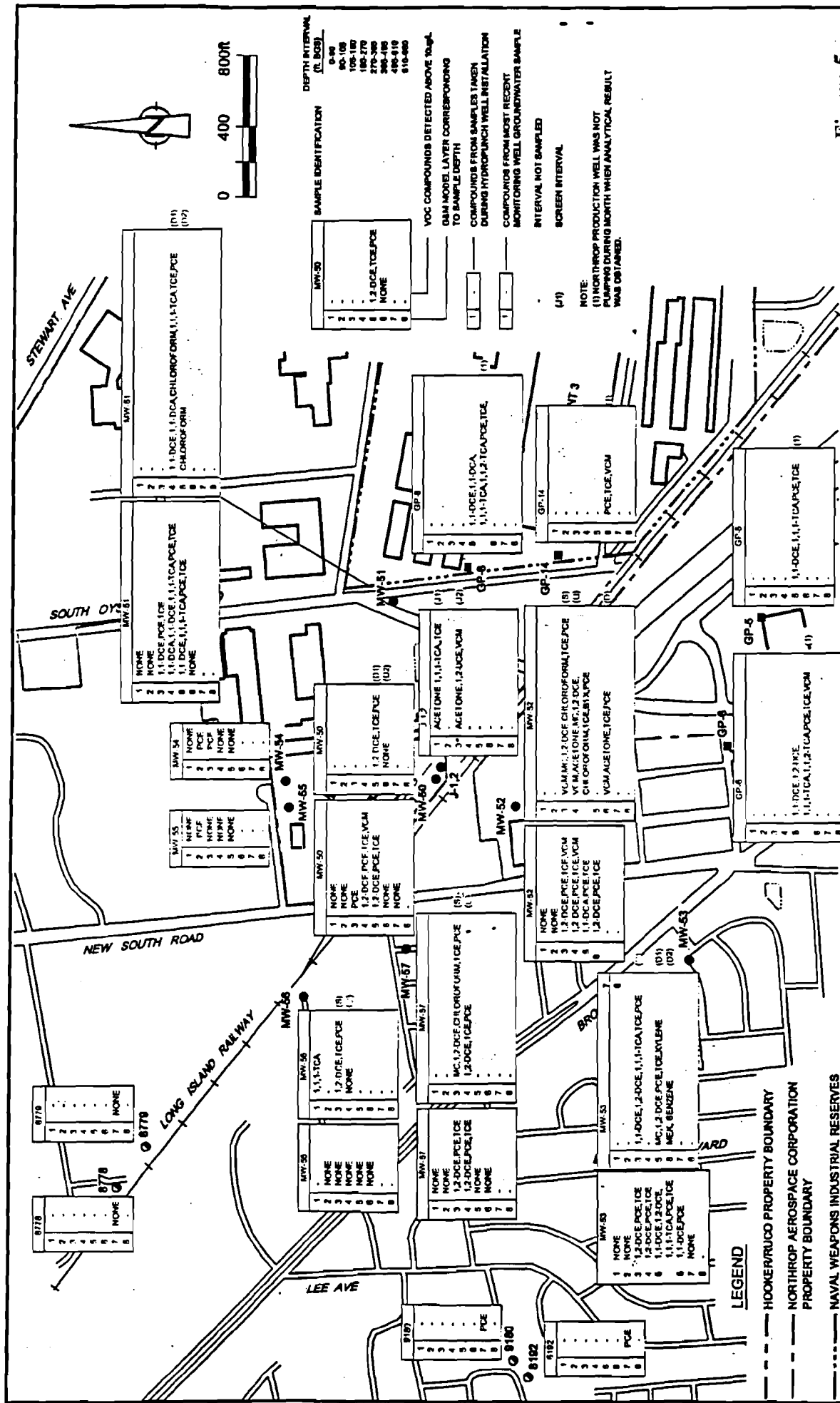


Figure 5.

VOC COMPOUNDS DETECTED IN GROUNDWATER ABOVE ARARS OU-3 REMEDIAL INVESTIGATION Hooker/Ruco Site, Hicksville, New York

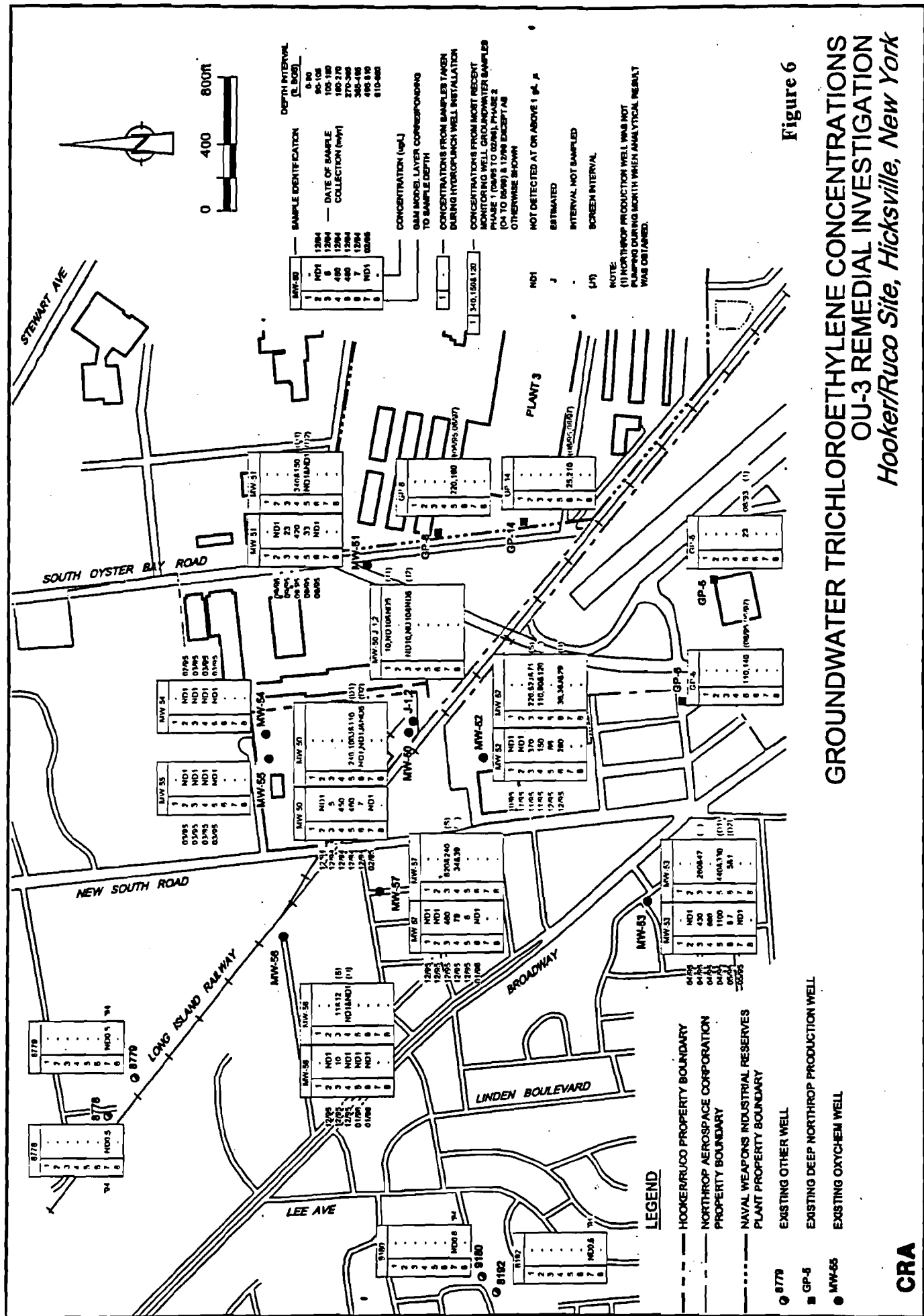
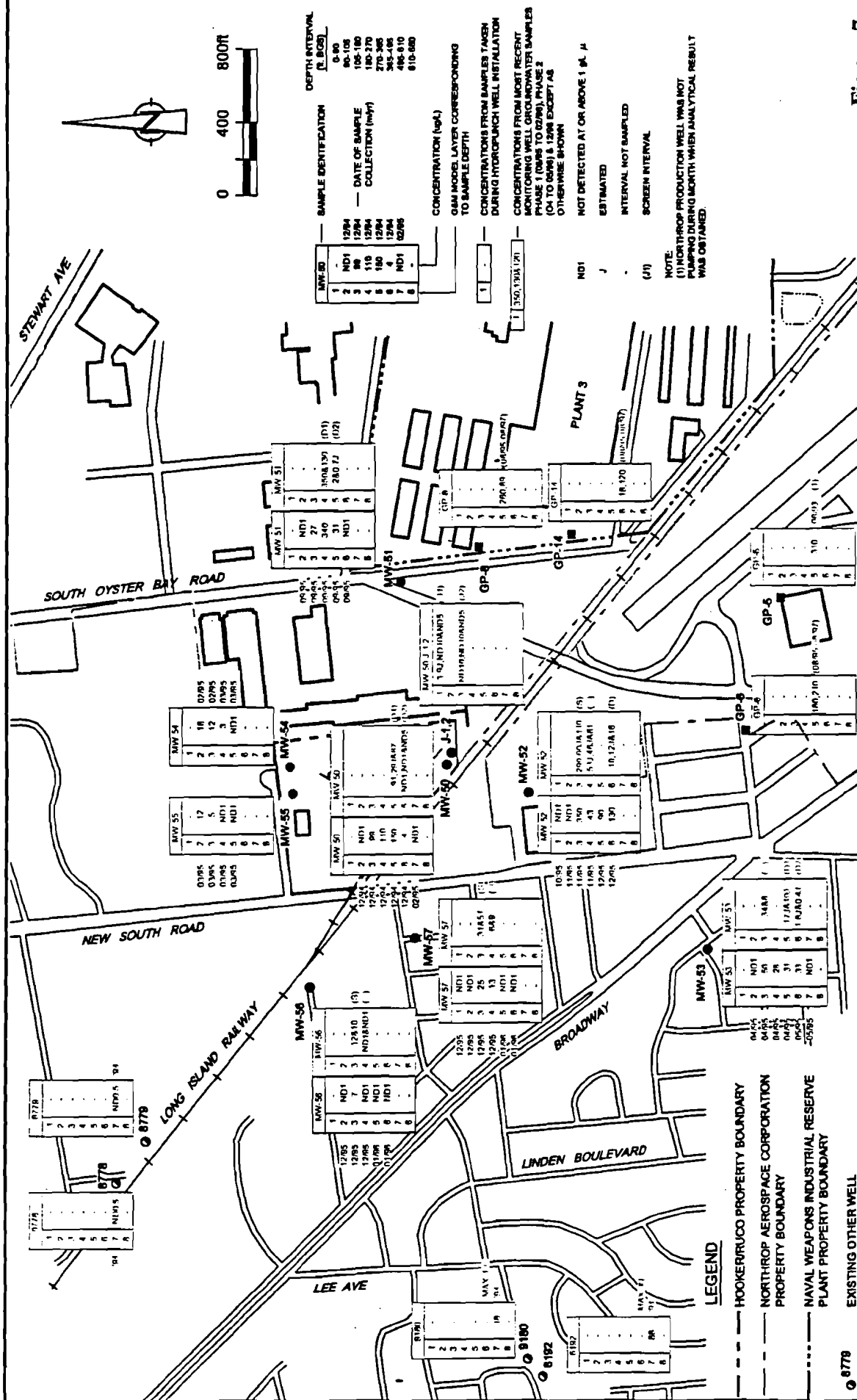
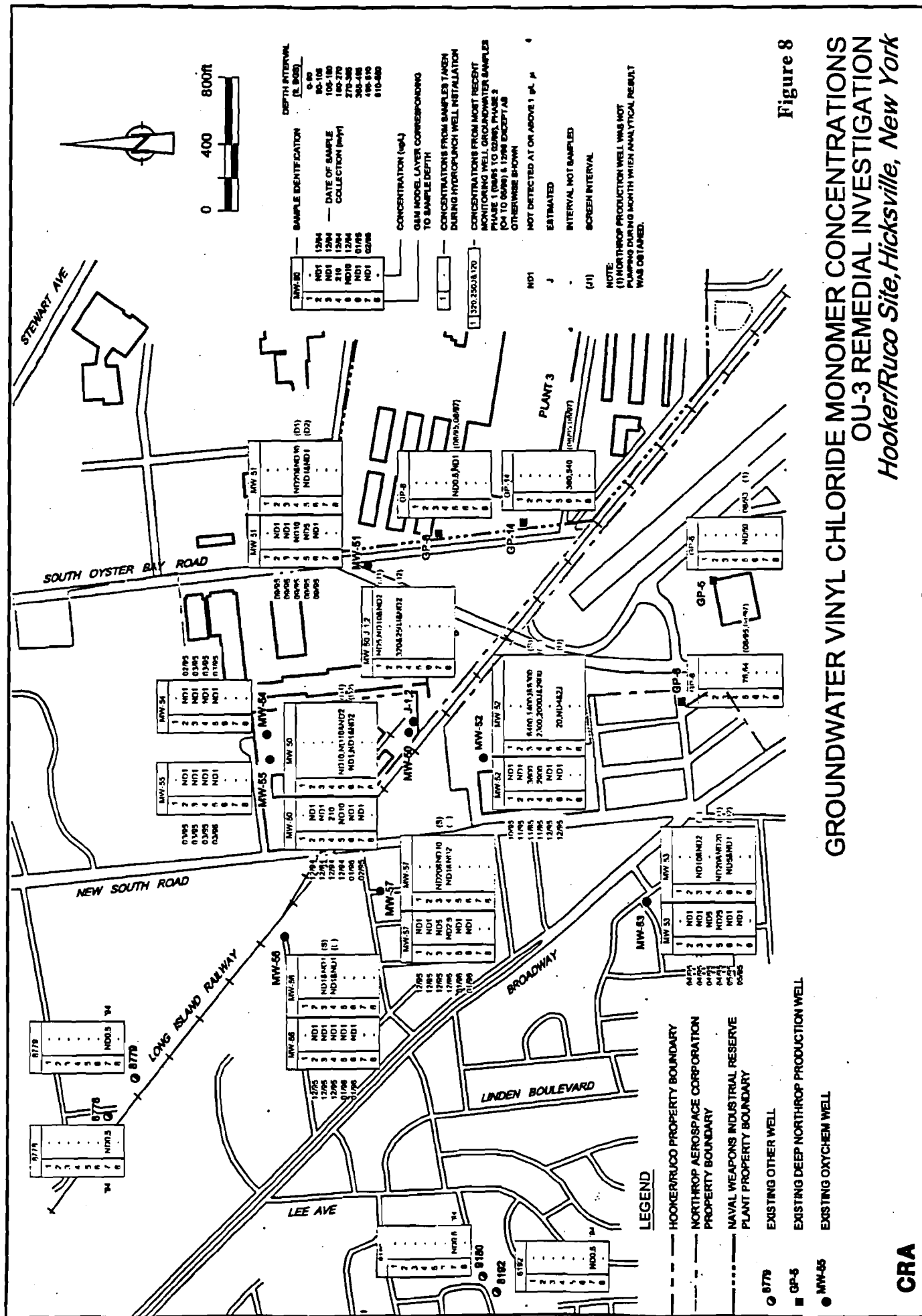


Figure 6

GROUNDWATER TRICHLOROETHYLENE CONCENTRATIONS OU-3 REMEDIAL INVESTIGATION Hooker/Ruco Site, Hicksville, New York





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TABLE 1

MID-1970s ANALYTICAL RESULTS FROM NORTHROP PRODUCTION WELL SAMPLING EVENTS (I)
 OU-3 REMEDIAL INVESTIGATION
 HOOKER/RUCO SITE, HICKSVILLE, NEW YORK

Northrop Well No.	Trichloroethylene Sample Date	Conc. (µg/l)	Tetrachloroethylene Sample Date	Conc. (µg/l)	Vinyl Chloride Sample Date	Conc. (µg/l)	1,1,1-Trichloroethane Sample Date	Conc. (µg/l)	1,1-Dichloroethane Sample Date	Conc. (µg/l)	1,1-Dichloroethylene Sample Date	Conc. (µg/l)	cis-1,2-Dichloroethylene Sample Date	Conc. (µg/l)
GP-1	—	—	11/17/75	ND	11/17/75	ND	11/17/75	ND			7/11/78	ND 5	11/17/75	ND
	7/12/76	350	7/12/76	490	9/10/76	6	7/2/76	14					7/12/76	220
	9/26/78	2000	9/26/78	10	7/11/78	0	10/22/78	5						
GP-2	9/10/76	240	10/27/76	19	9/10/76	60	10/27/76	25					10/27/76	ND 10
	1/17/77	120	1/17/77	16	1/17/77	90	1/17/77	37			7/25/78	15	1/17/77	28
	8/10/78	200	12/5/78	22	7/11/78	0	12/5/78	22					12/5/78	NA
GP-3	10/27/76	570	12/8/76	18	12/8/76	20	9/16/76	20			10/17/78	ND 5	12/8/76	ND 10
	1/17/77	860	1/17/77	11	1/17/77	270	1/17/77	10					1/17/77	8
	8/22/78	510	10/17/78	18	8/22/78	0	10/17/78	3					12/12/78	NA
GP-4	12/8/76	25000	12/8/76	40	9/16/76	72	12/2/76	30					10/27/76	ND 10
GP-5	—	—	11/17/75	ND	11/17/75	ND	11/17/75	ND					11/17/75	ND
	7/12/76	66	9/16/76	510	9/16/76	14	7/12/76	14					7/12/76	33
GP-6	4/1/74	ND	4/1/74	ND	4/1/74	ND	4/1/74	ND			7/11/78	ND 5	4/1/74	ND
	9/16/76	16	7/12/76	28	9/16/76	ND 5	7/12/76	10					7/12/76	23
	8/22/78	56	8/22/78	330	8/22/78	48	7/11/78	ND 5						
GP-8	4/1/74	ND	4/1/74	ND	4/1/74	ND	4/1/74	ND					4/1/74	ND
	8/4/75	16	8/4/75	88			11/17/75	ND						
	7/12/76	56	7/12/76	120	9/10/76	6	9/10/76	130					7/12/76	83
GP-9	9/10/76	12	7/1/76	16	9/10/76	ND 5	7/1/76	7.2			10/10/78	5	7/12/76	4
	12/5/78	57	12/5/78	120	10/17/78	16	10/17/78	14					12/5/78	NA
GP-10	12/2/76	190	12/8/76	24	12/8/76	ND 10	12/2/76	120			7/11/78	8	12/2/76	ND 10
	12/12/78	100	12/12/78	20	7/11/78	0	12/12/78	44					12/5/78	NA

TABLE 1

MID-1970s ANALYTICAL RESULTS FROM NORTHTROP PRODUCTION WELL SAMPLING EVENTS (1)
OU-3 REMEDIAL INVESTIGATION
HOOKER/RUCO SITE, HICKSVILLE, NEW YORK

Northrop Well No.	Trichloroethylene		Tetrachloroethylene		Vinyl Chloride		1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethylene		cis-1,2-Dichloroethylene	
	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)
GP-11	11/30/76	60	11/30/76	54	12/7/76	ND 5	12/7/76	11			9/26/78	ND 5	12/7/76	ND 10
	4/1/77	25	4/1/77	36	4/1/77	ND 5	4/1/77	8					4/1/77	ND 5
	9/26/78	26	9/26/78	15	9/26/78	0	9/26/78	5						
GP-13	11/30/76	39	12/7/76	ND 5	12/7/76	ND 5	11/30/76	1.4			7/11/78	ND 5	12/7/76	ND 10
	4/1/77	7	1/17/77	ND 50	4/1/77	ND 5	4/1/77	ND 5					4/1/77	ND 5
	8/10/78	8	7/25/78	ND 5	7/11/78	0	7/25/78	ND 5					12/12/78	NA
GP-14	4/1/74	ND	4/1/74	ND	4/1/74	ND	4/1/74	ND			7/11/78	ND 5	4/1/74	ND
	8/4/75	500	8/4/75	65	8/4/75	50	11/17/75	ND						
	7/12/76	30	7/12/76	79	12/8/76	17	7/12/76	5					7/12/76	1
	9/26/78	38	8/22/78	200	10/10/78	71	10/17/78	ND 5						
GP-15	11/30/76	59	11/30/76	19	12/7/76	ND 5	12/7/76	20			7/11/78	ND 5	12/7/76	ND 10
	1/14/77	35	4/1/77	10	4/1/77	ND 5	1/17/77	47					4/1/77	6
	8/22/78	7	7/11/78	ND 5	8/10/78	ND 5	8/22/78	9						
GP-16	11/30/76	50	12/7/76	ND 5	12/7/76	7	11/30/76	31			9/26/78	ND 5	12/7/76	ND 10
	1/17/77	17	1/17/77	ND 50	1/17/77	24	1/17/77	41					4/1/77	18
	9/26/78	42	12/5/78	ND 1	12/5/78	NA	12/5/78	15					12/5/78	NA

Notes:

(1) - Source - Nassau County Department of Health, Division of Environmental Services - chronological summary of Northrop well organics sampling.

NA - Not Analyzed.

ND - Not Detected.

NDx - Not Detected at or above x µg/L.

TABLE 2

MID-1970s ANALYTICAL RESULTS FROM MUNICIPAL WELL SAMPLING EVENTS (1)
OU-3 REMEDIAL INVESTIGATION
HOOKER/RUCO SITE, HICKSVILLE, NEW YORK

Municipal Well No.	Trichloroethylene		Tetrachloroethylene		Vinyl Chloride		1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethylene		cis-1,2-Dichloroethylene	
	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)
Hicksville														
H3-1/3488	12/6/76	ND 1	12/6/76	ND 5	11/29/76	68*	12/6/76	24					11/29/76	ND
	1/13/77	ND 10	1/13/77	ND 10	12/6/76	ND 10	5/24/77	32					1/13/77	ND 10
					1/13/77	ND 10								
H3-2/8525	1/19/77	ND 10	1/19/77	ND 10	1/19/77	ND 10	1/19/77	ND 10	3/28/78	ND 1			1/19/77	ND 10
	3/28/78	ND 1	3/28/78	ND 1	3/28/78	NA	3/28/78	ND 1					3/28/78	ND 1
H8-1/6192	12/20/76	4.3	12/20/76	9.3	12/20/76	ND 1	12/20/76	ND 1	1/25/78	ND 2	1/25/78	ND 6	12/20/76	14
	1/13/77	ND 10	1/13/77	ND 10	1/13/77	ND 10	1/13/77	ND 10					1/13/77	ND 10
	1/25/78	ND 4	1/25/78	ND 2	1/25/78	NA	1/25/78	52					1/25/78	ND 2
H8-2/6193	11/1/75	ND	11/1/75	ND	11/1/75	ND	11/1/75	ND	1/25/78	ND 1	1/25/78	ND 3	11/1/75	ND
	3/4/77	ND 10	3/4/77	ND 10	3/4/77	ND 10	3/4/77	ND 10					3/4/77	ND 10
	1/25/78	ND 4	7/7/78	1	1/25/78	NA	1/25/78	ND 2					1/25/78	ND 1
H8-3/9180	3/29/78	ND 2	3/29/78	ND 2	3/20/78	NA	3/29/78	ND 2	3/29/78	ND 2	3/29/78	ND 4	3/29/78	ND 2
H9-1/8778	12/20/76	ND 1	12/20/76	4	12/20/76	ND 1	12/20/76	ND 1	5/3/78	ND 1	5/3/78	ND 3	12/20/76	13
	1/13/77	ND 10	1/13/77	ND 10	1/13/77	ND 10	1/13/77	ND 10					1/13/77	ND 10
	5/3/78	ND 1	5/3/78	ND 1	5/3/78	NA	5/3/78	ND 1					5/3/78	ND 1
H9-2/8779	12/20/76	5.2	12/2/76	ND 2.5	12/2/76	ND 10	12/20/76	2.8	5/3/78	ND 1	5/3/78	ND 3	12/20/76	0.8
	1/13/77	ND 10	1/13/77	ND 10	1/13/77	ND 10	1/13/77	ND 10					1/13/77	ND 10
	5/3/78	ND 1	5/3/78	ND 1	5/3/78	NA	5/3/78	ND 1					5/3/78	ND 1
Levittown														
L6/3194	11/29/79	ND	11/29/76	ND	11/29/76	ND	11/29/76	ND	12/6/78	ND 1	12/6/78	ND 1	11/29/76	ND
	4/12/78	ND 1	4/12/78	ND 1	4/12/78	NA	4/12/78	ND 1					12/6/78	ND 1
L6A/3618	11/29/76	ND	11/29/76	ND	11/29/76	ND	11/29/76	ND					11/29/76	ND
	1/25/78	ND 4	1/25/78	ND 2	1/25/78	NA	1/25/78	ND 4					10/26/78	NA

TABLE 2

MID-1970s ANALYTICAL RESULTS FROM MUNICIPAL WELL SAMPLING EVENTS (1)
OU-3 REMEDIAL INVESTIGATION
HOOKER/RUCO SITE, HICKSVILLE, NEW YORK

Municipal Well No.	Trichloroethylene		Tetrachloroethylene		Vinyl Chloride		1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethylene		cis-1,2-Dichloroethylene	
	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)
Levittown														
L10/4451	7/1/76	ND	7/12/76	ND	7/12/76	ND	7/12/76	ND	1/26/78	ND 1	1/26/78	ND 1	7/12/76	ND
	3/15/78	ND 4	3/15/78	ND 2	3/15/78	NA	3/15/78	ND 2					1/26/78	ND 1
LSA/7076	1/3/77	5	1/18/77	ND 10	1/3/77	ND 10	1/18/77	ND 10	12/6/78	ND 1	12/6/78	ND 1	1/18/77	ND 10
	3/1/78	ND 1	3/1/78	ND 1	3/1/78	NA	3/1/78	ND 1					12/6/78	ND 1
Bethpage														
B6-1/3876	12/6/76	60	12/6/76	17	12/6/76	ND 10	12/6/76	15					12/20/76	ND 1
	1/21/77	340	5/24/77	2.5	1/21/77	ND 10	1/21/77	300					1/21/77	ND 10
	12/27/78	87	12/27/78	4	3/14/78	NA	12/27/78	5					3/14/78	NA
B6-2/8941	12/2/76	ND	12/2/76	ND	12/2/76	ND	12/2/76	ND 1						
	12/20/76	2.6	12/20/76	1.4	12/20/76	ND 1	12/20/76	1.6	9/27/78	ND 1	9/27/78	ND 2	12/20/76	ND 1
	10/20/77	ND 4	10/20/77	ND 2	10/20/77	NA	10/20/77	ND 2					10/20/77	NA
	9/27/78	ND 1	4/11/78	ND 1	4/11/78	NA	4/11/78	ND 1					9/27/78	ND 1
B10/6915	12/20/76	5.0	12/20/76	1.3	12/20/76	ND 1	12/20/76	ND 1	10/4/78	ND 1	10/4/78	ND 2	12/20/76	ND 1
	10/4/78	ND 1	4/11/78	ND 1	4/11/78	ND	4/11/78	ND 1					10/4/78	ND 1
B11/6916	11/1/75	ND	11/1/75	ND	11/1/75	ND	11/1/75	ND	9/27/78	ND 1	9/27/78	ND 2	11/1/75	ND
	12/20/76	7.0	12/20/76	1.3	12/20/76	ND 1	12/20/76	ND 1					12/20/76	ND 1
	4/11/78	ND 1	4/11/78	ND 1	4/11/78	ND	4/11/78	ND 1					9/27/78	ND 1

Notes:

(1) - Source - Nassau County Department of Health, Division of Environmental Services - chronological summary of municipal well organics sampling.

NA - Not Analyzed.

ND - Not Detected.

NDx - Not Detected at or above x µg/L.

* - This detection of Vinyl Chloride was reported to have resulted from a lab error. A resampling of this well in the following 2 months confirmed the lab error.

TABLE 3

**1980s ANALYTICAL RESULTS FROM NORTHROP PRODUCTION WELL SAMPLING EVENTS (1)
OU-3 REMEDIAL INVESTIGATION
HOOKER/RUCO SITE, HICKSVILLE, NEW YORK**

<i>Northrop Well No.</i>	<i>Trichloroethylene Sample Date</i>	<i>Conc. (µg/l)</i>	<i>Tetrachloroethylene Sample Date</i>	<i>Conc. (µg/l)</i>	<i>Vinyl Chloride Sample Date</i>	<i>Conc. (µg/l)</i>	<i>1,1,1-Trichloroethane Sample Date</i>	<i>Conc. (µg/l)</i>	<i>1,1-Dichloroethane Sample Date</i>	<i>Conc. (µg/l)</i>	<i>1,1-Dichloroethylene Sample Date</i>	<i>Conc. (µg/l)</i>	<i>cis-1,2-Dichloroethylene Sample Date</i>	<i>Conc. (µg/l)</i>
GP-2	11/10/87	770	11/10/87	37	11/10/87	39	11/10/87	11	11/10/87	ND 4				
GP-3	11/13/87	170	11/13/87	34			11/13/87	1	11/13/87	ND 4				
GP-5	11/10/87	1200	11/10/87	110	4/4/80 11/10/87	15 25	11/10/87	20	11/10/87	ND 4				
GP-6	3/22/89	ND 1	3/22/89	ND	4/4/80	2.6	3/22/89	ND			3/22/89	3	3/22/89	ND
GP-8	11/13/87	65	11/13/87	120	4/4/80 11/13/87	11 93	11/13/87	68	11/13/87	ND 4				
GP-9	11/13/87	79	11/13/87	5	11/13/87	3	11/13/87	52	11/13/87	ND 4				
GP-10	11/13/87	42	11/13/87	6	11/13/87	2	11/13/87	5	11/13/87	ND 4				
GP-11	11/10/87	17	11/10/87	7	11/10/87	1	11/10/87	2	11/13/87	ND 4				
GP-13	11/10/87	ND 1	11/10/87	ND 1	11/10/87	ND 1	11/10/87	ND 1	11/10/87	ND 4				
GP-14	11/10/87 3/20/89	43 42	11/10/87 3/20/89	130 130	11/10/87 3/21/88	27 250	11/10/87 3/21/88	1 3	11/10/87	ND 4	3/20/89	2	3/20/89	14
GP-15	11/13/87	12	11/13/87	3	11/13/87	1	11/13/87	4	11/13/87	ND 4				
GP-16	11/10/87	8	11/10/87	ND 1	11/10/87	6	11/10/87	7	11/13/87	ND 4				

Notes:

(1) - Sources - New York State Department of Health, Division of Laboratories and Research. April 15, 1980 Memorandum.
Northrop Aerospace Corporation Production Well Water Quality Reports. Feldman et al., 1992.

ND - Not Detected.

NDx - Not Detected at or above x µg/L.

TABLE 4

1980s ANALYTICAL RESULTS FROM MUNICIPAL WELL SAMPLING EVENTS (1)
OU-3 REMEDIAL INVESTIGATION
HOOKER/RUCO SITE, HICKSVILLE, NEW YORK

Municipal Well No.	Trichloroethylene		Tetrachloroethylene		Vinyl Chloride		1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethylene		cis-1,2-Dichloroethylene	
	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)
<u>Hicksville</u>														
H3-2/8525	3/11/81	ND 1	3/20/80	ND 2	3/11/81	ND 1	3/11/81	ND 2	3/11/81	ND 1	3/11/81	ND 1	3/11/81	ND 1
H8-1/6192	10/20/80	ND 4	1/2/81	ND 2	3/10/81	ND 1	10/20/80	ND 2	10/20/80	ND 1	10/20/80	ND 1	3/10/81	ND 1
H8-2/6193	10/20/80	ND 4	10/20/80	ND 2	3/25/81	ND 1	10/20/80	ND 2	10/20/80	ND 1	10/20/80	ND 1	3/25/81	ND 1
H8-3/9180	1/21/81	ND 4	1/29/81	1	6/12/80	ND 0.5	1/2/81	ND 2	3/13/80	ND 1	3/13/80	ND 1	3/13/80	ND 1
H9-1/8778	6/6/80	ND 4	6/6/80	ND 2	1/29/81	ND 1	3/4/80	ND 3	1/29/81	ND 1	3/4/80	ND 2	1/29/81	ND 1
H9-2/8779	6/6/80	ND 4	6/6/80	ND 2	3/10/81	ND 1	6/6/80	ND 2	3/10/81	ND 1	3/10/81	ND 1	3/10/81	ND 1
<u>Levittown</u>														
L5A/7076	4/23/80	ND 4	7/30/80	ND 3	6/26/80	ND 0.5	7/30/80	ND 3	--	--	--	--	4/23/80	NA
LH6A/3618	7/30/80	ND 3	7/30/80	ND 3	6/26/80	ND 0.5	2/6/81	2	--	--	--	--	6/26/80	NA
L10/4451	5/8/80	ND 4	2/24/81	3	6/26/80	ND 0.5	3/18/80	ND 3	--	--	--	--	6/26/80	NA
<u>Bethpage</u>														
B6-2/8941	5/20/80	ND 4	5/20/80	ND 2	3/11/81	ND 1	5/20/80	ND 2	8/21/80	ND 1	8/21/80	ND 1	8/21/80	ND 1
B10/6915	5/5/81	ND 4	5/5/81	ND 2	6/11/80	ND 0.5	5/5/81	ND 2	8/21/80	ND 1	7/19/81	ND 1	8/21/80	ND 1
B11/6916	11/5/80	ND 4	11/5/80	ND 2	2/19/81	ND 1	11/5/80	ND 2	2/19/81	ND 1	2/19/81	ND 1	2/19/81	ND 1

Notes:

(1) - Source = Nassau County Department of Health, Division of Environmental Services - chronological summary of municipal well organics sampling.

NA - Not Analyzed.

ND - Not Detected.

NDx - Not Detected at or above x µg/L.

TABLE 5

EARLY 1990s ANALYTICAL RESULTS FROM NORTHROP PRODUCTION WELL SAMPLING EVENTS (1)
OU-3 REMEDIAL INVESTIGATION
HOOKER/RUCO SITE, HICKSVILLE, NEW YORK

Northrop Well No.	Trichloroethylene		Tetrachloroethylene		Vinyl Chloride		1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethylene		cis-1,2-Dichloroethylene	
	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)
GP-1	8/24/93	2800	8/24/93	ND 200	8/24/93	ND 200	8/24/93	ND 200	8/24/93	ND 200	8/24/93	ND 200	8/24/93	ND 200
GP-2	8/30/93	3000	8/30/93	52J	8/30/93	ND 200	8/30/93	24J	8/30/93	ND 200	8/30/93	30J	8/30/93	ND 200
GP-5	8/30/93	23	8/30/93	11	8/30/93	ND 200	8/30/93	ND 200	8/30/93	ND 200	8/30/93	ND 200	8/30/93	ND 200
GP-6	9/18/92	160	9/23/93	67	9/18/92	550	9/23/93	28	9/18/92	3	9/23/93	17	9/23/93	43
GP-8	8/30/93	240	8/30/93	310	8/30/93	ND 50	8/30/93	550	8/30/93	11J	8/30/93	420	8/30/93	ND 50
GP-10	12/6/91	110	12/6/91	9	12/6/91	ND 10	12/6/91	20J	12/6/91	ND 5	12/6/91	7	12/6/91	ND 5
GP-11	12/6/91	100	12/6/91	10	12/6/91	ND 10	12/6/91	17J	12/6/91	ND 5	12/6/91	7	12/6/91	ND 5
GP-13	12/6/91	26	12/6/91	2J	12/6/91	ND 10	12/6/91	6J	12/6/91	ND 5	12/6/91	2J	12/6/91	ND 5
GP-14	9/23/93	120	6/5/90	88	8/30/93	370	6/22/92	12	8/30/93	ND 20	6/22/92	4	9/23/93	14
GP-15	12/6/91	6	12/6/91	2J	12/6/91	ND 10	12/6/91	ND 5	12/6/91	ND 5	12/6/91	ND 5	12/6/91	ND 5

Notes:

(1) - Source - RI Report, Northrop/Grumman Aerospace Corporation, Bethpage, New York, Geraghty and Miller, Inc., September 1994.

NDx - Not Detected at or above x µg/L.

J - Estimated value.

TABLE 6

EARLY 1990s ANALYTICAL RESULTS FROM MUNICIPAL WELL SAMPLING EVENTS (1)
OU-3 REMEDIAL INVESTIGATION
HOOKER/RUCO SITE, HICKSVILLE, NEW YORK

Municipal Well No.	Trichloroethylene		Tetrachloroethylene		Vinyl Chloride		1,1,1-Trichloroethane		1,1-Dichloroethane		1,1-Dichloroethylene		cis-1,2-Dichloroethylene	
	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)	Sample Date	Conc. (µg/l)
Hicksville														
H3-2/8525	12/12/94	ND 0.5	12/12/94	1	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5
H8-1/6192	12/12/94	2.7	12/12/94	88	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5
H8-3/9180	12/12/94	ND 0.5	12/12/94	18	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5
H9-1/8778	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5
H9-2/8779	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	0.7	12/12/94	1.1	12/12/94	ND 0.5	12/12/94	ND 0.5
H9-3/10208	12/12/94	0.7	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5	12/12/94	ND 0.5
Bethpage														
B6-1/3876	9/2/93	200	9/2/93	6.5	9/2/93	ND 0.5	9/2/93	2.4	9/2/93	ND 0.5	9/2/93	4.2	9/2/93	1.7
B6-2/8941	9/2/93	0.5	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 1
B10/6915	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 1
B11/6916	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 0.5	9/2/93	ND 1

Notes:

(1) - Sources: Hicksville municipal well water quality data for 1994, H2M group. RI Report, Northrop Aerospace Corporation, Bethpage, New York, Geraghty and Miller, Inc., September 1994.

NDx - Not Detected at or above x µg/L.

TABLE 7

SUMMARY OF ORGANIC COMPOUNDS
MONITORING WELL RESULTS
OU-3 REMEDIAL INVESTIGATION
HOOKER/UCO SITE, HICKSVILLE, NEW YORK

	Location:		GF-6	MW-50 D1		MW-50 D2		MW-50 J2		MW-50 J1		Groundwater Discharge ARAR
	Sample Date:	GF-8		GF-6	GF-8	GF-6	GF-8	GF-6	GF-8	GF-6		
	Units:	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)	
ICL Volatiles												
Chloroethane	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10	ND 5	ND 10	5
Vinyl chloride	1.1	ND 0.5	76	ND 10	ND 10	ND 1	ND 1	1320	2501/2501	ND 5	ND 10	2
Acetone	ND 2	ND 2	ND 2	R	R	R	R	ND 10	ND 10	ND 5	ND 10	50
Methylene Chloride	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10	ND 5	ND 10	50
Carbon Disulfide	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10	ND 5	ND 10	50
1,1-Dichloroethylene	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10	ND 5	ND 10	5
1,2-Dichloroethane	1	12	3	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10	ND 5	ND 10	5
1,2-Dichloroethylene (total)	1.6	4.1	94	ND 10	ND 10	ND 1	ND 1	1717	3471/3471	1.61	ND 10	5
Chloroform	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10	ND 5	ND 10	7
1,2-Dichloroethane	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10	ND 5	ND 10	0.6
2-Butanone (MEK)	R	R	10	R	R	R	R	R/R	R/R	R	R	50
1,1,1-Trichloroethane	1.1	390	151	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10	ND 5	ND 10	5
Carbon tetrachloride	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10	ND 5	ND 10	5
Bromodichloromethane	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10	ND 5	ND 10	50
Trichloroethylene	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10	ND 5	ND 10	5
1,1,2-Trichloroethane	ND 0.5	1.4	110	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10	ND 5	ND 10	1
Benzene	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10	ND 5	ND 10	0.7
Tetrachloroethylene	18	260	180	91	291	ND 1	ND 1	ND 10	ND 10	3.91	ND 10	5
Toluene	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10	ND 5	ND 10	5
Chlorobenzene	ND 0.5	ND 0.5	0.221	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10	ND 5	ND 10	5
Ethylbenzene	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10	0.941	ND 10	5
Xylene (total)	ND 0.5	ND 0.5	ND 1	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10	ND 10	ND 10	5
ICL Semivolatiles												
Phenol	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	1*
1,2-Dichlorobenzene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	3
4-Methylphenol	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	1*
Naphthalene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	50
2-Methylnaphthalene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	NL
Dimethylphthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	50
Diethylphthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	50
Di-n-butylphthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	50
Butylbenzylphthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	50
Butylbenzylphthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	50
Di(2-Ethylhexyl)phthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	50
Total TCA	21	41	ND	6501	261	2401	411	1801	3301/74501	34001	13001	50 (1)
Pesticides/PCBs												
Pesticides/PCBs	NA	NA	NA	NA	NA	ND	NA	ND	NA/NA	ND	NA	
Notes:												
TCL - Target Compound List												
ND - Not detected at or above 1 ug/L												
I - Associated value is estimated.												
R - Data were rejected.												
TCA - Tentative Identified Compounds												
ND - Not Detected												

TABLE 7

SUMMARY OF ORGANIC COMPOUNDS
MONITORING WELL RESULTS
OU-3 REMEDIAL INVESTIGATION
AUGUST 1995 - MAY 1996

Location:	MW-53 D2		MW-53 Shallow		MW-53 D1		MW-51D1		MW-51D2		MW-52S		Groundwater Discharge ARAR
Sample Date:	8/8/95	4/29/96	8/8/95	4/29/96	8/8/95	4/29/96	2/22/96	4/29/96	2/23/96	4/29/96	2/21/96	5/01/96	
Units:	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	
TCL Volatiles													
Chloromethane	ND 5	0.9]	ND 10	ND 2	ND 20	ND 20	ND 20	ND 10	ND 1	ND 1	ND 200	ND50 / ND50	5
Vinyl chloride	ND 5	ND 1	ND 10	ND 2	ND 20	ND 20	ND 20	ND 10	ND 1	ND 1	6400]	1400] / 1400]	2
Acetone	R	R	R	R	R	R	R	R	R	R	R	R / 300]	50
Methylene Chloride	ND 5	ND 1	ND 10	ND 2	ND 20	9]	ND 20	4]	ND 1	ND 1	ND 200	22] / ND50	5
Carbon Disulfide	ND 5	0.9]	ND 10	ND 2	ND 20	ND 20	ND 20	ND 10	ND 1	11]	ND 200	ND50 / ND50	50
1,1-Dichloroethylene	2.6]	ND 1	ND 10	1]	1.3]	ND 20	390]	100]	ND 1	0.2]	ND 200	ND50 / ND50	5
1,1-Dichloroethane	3.3]	1	ND 10	ND 2	ND 20	ND 20	20]	8]	0.43]	0.6]	ND 200	ND50 / ND50	5
1,2-Dichloroethylene (total)	0.65]	0.3]	10]	2	88]	49]	ND 20	2]	ND 1	ND 1	ND 200	23] / 36]	5
Chloroform	ND 5	ND 1	ND 10	ND 2	ND 21	ND 20	98]	22]	28]	3	520]	ND50 / 19]	7
1,2-Dichloroethane	ND 5	0.4]	ND 10	ND 2	ND 20	ND 20	ND 20	ND 10	ND 1	ND 1	ND 200	ND50 / ND50	0.6
2-Butanone (MEK)	76]	R	R	R	R	R	R	R	R	R	R	R / R	50
1,1,1-Trichloroethane	2.9]	1	1.8]	20]	2.1]	2]	520]	160]	0.67]	ND 1	ND 200	ND50 / ND50	5
Carbon tetrachloride	ND 5	ND 1	ND 10	ND 2	ND 20	ND 20	ND 20	ND 10	ND 1	ND 1	ND 200	ND50 / ND50	5
Bromodichloromethane	ND 5	ND 1	ND 10	ND 2	ND 20	ND 20	7.2]	ND 10	2.4	ND 1	ND 200	ND50 / ND50	50
Trichloroethylene	5	1	260]	47]	440]	330]	340]	150]	ND 1	ND 1	220]	44] / 53]	5
1,1,2-Trichloroethane	ND 5	ND 1	ND 10	ND 2	ND 20	ND 20	ND 20	ND 10	ND 1	ND 1	ND 200	ND50 / ND50	1
Benzene	2.4]	1]	ND 10	ND 2	ND 20	ND 20	ND 20	ND 10	ND 1	ND 1	ND 200	ND50 / ND50	0.7
Tetrachloroethylene	1.8]	0.4]	34]	8]	17]	10]	350]	130]	2.3	0.7]	290]	51] / 60]	5
Toluene	ND 5	0.4]	ND 10	ND 2	ND 20	5]	ND 20	ND 10	ND 1	0.2]	ND 200	ND50 / ND50	5
Chlorobenzene	ND 5	ND 1	ND 10	ND 2	ND 20	ND 20	ND 20	ND 10	ND 1	ND 1	ND 200	ND50 / ND50	5
Ethylbenzene	0.39]	ND 1	ND 10	ND 2	ND 20	2]	ND 20	ND 10	ND 1	ND 1	ND 200	ND50 / ND50	5
Xylene (total)	2]	ND 1	ND 10	0.4]	ND 20	13]	ND 20	ND 10	ND 1	ND 1	ND 200	ND50 / ND50	5
TCL Semivolatiles													
Phenol	ND 10	3]	ND 10	1]	ND 10	4]	ND 10	ND 10	ND 10	ND 10	ND 10	ND10 / ND10	1*
1,2-Dichlorobenzene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	9]	4]	ND 10	ND 10	ND 10	ND10 / ND10	3
4-Methylphenol	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND10 / ND10	1*
Naphthalene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND10 / ND10	50
2-Methylnaphthalene	0.3]	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND10 / ND10	NL
Dimethylphthalate	ND 10	ND 10	ND 10	ND 10	0.7]	0.9]	8]	2]	ND 10	ND 10	ND 10	ND10 / ND10	50
Diethylphthalate	ND 10	ND 10	ND 10	0.6]	ND 10	2]	ND 10	ND 10	0.2]	ND 10	ND 10	ND10 / ND10	50
Di-n-butylphthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND10 / ND10	50
Butylbenzylphthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND10 / ND10	50
bis(2-Ethylhexyl)phthalate	38	30	ND 10	20	19	67]	ND 10	ND 10	ND 10	ND 10	ND 10	ND10 / ND10	50
Total TCs	190]	28]	270]	38]	240]	140]	29]	10]	47]	130]	65]	31]	50 ⁽¹⁾
Pesticides/PCBs	ND	NA	ND	NA	ND	NA	NA	NA	NA	NA	NA	NA / NA	

Notes:

TCL	- Target Compound List	N	- Not Analyzed
ND x	- Not detected at or above x µg/L	(1	- Each Individual Compound
]	- Associated value is estimated.	*	- Sum of compounds
R	- Data were rejected.	Ex]	- Exceeded ARAR
TCs	- Tentative Identified Compounds	NL	- Not Listed
ND	- Not Detected		

TABLE 7

SUMMARY OF ORGANIC COMPOUNDS
MONITORING WELL RESULTS
OU-3 REMEDIAL INVESTIGATION
AUGUST 1995 - MAY 1996

Location: Sample Date: Unit:	MW-521		MW-52D		MW-565		MW-561		MW-575		MW-571		Groundwater Ditchwater ABAR
	2/2/96 (ug/L)	5/01/96 (ug/L)	2/2/96 (ug/L)	5/01/96 (ug/L)	2/19/96 (ug/L)	4/29/96 (ug/L)	2/19/96 (ug/L)	4/29/96 (ug/L)	2/20/96 (ug/L)	4/30/96 (ug/L)	2/20/96 (ug/L)	4/30/96 (ug/L)	
ICL Volatiles													
Chloromethane	ND 100	ND 100	ND 10	ND 4	ND 1	ND 1	ND 1	ND 1	ND 20	ND 10	ND 1	ND 2	5
Vinyl chloride	F ²⁰⁰ 1	F ²⁰⁰ 1	F ²⁰ 1	ND 4	ND 1	ND 1	ND 1	ND 1	ND 20	ND 10	ND 1	ND 2	2
Acetone	R	F ⁴⁰⁰ 1	F ³⁰ 1	R	R	R	R	R	R	F ⁸ 1	18	ND 2	5
Methylene Chloride	ND 100	ND 100	ND 12	ND 4	ND 1	ND 2	ND 1	ND 1	ND 20	ND 10	ND 1	ND 2	5
Carbon Disulfide	ND 100	ND 100	ND 10	ND 4	0.38	ND 1	ND 1	ND 1	ND 20	ND 10	ND 1	ND 2	50
1,1-Dichloroethane	ND 100	ND 100	ND 10	ND 4	0.46	0.51	ND 1	0.51	ND 20	ND 10	ND 1	0.71	5
1,1-Dichloroethane	ND 100	ND 100	ND 10	4	F ¹³ 1	F ¹⁴ 1	ND 1	ND 1	F ¹⁰ 1	F ¹⁰ 1	1.5	2	5
1,2-Dichloroethane (total)	F ¹⁶ 1	F ⁴⁰ 1	ND 10	ND 4	ND 1	ND 1	ND 1	ND 1	F ¹⁰ 1	F ¹⁰ 1	F ¹⁴ 1	F ¹⁰ 1	5
Chloroform	ND 100	ND 100	ND 10	ND 4	ND 1	ND 1	ND 1	ND 1	ND 20	ND 10	ND 1	ND 2	7
1,2-Dichloroethane	ND 100	ND 100	ND 10	ND 4	ND 1	ND 1	ND 1	ND 1	ND 20	ND 10	ND 1	ND 2	0.6
2-Butanone (MEK)	R	R	R	R	R	4	R	R	R	R	R	R	50
1,1,1-Trichloroethane	ND 100	ND 100	ND 10	ND 4	ND 1	ND 1	ND 1	ND 1	ND 20	ND 10	3.5	4	5
Carbon tetrachloride	ND 100	ND 100	ND 10	ND 4	ND 1	ND 1	ND 1	ND 1	ND 20	ND 10	ND 1	ND 2	5
Bromodichloromethane	22	ND 100	ND 10	ND 4	ND 1	ND 1	ND 1	ND 1	6.8	ND 10	ND 1	ND 2	50
Trichloroethylene	F ¹¹⁰ 1	F ¹⁰⁰ 1	F ³⁶ 1	F ³⁸ 1	F ¹¹ 1	F ¹² 1	ND 1	ND 1	F ²⁰ 1	F ¹⁰ 1	F ¹⁴ 1	F ¹⁰ 1	5
1,1,2-Trichloroethane	ND 100	ND 100	ND 10	ND 4	ND 1	ND 1	ND 1	ND 1	ND 20	ND 10	ND 1	ND 2	1
Benzene	ND 100	F ³⁴ 1	ND 10	ND 4	ND 1	ND 1	ND 1	ND 1	ND 20	ND 10	ND 1	ND 2	0.7
Tetrachloroethylene	F ⁸³ 1	F ⁴⁰ 1	ND 10	F ¹² 1	F ¹² 1	0.6	ND 1	ND 1	F ¹⁰ 1	0.31	F ¹⁴ 1	ND 2	5
Toluene	ND 100	ND 100	ND 10	ND 4	ND 1	ND 1	ND 1	ND 1	ND 20	ND 10	ND 1	ND 2	5
Chlorobenzene	ND 100	ND 100	ND 10	ND 4	ND 1	ND 1	ND 1	ND 1	ND 20	ND 10	ND 1	ND 2	5
Ethylbenzene	ND 100	ND 100	ND 10	ND 4	0.26	ND 1	ND 1	ND 1	ND 20	ND 10	ND 1	ND 2	5
Xylene (total)	ND 100	F ¹² 1	ND 10	ND 4	2	0.21	ND 1	ND 1	ND 20	ND 10	ND 1	ND 2	5
ICL Semivolatiles													
Phenol	ND 10	ND 10	ND 10	ND 10	ND 10	F ⁸ 1	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	1*
1,2-Dichlorobenzene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	F ⁹ 1	3
4-Methylphenol	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	1*
Naphthalene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	50
2-Methylnaphthalene	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	NL
Dimethylphthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	21	50
Dibutylphthalate	ND 10	ND 10	ND 10	ND 10	0.31	ND 10	ND 10	ND 10	0.41	ND 10	ND 10	ND 10	50
Di-n-butylphthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	50
Butylbenzylphthalate	ND 10	ND 10	ND 10	ND 10	ND 10	4	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	50
but(2-Ethylhexyl)phthalate	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	50
Total TCA	31	11	77	ND	17	21	24	71	14	9	12	14	50 ^m
Pericides/PCBs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Notes:													
TCL - Target Compound List	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
ND - Not Detected at or above 5 ug/L	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	
F - Associated value is estimated	-	-	-	-	-	-	-	-	-	-	-	-	
R - Data were rejected	-	-	-	-	-	-	-	-	-	-	-	-	
TCA - Treatable Identified Compounds	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	
ND - Not Detected	-	-	-	-	-	-	-	-	-	-	-	-	

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
 PREDESIGN INVESTIGATION
 HOOKER/RUCO SITE
 HICKSVILLE, NEW YORK

Parameters	Units	Criteria	Location ID:		GP-6		GP-8		GP-14	
			TBC	Collection Date:	08/01/95	08/18/97	08/01/95	08/18/97	08/01/95	08/18/97
TCL Volatiles										
Vinyl chloride	µg/L	2		76	64	ND 0.5	ND 1	360	540	
Chloroethane	µg/L	NL		--	--	--	--	--	--	
Methylene chloride	µg/L	NL		ND 2	ND 1	ND 2	ND 1	ND 2	ND 1	
Acetone	µg/L	50		R	10	R	ND 1	111	54	
Carbon disulfide	µg/L	50		ND 1	--	ND 0.5	--	ND 0.5	--	
1,1-Dichloroethene	µg/L	NL		141	11	3601	290	ND 0.5	7	
1,1-Dichloroethane	µg/L	NL		3	--	12	--	1	--	
1,2-Dichloroethene(total)	µg/L	5		94	160	4.1	5	1.6	25	
2-Butanone	µg/L	50		R	29	R	16	R	4	
Chloroform	µg/L	7		ND 1	ND 1	ND 5.3	11	ND 0.5	2	
1,1,1-Trichloroethane	µg/L	NL		10	7	390	200	1.1	13	
Carbon tetrachloride	µg/L	NL		ND 1	ND 1	0.63	ND 1	ND 0.5	1	
Bromodichloromethane	µg/L	NL		ND 1	--	ND 0.5	--	ND 0.5	--	
Trichloroethene	µg/L	5		110	140	220	160	25	210	
Benzene	µg/L	0.7		ND 1	ND 1	ND 0.5	ND 1	ND 0.5	ND 1	
1,1,2-Trichloroethane	µg/L	NL		ND 1	--	1.4	--	ND 0.5	--	
4-Methyl-2-pentanone	µg/L	50		--	ND 1	--	ND 1	--	ND 1	
2-Hexanone	µg/L	NL		--	--	--	--	--	--	
Tetrachloroethene	µg/L	5		180	210	260	89	18	120	
Toluene	µg/L	NL		ND 1	ND 1	ND 0.5	ND 1	ND 0.5	ND 1	
Chlorobenzene	µg/L	5		0.221	--	ND 0.5	--	ND 0.5	--	
Ethylbenzene	µg/L	5		ND 1	--	ND 0.5	--	ND 0.5	--	
Xylene(total)	µg/L	5		ND 1	ND 1	ND 0.5	ND 1	ND 0.5	3	
Total TICs	µg/L	50 (1)		ND	ND	ND	ND	ND	ND	

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	TBC Criteria	Location ID:	GP-6		GP-8		GP-14		
			Collection Date:	08/01/95	08/18/97	08/01/95	08/18/97	08/01/95	08/18/97	
TCL Semi-Volatiles										
Phenol	µg/L	NL		ND 10	--	ND 10	--	ND 10	--	
4-Methylphenol	µg/L	NL		ND 10	--	ND 10	--	ND 10	--	
Naphthalene	µg/L	50		ND 10	--	ND 10	--	ND 10	--	
Diethylphthalate	µg/L	NL		ND 10	--	ND 10	--	ND 10	--	
Di-n-butylphthalate	µg/L	50		ND 10	--	ND 10	--	ND 10	--	
bis(2-Ethylhexyl)phthalate	µg/L	50		ND 10	--	ND 10	--	ND 10	--	
Butylbenzylphthalate	µg/L	NL		ND 10	--	ND 10	--	ND 10	--	
Di-n-octylphthalate	µg/L	50		ND 10	--	ND 10	--	ND 10	--	
Total TICs	µg/L	50 (1)		ND	--	4 J	--	2 J	--	
PCBs										
Aroclor-1242	µg/L	NL		--	--	--	--	--	--	

Notes:

(1) Each individual TIC cannot exceed 50 µg/L

NDx Not detected at or above x

TCL Target Compound List

J Reported value is estimated

R Reported value was rejected

— Not Analyzed

NL Not Listed in Table 5.2 of Predesign Work Plan For
Operable Unit-1, Revision 2, dated January 1999

Exceeds TBC Criteria

27/23 Duplicate Analysis

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	TBC Criteria	Location ID: R-1		A-1		D-1	
			Collection Date: 01/25/90	12/14/98	01/25/90	12/14/98	01/15/90	12/14/98
TCL Volatiles								
Vinyl chloride	µg/L	2	ND 0.17	ND 2	ND 0.17	ND 2	ND 0.17	ND 2
Chloroethane	µg/L	NL	ND 0.1	ND 10	ND 0.1	ND 10	ND 0.1	ND 10
Methylene chloride	µg/L	NL	ND 0.03	ND 10	2 R	ND 10	ND 0.03	ND 10
Acetone	µg/L	50	ND 10	ND 10	ND 10	ND 10	6 RJ	ND 10
Carbon disulfide	µg/L	50	ND 5	ND 10	ND 5	ND 10	ND 5	ND 10
1,1-Dichloroethene	µg/L	NL	ND 0.12	ND 10	ND 0.12	ND 10	ND 0.12	ND 10
1,1-Dichloroethane	µg/L	NL	ND 0.04	ND 10	ND 0.04	ND 10	ND 0.04	ND 10
1,2-Dichloroethene(total)	µg/L	5	ND 0.1	ND 5	ND 0.1	ND 5	54 J	39
2-Butanone	µg/L	50	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Chloroform	µg/L	7	ND 0.03	ND 7	ND 0.03	ND 7	ND 0.03	ND 7
1,1,1-Trichloroethane	µg/L	NL	ND 0.08	ND 10	ND 0.08	ND 10	ND 0.08	ND 10
Carbon tetrachloride	µg/L	NL	ND 0.21	ND 10	ND 0.21	ND 10	ND 0.21	ND 10
Bromodichloromethane	µg/L	NL	ND 0.08	ND 10	ND 0.08	ND 10	ND 0.08	ND 10
Trichloroethene	µg/L	5	ND 0.19	ND 5	ND 0.19	ND 5	18	14
Benzene	µg/L	0.7	ND 0.04	ND 0.7	ND 0.04	ND 0.7	ND 0.04	ND 0.7
1,1,2-Trichloroethane	µg/L	NL	ND 0.1	ND 10	ND 0.1	ND 10	ND 0.1	ND 10
4-Methyl-2-pentanone	µg/L	50	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
2-Hexanone	µg/L	NL	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Tetrachloroethene	µg/L	5	5 J	11	ND 0.14	ND 5	98	82
Toluene	µg/L	NL	ND 0.11	ND 10	ND 0.11	ND 10	ND 0.11	ND 10
Chlorobenzene	µg/L	5	ND 0.04	ND 5	ND 0.04	ND 5	ND 0.04	ND 5
Ethylbenzene	µg/L	5	ND 0.06	ND 5	ND 0.06	ND 5	ND 0.06	ND 5
Xylene(total)	µg/L	5	ND 0.1	ND 5	ND 0.1	ND 5	ND 0.1	ND 5
Total TICs	µg/L	50 (1)	ND	ND	-	ND	-	ND

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	TBC Criteria	Location ID:	R-1		A-1		D-1	
			Collection Date:	01/25/90	12/14/98	01/25/90	12/14/98	01/15/90	12/14/98
TCL Semi-Volatiles									
Phenol	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
4-Methylphenol	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Naphthalene	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Diethylphthalate	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Di-n-butylphthalate	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
bis(2-Ethylhexyl)phthalate	µg/L	50	2 RJ	ND 10	4 RJ	ND 10	ND 10	ND 26 R	ND 10
Butylbenzylphthalate	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Di-n-octylphthalate	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 2 J	ND 10
Total TICs	µg/L	50 (1)		ND	14	ND	68	ND	2
PCBs									
Aroclor-1242	µg/L	NL		ND 0.5	–	ND 0.05	–	ND 0.05	–

Notes:

(1) Each individual TIC cannot exceed 50 µg/L

NDx Not detected at or above x

TCL Target Compound List

J Reported value is estimated

R Reported value was rejected

- Not Analyzed

NL Not Listed in Table 5.2 of Predesign Work Plan For

Operable Unit-1, Revision 2, dated January 1999

Exceeds TBC Criteria

27/23 Duplicate Analysis

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	Criteria	Location ID:		E-1		E-2	
			TBC	Collection Date:	01/30/90	12/15/98	01/16/90	12/15/98
TCL Volatiles								
Vinyl chloride	µg/L	2	83 J	ND 2	15	17	8	ND 2
Chloroethane	µg/L	NL	ND 0.1	ND 10	ND 0.1	ND 10	ND 0.1	ND 10
Methylene chloride	µg/L	NL	ND 0.03	ND 10	ND 0.03	ND 10	ND 0.03	ND 10
Acetone	µg/L	50	ND 10	58 J	8 RJ	ND 10J	2 RJ	ND 10J
Carbon disulfide	µg/L	50	11 R	ND 10	5 R	ND 10	4 RJ	ND 10
1,1-Dichloroethene	µg/L	NL	ND 0.12	ND 10	ND 0.12	ND 10	ND 0.12	ND 10
1,1-Dichloroethane	µg/L	NL	ND 0.04	ND 10	ND 0.04	ND 10	ND 0.04	ND 10
1,2-Dichloroethene(total)	µg/L	5	21	2J	19 J	46	12 J	ND 5
2-Butanone	µg/L	50	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Chloroform	µg/L	7	ND 0.03	ND 7	ND 0.03	ND 7	ND 0.03	ND 7
1,1,1-Trichloroethane	µg/L	NL	ND 0.08	ND 10	ND 0.08	ND 10	ND 0.08	ND 10
Carbon tetrachloride	µg/L	NL	ND 0.21	ND 10	ND 0.21	ND 10	ND 0.21	ND 10
Bromodichloromethane	µg/L	NL	ND 0.08	ND 10	ND 0.08	ND 10	ND 0.08	ND 10
Trichloroethene	µg/L	5	ND 0.19	ND 5	ND 0.19	2J	2	ND 5
Benzene	µg/L	0.7	ND 0.04	ND 0.7	ND 0.04	ND 0.7	ND 0.04	ND 0.7
1,1,2-Trichloroethane	µg/L	NL	ND 0.1	ND 10	ND 0.1	ND 10	ND 0.1	ND 10
4-Methyl-2-pentanone	µg/L	50	320 J	ND 10	19	ND 10	ND 10	ND 10
2-Hexanone	µg/L	NL	8 RJ	ND 10	ND 10	ND 10	ND 0.14	ND 10
Tetrachloroethene	µg/L	5	ND 0.14	ND 5	ND 0.14	4J	ND 0.14	ND 5
Toluene	µg/L	NL	ND 0.11	ND 10	ND 0.11	ND 10	ND 0.11	4J
Chlorobenzene	µg/L	5	6	ND 5	2	ND 5	ND 0.04	ND 5
Ethylbenzene	µg/L	5	8	ND 5	3	ND 5	ND 0.06	ND 5
Xylene(total)	µg/L	5	15	ND 5	6	ND 5	ND 0.1	ND 5
Total TTCs	µg/L	50 (1)	-	134	-	111	-	ND

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOVER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	TBC Criteria	Location ID:	P-1		E-1		E-2	
			Collection Date:	01/30/90	12/15/98	01/16/90	12/15/98	01/16/90	12/15/98
TCL Semi-Volatiles									
Phenol	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10J
4-Methylphenol	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10J
Naphthalene	µg/L	50		ND 10	ND 10	2 J	ND 10	ND 10	ND 10
Diethylphthalate	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Di-n-butylphthalate	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
bis(2-Ethylhexyl)phthalate	µg/L	50		4 RJ	ND 10	2 RJ	ND 10	12 R	ND 10
Butylbenzylphthalate	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Di-n-octylphthalate	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Total TICs	µg/L	50 (1)		4200	222	130	73	2310	650
PCBs									
Aroclor-1242	µg/L	NL		ND 0.05	2.0	ND 0.05	ND 1.0	ND 0.05	ND 1.0

Notes:

- (1) Each individual TIC cannot exceed 50 µg/L
 NDx Not detected at or above x
 TCL Target Compound List
 J Reported value is estimated
 R Reported value was rejected
 - Not Analyzed
 NL Not Listed in Table 5.2 of Predesign Work Plan For
 Operable Unit-1, Revision 2, dated January 1999
 Exceeds TBC Criteria
 27/23 Duplicate Analysis

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	TBC Criteria	Location ID:	K-1 (GM-95)		K-2 (GM-91)		MW-50J1		
			Collection Date:	02/02/90	12/15/98	02/02/90	12/15/98	01/23/90	08/08/95	
TCL Volatiles										
Vinyl chloride	µg/L	2		ND 0.17	ND 2	ND 0.17	3	ND 0.17	ND 5	
Chloroethane	µg/L	NL		ND 0.1	ND 10	ND 0.1	ND 10	ND 0.1	ND 5	
Methylene chloride	µg/L	NL		ND 0.03	ND 10	10 R	ND 10	ND 0.03	ND 5	
Acetone	µg/L	50		ND 10	ND 10J	ND 10	ND 10	20 R	R	
Carbon disulfide	µg/L	50		ND 5	ND 10	ND 5	ND 10	11 R	ND 5	
1,1-Dichloroethene	µg/L	NL		ND 0.12	ND 10	ND 0.12	ND 10	ND 0.12	ND 5	
1,1-Dichloroethane	µg/L	NL		ND 0.04	ND 10	ND 0.04	ND 10	ND 0.04	ND 5	
1,2-Dichloroethene(total)	µg/L	5		ND 0.1	ND 5	ND 0.1	ND 5	2 J	1.6 J	
2-Butanone	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10	R	
Chloroform	µg/L	7		ND 0.03	ND 7	ND 0.03	ND 7	ND 0.03	ND 5	
1,1,1-Trichloroethane	µg/L	NL		ND 0.08	ND 10	ND 0.08	ND 10	ND 0.08	5.6	
Carbon tetrachloride	µg/L	NL		ND 0.21	ND 10	ND 0.21	ND 10	ND 0.21	ND 5	
Bromodichloromethane	µg/L	NL		ND 0.08	ND 10	ND 0.08	ND 10	ND 0.08	ND 5	
Trichloroethene	µg/L	5		ND 0.19	ND 5	ND 0.19	ND 5	ND 0.19	10	
Benzene	µg/L	0.7		ND 0.04	ND 0.7	ND 0.04	ND 0.7	ND 0.04	ND 5	
1,1,2-Trichloroethane	µg/L	NL		ND 0.1	ND 10	ND 0.1	ND 10	ND 0.1	ND 5	
4-Methyl-2-pentanone	µg/L	50		ND 10	ND 10	ND 10	ND 10	11 J	ND 25	
2-Hexanone	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10	ND 25	
Tetrachloroethene	µg/L	5		ND 0.14	ND 5	ND 0.14	ND 5	ND 0.14	3.9 J	
Toluene	µg/L	NL		ND 0.11	ND 10	ND 0.11	ND 10	ND 0.11	ND 5	
Chlorobenzene	µg/L	5		ND 0.04	ND 5	ND 0.04	ND 5	ND 0.04	ND 5	
Ethylbenzene	µg/L	5		ND 0.06	ND 5	ND 0.06	ND 5	ND 0.06	0.94 J	
Xylene(total)	µg/L	5		ND 0.1	ND 5	ND 0.1	ND 5	2 J	4 J	
Total TICs	µg/L	50 (1)		-	ND	-	ND	-	-	

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	Criteria	Location ID:	K-1 (GM-9S)		K-2 (GM-9I)		MW-50J1	
			Collection Date:	02/02/90	12/15/98	02/02/90	12/15/98	01/23/90	08/08/95
TCL Semi-Volatiles									
Phenol	µg/L	NL		ND 10	ND 10J	ND 10	ND 10	ND 10	ND 10
4-Methylphenol	µg/L	NL		ND 10	ND 10J	ND 10	ND 10	ND 10	ND 10
Naphthalene	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Diethylphthalate	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Di-n-butylphthalate	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
bis(2-Ethylhexyl)phthalate	µg/L	50		ND 10	ND 10	ND 10	ND 10	2 RJ	ND 10
Butylbenzylphthalate	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Di-n-octylphthalate	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10	ND 10
Total TICs	µg/L	50 (1)		1000	41	ND	250	5100	3400J
PCBs									
Aroclor-1242	µg/L	NL		ND 0.05	--	ND 0.05	--	ND 0.5	ND 1

Notes:

- (1) Each individual TIC cannot exceed 50 µg/L
- NDx Not detected at or above x
- TCL Target Compound List
- J Reported value is estimated
- R Reported value was rejected
- Not Analyzed
- NL Not Listed in Table 5.2 of Predesign Work Plan For
Operable Unit-1, Revision 2, dated January 1999
Exceeds TBC Criteria
- 27/23 Duplicate Analysis

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
 PREDESIGN INVESTIGATION
 HOOKER/RUCO SITE
 HICKSVILLE, NEW YORK

Parameters	Units	TBC Criteria	Location ID:	MW-50J1		MW-50J2			
			Collection Date:	05/01/96	12/16/98	01/18/90	08/08/95	05/01/96	12/16/98
TCL Volatiles									
Vinyl chloride	µg/L	2		ND 10	ND 2	29	320	250J/250J	ND 2/ND 2
Chloroethane	µg/L	NL		ND 10	ND 10	ND 0.1	ND 10	ND10/ND10	ND 10/ND 10
Methylene chloride	µg/L	NL		ND 10	ND 10	ND 0.03	ND 10	ND 10/ND 10	ND 10/ND 10
Acetone	µg/L	50		407 J	41	ND 10	R	R/R	ND 10/ND 10
Carbon disulfide	µg/L	50		ND 10	ND 10	ND 5	ND 10	ND 10/ND 10	ND 10/ND 10
1,1-Dichloroethene	µg/L	NL		ND 10	ND 10	ND 0.12	ND 10	ND 10/ND 10	ND 10/ND 10
1,1-Dichloroethane	µg/L	NL		ND 10	ND 10	ND 0.04	ND 10	ND 10/ND 10	ND 10/ND 10
1,2-Dichloroethene(total)	µg/L	5		ND 10	ND 5	3 J	17	36J/36J	ND 5/ND 5
2-Butanone	µg/L	50		R	ND 10	3 RJ	R	R/R	ND 10/ND 10
Chloroform	µg/L	7		ND 10	ND 7	ND 0.03	ND 10	ND 10/ND 10	ND
1,1,1-Trichloroethane	µg/L	NL		ND 10	ND 10	ND 0.08	ND 10	ND 10/ND 10	ND 10/ND 10
Carbon tetrachloride	µg/L	NL		ND 10	ND 10	ND 0.21	ND 10	ND 10/ND 10	ND
Bromodichloromethane	µg/L	NL		ND 10	ND 10	ND 0.08	ND 10	ND 10/ND 10	ND
Trichloroethene	µg/L	5		ND 10	ND 5	ND 0.19	ND 10	ND 10/ND 10	ND 5/ND 5
Benzene	µg/L	0.7		ND 10	ND 0.7	ND 0.04	ND 10	ND 10/ND 10	ND 0.7/ND 0.7
1,1,2-Trichloroethane	µg/L	NL		ND 10	ND 10	ND 0.1	ND 10	ND 10/ND 10	ND 10/ND 10
4-Methyl-2-pentanone	µg/L	50		R	ND 10J	ND 10	ND 50	R/R	ND 10J/ND 10J
2-Hexanone	µg/L	NL		R	ND 10	ND 10	ND 50	R/R	ND 10/ND 10
Tetrachloroethene	µg/L	5		ND 10	ND 5	ND 0.14	ND 10	ND 10/ND 10	ND 5/ND 5
Toluene	µg/L	NL		ND 10	ND 10	7 R	ND 10	ND 10/ND 10	ND 10/ND 10
Chlorobenzene	µg/L	5		ND 10	ND 5	ND 0.04	ND 10	ND 10/ND 10	ND 5/ND 5
Ethylbenzene	µg/L	5		ND 10	ND 5	7 J	ND 10	ND 10/ND 10	ND 5/ND 5
Xylene(total)	µg/L	5		ND 10	4J	6 J	ND 10	ND 10/ND 10	ND 5/ND 5
Total TICs	µg/L	50 (1)		--	493	--	--	--	27/23

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	TBC Criteria	Location ID:	MW-50J1		MW-50J2			
			Collection Date:	05/01/96	12/16/98	01/18/90	08/08/95	05/01/96	12/16/98
TCL Semi-Volatiles									
Phenol	µg/L	NL		17	ND 10	ND 10	ND 10	ND 40/ND 10	ND 10/ND 10
4-Methylphenol	µg/L	NL		23	ND 10	ND 10	ND 10	ND 40/ND 10	ND 10/ND 10
Naphthalene	µg/L	50		ND 10	ND 10	ND 10	ND 10	3J/ND 10	ND 10/ND 10
Diethylphthalate	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 40/ND 10	ND 10/ND 10
Di-n-butylphthalate	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 40/ND 10	ND 10/ND 10
bis(2-Ethylhexyl)phthalate	µg/L	50		ND 10	ND 10	2 RJ	ND 10	ND 40/ND 10	ND 10/ND 10
Butylbenzylphthalate	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 40/ND 10	ND 10/ND 10
Di-n-octylphthalate	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10/ND 10
Total TICs	µg/L	50 (1)		1300J	802	130	180J	530J/2500J	60/53
PCBs									
Aroclor-1242	µg/L	NL		-	-	ND 0.5	ND 1	- / -	- / -

Notes:

- (1) Each individual TIC cannot exceed 50 µg/L
 NDx Not detected at or above x
 TCL Target Compound List
 J Reported value is estimated
 R Reported value was rejected
 - Not Analyzed
 NL Not Listed in Table 5.2 of Predesign Work Plan For
 Operable Unit-1, Revision 2, dated January 1999
 Exceeds TBC Criteria
 27/23 Duplicate Analysis

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
 PREDESIGN INVESTIGATION
 HOOKER/RUCO SITE
 HICKSVILLE, NEW YORK

Parameters	Units	Criteria	Location ID:			Composite-1			
			TBC	Collection Date:					
							MW-50D1	MW-50D2	
			08/08/95	05/02/96	12/19/98	08/08/95	05/02/96	12/16/98	12/16/98
TCL Volatiles									
Vinyl chloride	µg/L	2	ND 10	ND 10	ND 2	ND 1	ND 1	ND 2	ND 2
Chloroethane	µg/L	NL	ND 10	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10
Methylene chloride	µg/L	NL	ND 10	ND 10	ND 10	ND 2	ND 1	ND 10	ND 10
Acetone	µg/L	50	R	R	ND 10	R	R	ND 10	71
Carbon disulfide	µg/L	50	ND 10	ND 10	ND 10	ND	ND	ND 10	ND 10
1,1-Dichloroethene	µg/L	NL	ND 10	ND 10	1 f	ND 1	ND 1	ND 10	ND 10
1,1-Dichloroethane	µg/L	NL	ND 10	ND 10	2 j	ND 1	ND 1	ND 10	ND 10
1,2-Dichloroethene (total)	µg/L	5	51	20 j	14	ND 1	ND 1	ND 5	ND 5
2-Butanone	µg/L	50	R	R	ND 10	R	R	ND 10	ND 10
Chloroform	µg/L	7	ND 10	ND 10	ND 7	ND 1	ND 1	ND 7	ND 7
1,1,1-Trichloroethane	µg/L	NL	1.5 j	ND 10	2 j	ND 1	ND 1	ND 10	ND 10
Carbon tetrachloride	µg/L	NL	ND 10	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10
Bromodichloromethane	µg/L	NL	ND 10	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10
Trichloroethene	µg/L	5	240	100 f	110	ND 1	ND 1	ND 5	ND 5
Benzene	µg/L	0.7	ND 10	ND 10	ND 0.7	ND 1	ND 1	ND 0.7	ND 0.7
1,1,2-Trichloroethane	µg/L	NL	ND 10	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10
4-Methyl-2-pentanone	µg/L	50	ND 50	R	ND 10	ND 5	R	ND 10	ND 10
2-Hexanone	µg/L	NL	ND 50	R	ND 10	ND 5	R	ND 10	ND 10
Tetrachloroethene	µg/L	5	91	29 j	67	ND 1	ND 1	ND 5	ND 5
Toluene	µg/L	NL	ND 10	ND 10	ND 10	ND 1	ND 1	ND 10	ND 10
Chlorobenzene	µg/L	5	ND 10	ND 10	ND 5	ND 1	ND 1	ND 5	ND 5
Ethylbenzene	µg/L	5	ND 10	ND 10	ND 5	ND 1	ND 1	ND 5	ND 5
Xylene (total)	µg/L	5	ND 10	ND 10	ND 5	ND 1	ND 1	ND 5	ND 5
Total TICs	µg/L	50 (1)	ND	ND	7	ND	ND	ND	187

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	Criteria	Location ID:				Composite-1:			
			TBC	Collection Date:						
TCL Semi-Volatiles										
Phenol	µg/L	NL		ND 10	ND 10	ND 10f	ND 10	ND 10	ND 10	ND 10
4-Methylphenol	µg/L	NL		ND 10	ND 10	ND 10f	ND 10	ND 10	ND 10	ND 10
Naphthalene	µg/L	50		ND 10	ND 10	ND 10f	ND 10	ND 10	ND 10	ND 10
Diethylphthalate	µg/L	NL		ND 10	ND 10	ND 10f	ND 10	ND 10	ND 10	ND 10
Di-n-butylphthalate	µg/L	50		ND 10	ND 10	ND 10f	ND 10	0.8f	ND 10	ND 10
bis(2-Ethylhexyl)phthalate	µg/L	50		11	11	ND 10f	ND 10	ND 10	ND 10	ND 10
Butylbenzylphthalate	µg/L	NL		ND 10	ND 10	ND 10f	56	ND 10	ND 10	ND 10
Di-n-octylphthalate	µg/L	50		ND 10	ND 10	ND 10f	ND 10	ND 10	ND 10	ND 10
Total TICs	µg/L	50 (1)		650f	26f	16	240f	41f	85	544
PCBs										
Aroclor-1242	µg/L	NL		--	--	--	--	--	--	--

Notes:

(1) Each individual TIC cannot exceed 50 µg/L

NDx Not detected at or above x

TCL Target Compound List

f Reported value is estimated

R Reported value was rejected

- Not Analyzed

NL Not Listed in Table 5.2 of Predesign Work Plan For

Operable Unit-1, Revision 2, dated January 1999

Exceeds TBC Criteria

27/23 Duplicate Analysis

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	TBC Criteria	Location ID:	MW-52I			MW-52S		
			Collection Date:	02/22/96	05/01/96	12/17/98	02/21/96	05/01/96	12/17/98
TCL Volatiles									
Vinyl chloride	µg/L	2		2300	2000J	2900	6400	1400J/1400J	6300
Chloroethane	µg/L	NL		ND 100	ND 100	ND 10	ND 200	ND50/ND50	9J
Methylene chloride	µg/L	NL		ND 100	420J	ND 10	ND 200	22J/ND 50	ND 10
Acetone	µg/L	50		R	1400J	ND 10	R	R/300J	ND 10
Carbon disulfide	µg/L	50		ND 100	ND 100	ND 10	ND 200	ND 50/ND 50	ND 10
1,1-Dichloroethene	µg/L	NL		ND 100	ND 100	2J	ND 200	ND 50/ND 50	3J
1,1-Dichloroethane	µg/L	NL		ND 100	ND 100	ND 10	ND 200	ND 50/ND 50	ND 10
1,2-Dichloroethene(total)	µg/L	5		ND 100	40J	60	ND 200	23J/26J	63
2-Butanone	µg/L	50		R	R	ND 10	R	R/R	ND 10
Chloroform	µg/L	7		140	190J	ND 7	520	ND 50/19J	ND 7
1,1,1-Trichloroethane	µg/L	NL		ND 100	ND 100	ND 10	ND 200	ND 50/ND 50	ND 10
Carbon tetrachloride	µg/L	NL		ND 100	ND 100	ND 10	ND 200	ND 50/ND 50	ND 10
Bromodichloromethane	µg/L	NL		22J	ND 100	ND 10	ND 200	ND 50/ND 50	ND 10
Trichloroethene	µg/L	5		110	90J	120	220	46J/52J	71
Benzene	µg/L	0.7		ND 100	36J	ND 0.7	ND 200	ND 50/ND 50	2
1,1,2-Trichloroethane	µg/L	NL		ND 100	ND 100	ND 10	ND 200	ND 50/ND 50	ND 10
4-Methyl-2-pentanone	µg/L	50		ND 100	R	ND 10J	ND 200	R/R	ND 10J
2-Hexanone	µg/L	NL		ND 100	R	ND 10	R	R/R	ND 10
Tetrachloroethene	µg/L	5		53J	46J	81	290	51J/60J	110
Toluene	µg/L	NL		ND 100	44J	ND 10	ND 200	ND 50/ND 50	2J
Chlorobenzene	µg/L	5		ND 100	ND 100	ND 5	ND 200	ND 50/ND 50	ND 5
Ethylbenzene	µg/L	5		ND 100	4J	ND 5	ND 200	ND 50/ND 50	2J
Xylene(total)	µg/L	5		ND 100	12J	4J	ND 200	ND 50/ND 50	5
Total TICs	µg/L	50 (1)		ND	9	9	ND	ND/ND	54

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOVER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	TBC Criteria	Location ID:	MW-52I			MW-52S		
			Collection Date:	02/22/96	05/01/96	12/17/98	02/21/96	05/01/96	12/17/98
TCL Semi-Volatiles									
Phenol	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10
4-Methylphenol	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10
Naphthalene	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10
Diethylphthalate	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10
Di-n-butylphthalate	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10
bis(2-Ethylhexyl)phthalate	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10
Butylbenzylphthalate	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10
Di-n-octylphthalate	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10
Total TICs	µg/L	50 (1)		31J	11J	146	65J	31J	175
PCBs									
Aroclor-1242	µg/L	NL		--	--	--	--	--	--

Notes:

(1) Each individual TIC cannot exceed 50 µg/L

NDx Not detected at or above x

TCL Target Compound List

J Reported value is estimated

R Reported value was rejected

- Not Analyzed

NL Not Listed in Table 5.2 of Pre-design Work Plan For
Operable Unit-1, Revision 2, dated January 1999

Exceeds TBC Criteria

27/23 Duplicate Analysis

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
 PREDESIGN INVESTIGATION
 HOOKER/RUCO SITE
 HICKSVILLE, NEW YORK

Parameters	Units	Criteria	Location ID:		MW-52D		GM-101		Composite-2		
			TBC	Collection Date:	02/21/96	05/01/96	12/17/98	10/25/91	08/27/93	12/17/98	12/16/98
TCL Volatiles											
Vinyl chloride	µg/L	2		20	ND 4	21	ND10/ND10	ND 10	ND 2	3000	
Chloroethane	µg/L	NL		ND 10	ND 4	ND 10	ND10/ND10	ND 10	ND 10	51	
Methylene chloride	µg/L	NL		ND 12	ND 4	ND 10	ND5/ND5	ND 10	ND 10	ND 10	
Acetone	µg/L	50		3301	R	ND 10	ND12/ND10	ND 10	ND 10	ND 10	
Carbon disulfide	µg/L	50		ND 10	ND 4	ND 10	ND5/ND5	ND 10	ND 10	ND 10	
1,1-Dichloroethene	µg/L	NL		ND 10	ND 4	21	21/31	31	ND 10	ND 10	
1,1-Dichloroethane	µg/L	NL		ND 10	ND 4	31	ND5/ND5	ND 10	ND 10	ND 10	
1,2-Dichloroethene(total)	µg/L	5		ND 10	41	31	31/31	ND 10	21	54	
2-Butanone	µg/L	50		R	R	ND 10	R/R	ND 10	ND 10	ND 10	
Chloroform	µg/L	7		ND 10	ND 4	ND 7	ND5/ND5	ND 10	ND 7	ND 7	
1,1,1-Trichloroethane	µg/L	NL		ND 10	ND 4	21	7/10	51	21	ND 10	
Carbon tetrachloride	µg/L	NL		ND 10	ND 4	ND 10	ND5/ND5	ND 10	ND 10	ND 10	
Bromodichloromethane	µg/L	NL		ND 10	ND 4	ND 10	ND5/ND5	ND 10	ND 10	ND 10	
Trichloroethene	µg/L	5		36	381	29	25/32	19	7	76	
Benzene	µg/L	0.7		ND 10	ND 4	ND 0.7	ND5/ND5	ND 10	ND 0.7	1	
1,1,2-Trichloroethane	µg/L	NL		ND 10	ND 4	ND 10	ND5/ND5	ND 10	ND 10	ND 10	
4-Methyl-2-pentanone	µg/L	50		ND 10	R	ND 101	ND10/ND10	ND 10	ND 101	ND 10	
2-Hexanone	µg/L	NL		R	R	ND 10	ND10/ND10	ND 10	ND 10	ND 10	
Tetrachloroethene	µg/L	5		10	121	18	6/7	61	41	74	
Toluene	µg/L	NL		ND 10	ND 4	ND 10	ND5/ND5	ND 10	ND 10	ND 10	
Chlorobenzene	µg/L	5		ND 10	ND 4	ND 5	ND5/ND5	ND 10	ND 5	ND 5	
Ethylbenzene	µg/L	5		ND 10	ND 4	ND 5	ND5/ND5	ND 10	ND 5	ND 5	
Xylene(total)	µg/L	5		ND 10	ND 4	ND 5	ND5/ND5	ND 10	ND 5	31	
Total TICs	µg/L	50 (1)		ND	ND	ND	-/-	--	ND	ND	

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	TBC Criteria	Location ID:	MW-52D			GM-10I		Composite-2	
			Collection Date:	02/21/96	05/01/96	12/17/98	12/17/98	12/17/98	12/17/98	12/16/98
TCL Semi-Volatiles										
Phenol	µg/L	NL		ND 10	ND 10	ND 10J	--	--	ND 10	ND 10
4-Methylphenol	µg/L	NL		ND 10	ND 10	ND 10J	--	--	ND 10	ND 10
Naphthalene	µg/L	50		ND 10	ND 10	ND 10J	--	--	ND 10	ND 10
Diethylphthalate	µg/L	NL		ND 10	ND 10	ND 10J	--	--	ND 10	ND 10
Di-n-butylphthalate	µg/L	50		ND 10	ND 10	ND 10J	--	--	ND 10	ND 10
bis(2-Ethylhexyl)phthalate	µg/L	50		ND 10	ND 10	ND 10J	--	--	ND 10	ND 10
Butylbenzylphthalate	µg/L	NL		ND 10	ND 10	1J	--	--	ND 10	ND 10
Di-n-octylphthalate	µg/L	50		ND 10	ND 10	3.5J	--	--	ND 10J	ND 10
Total TICs	µg/L	50 (1)		77J	ND	13J	--	--	34	252
PCBs										
Aroclor-1242	µg/L	NL		--	--	--	--	--	--	--

Notes:

(1) Each individual TIC cannot exceed 50 µg/L

NDx Not detected at or above x

TCL Target Compound List

J Reported value is estimated

R Reported value was rejected

- Not Analyzed

NL Not Listed in Table 5.2 of Predesign Work Plan For
Operable Unit-1, Revision 2, dated January 1999

Exceeds TBC Criteria

27/23 Duplicate Analysis

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
 PREDESIGN INVESTIGATION
 HOOKER/RUCO SITE
 HICKSVILLE, NEW YORK

Parameters	Units	TBC Criteria	Location ID:	F-1		F-2		I-1		I-2	
			Collection Date:	01/18/90	12/18/98	01/18/90	12/18/98	01/17/90	12/19/98	01/17/90	12/19/98
TCL Volatiles											
Vinyl chloride	µg/L	2		ND 0.017	7	ND 0.017	1J	ND 0.017/ND 0.017	ND 2	94J	45
Chloroethane	µg/L	NL		ND 0.1	ND 10	ND 0.1	ND 10	ND 0.1/ND 0.1	ND 10	ND 0.1	2J
Methylene chloride	µg/L	NL		2 RJ	ND 10	1 R	ND 10	ND 0.03/ND 0.03	ND 10	ND 0.03	ND 10
Acetone	µg/L	50		35 R	ND 10	7 RJ	ND 10	ND 10/ND 10	ND 10	ND 10	ND 10
Carbon disulfide	µg/L	50		4 RJ	ND 10	1 RJ	ND 10	ND 5/ND 5	ND 10	ND 5	ND 10
1,1-Dichloroethene	µg/L	NL		ND 0.12	ND 10	ND 0.12	ND 10	ND 0.12/ND 0.12	ND 10	ND 0.12	ND 10
1,1-Dichloroethane	µg/L	NL		ND 0.04	ND 10	ND 0.04	ND 10	ND 0.04/ND 0.04	ND 10	ND 0.04	ND 10
1,2-Dichloroethene(total)	µg/L	5		ND 0.1	2J	ND 0.1	ND 5	24J/22J	ND 5	ND 0.1	ND 5
2-Butanone	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND	ND 10	ND 10	ND 10
Chloroform	µg/L	7		ND 0.03	ND 7	ND 0.03	ND 7	ND	ND 7	ND 0.03	ND 7
1,1,1-Trichloroethane	µg/L	NL		ND 0.08	ND 10	ND 0.08	ND 10	ND 0.08/ND 0.08	ND 10	ND 0.08	ND 10
Carbon tetrachloride	µg/L	NL		ND 0.21	ND 10	ND 0.21	ND 10	ND	ND 10	ND 0.21	ND 10
Bromodichloromethane	µg/L	NL		ND 0.08	ND 10	ND 0.08	ND 10	ND	ND 10	ND 0.08	ND 10
Trichloroethene	µg/L	5		ND 0.19	ND 5	ND 0.19	ND 5	5/5	1J	ND 0.19	ND 5
Benzene	µg/L	0.7		ND 0.04	ND 0.7	ND 0.04	ND 0.7	ND 0.04/ND 0.04	ND 0.7	ND 0.04	ND 0.7
1,1,2-Trichloroethane	µg/L	NL		ND 0.1	ND 10	ND 0.1	ND 10	ND	ND 10	ND 0.1	ND 10
4-Methyl-2-pentanone	µg/L	50		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10	ND 10	ND 10
2-Hexanone	µg/L	NL		ND 10	ND 10	ND 10	ND 10	ND 10/ND 10	ND 10	ND 10	ND 10
Tetrachloroethene	µg/L	5		ND 0.14	ND 5	ND 0.14	ND 5	69/64	85	2 R	5
Toluene	µg/L	NL		ND 0.11	ND 10	ND 0.11	ND 10	ND 0.11/ND 0.11	ND 10	ND 0.11	ND 10
Chlorobenzene	µg/L	5		ND 0.04	ND 5	ND 0.04	3J	ND 0.04/ND 0.04	ND 5	ND 0.04	ND 5
Ethylbenzene	µg/L	5		ND 0.06	ND 5	ND 0.06	2J	ND 0.06/ND 0.06	ND 5	ND 0.06	ND 5
Xylene(total)	µg/L	5		1	ND 5	1 J	3J	ND 0.1/ND 0.1	ND 5	ND 0.1	ND 5
Total TICs	µg/L	50 (1)		-	168	-	281	- / -	ND	-	ND

TABLE 8

SUMMARY OF DETECTED ORGANIC COMPOUNDS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOVER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	TBC Criteria	Location ID:	F-1		F-2		I-1		I-2	
			Collection Date:	01/18/90	12/18/98	01/18/90	12/18/98	01/17/90	12/19/98	01/17/90	12/19/98
TCL Semi-Volatiles											
Phenol	µg/L	NL		-	ND 10J	ND 10	ND 10J	ND 10/ND 10	ND 10J	ND 10	ND 10J
4-Methylphenol	µg/L	NL		-	ND 10J	ND 10	ND 10J	ND 10/ND 10	ND 10J	ND 10	ND 10J
Naphthalene	µg/L	50		-	ND 10J	ND 10	1J	ND 10/ND 10	ND 10J	ND 10	ND 10J
Diethylphthalate	µg/L	NL		-	ND 10J	ND 10	ND 10J	ND 10/ND 10	ND 10J	ND 10	ND 10J
Di-n-butylphthalate	µg/L	50		-	ND 10J	ND 10	ND 10J	ND 10/ND 10	ND 10J	ND 10	ND 10J
bis(2-Ethylhexyl)phthalate	µg/L	50		-	ND 10J	2 RJ	ND 10J	2 RJ/5 RJ	ND 10J	6 RJ	ND 10J
Butylbenzylphthalate	µg/L	NL		-	ND 10J	ND 10	ND 10J	ND 10/ND 10	ND 10J	ND 10	ND 10J
Di-n-octylphthalate	µg/L	50		ND 10	ND 10J	ND 10	ND 10J	ND 10/ND 10	ND 10J	ND 10	ND 10J
Total TICs	µg/L	50 (1)		520	330	110	936	ND / ND	7	ND	29
PCBs											
Aroclor-1242	µg/L	NL		ND 0.5	--	ND 0.5	--	ND 0.053/ND 0.053	ND 1.0J	ND 0.5	ND 1.0J

Notes:

(1) Each individual TIC cannot exceed 50 µg/L

NDx Not detected at or above x

TCL Target Compound List

J Reported value is estimated

R Reported value was rejected

-- Not Analyzed

NL Not Listed in Table 5.2 of Pre-design Work Plan For

Operable Unit-1, Revision 2, dated January 1999

Exceeds TBC Criteria

27/23 Duplicate Analysis

TABLE 9

SUMMARY OF DETECTED INORGANICS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	TBC Criteria	Location ID:	R-1		A-1		D-1		
			Collection Date:	01/25/90	12/14/98	01/25/90	12/14/98	01/15/90	12/14/98	
TAL Metals (total)										
Aluminum	µg/L	NR		140	ND 32.3	690 J	2160	410 J	ND 32.3	
Antimony	µg/L	6		ND 34	ND 2.9	ND 34	6.4	ND 20	ND 2.9	
Arsenic	µg/L	25		ND 2	ND 2.4	ND 2	ND 2.4	ND 2	ND 2.4	
Barium	µg/L	1000		47	34.3	96	60.3	41	42.5	
Beryllium	µg/L	1		ND 0.2	ND 0.30	1.5 J	0.67	ND 2	ND 0.30	
Cadmium	µg/L	5		ND 2	ND 0.50	ND 2	ND 0.50	ND 1	ND 0.50	
Calcium	µg/L	NR		12000 J	9730	17000 J	8380	25000 J	27700	
Chromium	µg/L	50		ND 2	3.9	11 R	821	160 J	58.0	
Cobalt	µg/L	NR		ND 3	ND 3.6	ND 3	ND 3.6	ND 1	ND 3.6	
Copper	µg/L	200		ND 3	ND 2.2	16	19.8	ND 0.3	ND 2.2	
Iron	µg/L	300 (1)		130 J	55.1	73 R	3740	1300 J	168	
Lead	µg/L	15		5 J	ND 1.0	3 J	5.4	3 J	ND 1.0	
Magnesium	µg/L	NR		2300	2370	3300	1720	5700 J	7360	
Manganese	µg/L	300 (1)		7	4.1	140 J	46.6	53 J	10.0	
Nickel	µg/L	NR		ND 6	ND 3.2	11 R	11.8	3	ND 3.2	
Potassium	µg/L	NR		780	926J	3800	1800J	3300	3520J	
Selenium	µg/L	10		ND 2	ND 1.9	ND 2	ND 1.9	ND 2	ND 1.9	
Silver	µg/L	50		ND 2 J	ND 0.60	6 J	ND 0.60	1	ND 0.60	
Sodium	µg/L	20000		4200	5380	54000 J	38600	18000 J	16800	
Thallium	µg/L	NL		ND 2	1.2	ND 2	1.3	ND 2	ND 1.2	
Vanadium	µg/L	NR		ND 4	ND 1.9	5	3.3	11 R	ND 1.9	
Zinc	µg/L	300		ND 6	ND 5.6	10 R	ND 12.1	5	ND 7.1	
TAL Metals (filtered)										
Iron	µg/L	300 ⁽¹⁾		--	ND 16.6	--	ND 16.6	--	--	
Manganese	µg/L	300 ⁽¹⁾		--	2.8	--	20.0	--	--	

TABLE 9

SUMMARY OF DETECTED INORGANICS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

		Location ID: R-1		A-1		D-1	
		Collection Date: 01/25/90	12/14/98	01/25/90	12/14/98	01/15/90	12/14/98
Parameters	Units						
General Chemistry (total)							
Cyanide	mg/L	ND 10	--	ND 10	--	ND 10	ND 0.010
BOD5	mg/L	--	ND 2	4	ND 2	--	ND 2
COD	mg/L	--	ND 10.0	--	ND 10.0	--	ND 10.0
Hardness	mg/L	--	--	58	--	--	--
TSS	mg/L	--	37.6	ND 3	56.8	--	6.8
TDS	mg/L	--	ND 79	240	184	--	207
TOC	mg/L	--	--	--	--	--	1.5

Notes:

NDx Not detected at or above x

TAL Target Analyte List

BOD Biological Oxygen Demand

COD Chemical Oxygen Demand

TSS Total Suspended Solids

TDS Total Dissolved Solids

TOC Total Organic Carbon

J Reported value is estimated

R Reported value was rejected

-- Not Analyzed

Exceeds TBC Criteria

Mercury was not detected and thus not listed.

NL Not Listed in Table 5.2 of Predesign Work Plan

For Operable Unit-1, Revision 2, dated Jan/99

NR Not Regulated

(1) Sum not to exceed 500 µg/L

(2) Not analyzed for inorganics during RI performed by Northrop

TABLE 9

SUMMARY OF DETECTED INORGANICS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

			Location ID:		P-1		E-1		E-2	
			Collection Date:	01/30/90	12/15/98	01/16/90	12/15/98	01/16/90	12/15/98	
Parameters	Units	TBC Criteria								
TAL Metals (total)										
Aluminum	µg/L	NR	33 R	126	22 J	ND 46.1	26 J	ND 86.9		
Antimony	µg/L	6	ND 34	ND 2.9	ND 20	ND 2.9	ND 20	ND 2.9		
Arsenic	µg/L	25	ND 2	5.7	ND 2	ND 2.4	20 J	24.0		
Barium	µg/L	1000	19	53.2	19	52.1	9	9.8		
Beryllium	µg/L	1	ND 2	ND 0.30	ND 2	ND 0.30	ND 2	ND 0.30		
Cadmium	µg/L	5	4	ND 0.50	1	ND 0.50	3	ND 0.50		
Calcium	µg/L	NR	4600	21200	3200	14600	12000 J	13800		
Chromium	µg/L	50	ND 2	2.5	ND 1	ND 0.90	ND 1	ND 0.90		
Cobalt	µg/L	NR	ND 3	ND 3.6	2	ND 3.6	4	ND 3.6		
Copper	µg/L	200	ND 2	ND 2.2	ND 0.3	ND 2.2	ND 0.3	ND 2.2		
Iron	µg/L	300 (1)	9700 J	14200	9200 J	6170	30000 J	21800		
Lead	µg/L	15	3 R	1.5	ND 4 J	ND 1.0	ND 2 J	1.9		
Magnesium	µg/L	NR	1000	5150	720	3500	1200	3120		
Manganese	µg/L	300 (1)	790 J	110	460 J	90.7	83 J	95.2		
Nickel	µg/L	NR	ND 6	ND 3.2	ND 2	ND 3.2	3 R	ND 3.2		
Potassium	µg/L	NR	880	1250J	1300	1210J	860	993J		
Selenium	µg/L	10	ND 2	ND 2.5	2 J	ND 1.9	ND 2 J	ND 1.9		
Silver	µg/L	50	ND 2 J	ND 0.60	2 J	ND 0.60	ND 1 J	ND 0.60		
Sodium	µg/L	20000	19000 J	4540	17000 J	2760	3300 J	2920		
Thallium	µg/L	NL	ND 2	ND 1.2	ND 2	ND 1.2	ND 2	ND 1.2		
Vanadium	µg/L	NR	ND 4	ND 1.9	2 R	ND 1.9	ND 1	ND 1.9		
Zinc	µg/L	300	ND 2	12.4	16 R	7.2	19 R	ND 5.6		
TAL Metals (filtered)										
Iron	µg/L	300 ⁽¹⁾	--	--	--	--	--	--		
Manganese	µg/L	300 ⁽¹⁾	--	--	--	--	--	--		

TABLE 9

SUMMARY OF DETECTED INORGANICS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	Location ID:	P-1	E-1	E-2			
		Collection Date:	01/30/90	12/15/98	01/16/90	12/15/98	01/16/90	12/15/98
General Chemistry (total)								
Cyanide	mg/L		ND 10	ND 0.010	ND 10	ND 0.010	ND 10	ND 0.010
BOD5	mg/L		--	4	--	ND 4	--	7
COD	mg/L		--	34.9	--	ND 10.0	--	11.6
Hardness	mg/L		--	74.2	--	50.9	--	47.3
TSS	mg/L		--	32.8	--	6.4	--	47.2
TDS	mg/L		--	ND 124	--	ND 88	--	ND 87
TOC	mg/L		--	ND 3.6	--	ND 2.1	--	ND 2.3

Notes:

NDx Not detected at or above x

TAL Target Analyte List

BOD Biological Oxygen Demand

COD Chemical Oxygen Demand

TSS Total Suspended Solids

TDS Total Dissolved Solids

TOC Total Organic Carbon

J Reported value is estimated

R Reported value was rejected

-- Not Analyzed

Exceeds TBC Criteria

Mercury was not detected and thus not listed.

NL Not Listed in Table 5.2 of Predisgn Work Plan

For Operable Unit-1, Revision 2, dated Jan/99

NR Not Regulated

(1) Sum not to exceed 500 µg/L

(2) Not analyzed for inorganics during RI performed by Northrop

TABLE 9

SUMMARY OF DETECTED INORGANICS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

			Location ID: K-1 (GM-95)		K-2 (GM-91)		MW-50J1		
			Collection Date:	02/02/90	12/15/98	02/02/90	12/15/98	01/23/90	12/16/98
Parameters	Units	TBC Criteria							
TAL Metals (total)									
Aluminum	µg/L	NR	330	406	440	ND 51.4	260 J	ND 26.9	
Antimony	µg/L	6	ND 34	ND 2.9	ND 34	ND 2.9	ND 34	ND 2.9	
Arsenic	µg/L	25	24	24.0	59	54.7	68	83.4	
Barium	µg/L	1000	31	25.9	20	9.6	92	98.6	
Beryllium	µg/L	1	0.66 J	ND 0.30	0.36 J	ND 0.30	ND 2	ND 0.30	
Cadmium	µg/L	5	3	ND 0.50	2	ND 0.50	ND 2	ND 0.50	
Calcium	µg/L	NR	15000	6070	11000	3890	33000 J	15800	
Chromium	µg/L	50	2	ND 0.90	4	ND 0.90	2	ND 0.90	
Cobalt	µg/L	NR	6	ND 3.6	3	ND 3.6	17	ND 3.6	
Copper	µg/L	200	13	4.9	8.2	ND 2.2	4.6	ND 2.2	
Iron	µg/L	300 (1)	55000	46000	23000	57800	75000 J	118000	
Lead	µg/L	15	3 J	2.6	2 J	3.8	2 J	5.2	
Magnesium	µg/L	NR	1800	2030	1400	1290	1700	5610	
Manganese	µg/L	300 (1)	230	174	120	116	420 J	430	
Nickel	µg/L	NR	ND 6	ND 3.2	7	ND 3.2	23	ND 3.2	
Potassium	µg/L	NR	890	1030J	12000	931J	1400	3160J	
Selenium	µg/L	10	ND 20	ND 1.9	ND 2	ND 2.9	ND 20	ND 1.9	
Silver	µg/L	50	ND 2 J	2.6	ND 2 J	3.3	ND 2 J	5.8	
Sodium	µg/L	20000	1200	2420	23000	10200	8400 J	5000	
Thallium	µg/L	NL	ND 2	ND 1.2	ND 2	ND 1.2	ND 2	ND 1.2	
Vanadium	µg/L	NR	ND 4	ND 1.9	ND 4	ND 1.9	ND 4	ND 1.9	
Zinc	µg/L	300	3	ND 5.6	10	ND 5.6	19 J	ND 5.6	
TAL Metals (filtered)									
Iron	µg/L	300 ⁽¹⁾	--	--	--	--	--	106000	
Manganese	µg/L	300 ⁽¹⁾	--	--	--	--	--	407	

TABLE 9

SUMMARY OF DETECTED INORGANICS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	Location ID:	K-1 (GM-9S)		K-2 (GM-9I)		MW-50J1	
		Collection Date:	02/02/90	12/15/98	02/02/90	12/15/98	01/23/90	12/16/98
General Chemistry (total)								
Cyanide	mg/L		ND 10 J	ND 0.010	ND 10 J	ND 0.010	ND 10	ND 0.010
BOD5	mg/L		8/18	9	7/17	6	--	26
COD	mg/L		41	11.3	35	13.9	--	66.5
Hardness	mg/L		46	23.5	36	15.0	--	62.6
TSS	mg/L		70	38.4	56	110.4	--	81
TDS	mg/L		150	ND 98	170	ND 83	--	190
TOC	mg/L		7	ND 2.0	8	ND 3.1	--	13.9

Notes:

NDx Not detected at or above x

TAL Target Analyte List

BOD Biological Oxygen Demand

COD Chemical Oxygen Demand

TSS Total Suspended Solids

TDS Total Dissolved Solids

TOC Total Organic Carbon

J Reported value is estimated

R Reported value was rejected

-- Not Analyzed

Exceeds TBC Criteria

Mercury was not detected and thus not listed.

NL Not Listed in Table 5.2 of Pre-design Work Plan

For Operable Unit-1, Revision 2, dated Jan/99

NR Not Regulated

(1) Sum not to exceed 500 µg/L

(2) Not analyzed for inorganics during RI performed by Northrop

TABLE 9

SUMMARY OF DETECTED INORGANICS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

			Location ID:	MW-50J2		MW-50D2	Composite-1	MW-52I	MW-52S
Parameters	Units	TBC Criteria	Collection Date:	01/18/90	12/16/98	12/16/98	12/16/98	12/17/98	12/17/98
TAL Metals (total)									
Aluminum	µg/L	NR		370	ND 21.1/90.3	782	ND 48.2J	ND 40.1J	543J
Antimony	µg/L	6		ND 20.0	ND 2.9/ND 2.9	ND 2.9	ND 2.9	ND 2.9	ND 2.9
Arsenic	µg/L	25		43 J	48.7/49.0	3.1	61.6	ND 2.4	ND 2.4
Barium	µg/L	1000		14.0	11.2/11.4	22.2	46.7	ND 13.9	28.3
Beryllium	µg/L	1		ND 2.0	ND 0.30/ND 0.30	ND 0.30	ND 0.30	ND 0.30	ND 0.30
Cadmium	µg/L	5		1	ND 0.50/ND 0.50	ND 0.50	ND 0.50	ND 0.50	ND 0.50
Calcium	µg/L	NR		29000 J	11200/11300	66800	14000	5070	19100
Chromium	µg/L	50		ND 1.0	1.6/1.4	9.6	ND 0.90	ND 0.90	ND 0.90
Cobalt	µg/L	NR		3.0	ND 3.6/ND 3.6	ND 3.6	ND 3.6	ND 3.6	ND 3.6
Copper	µg/L	200		ND 0.3	ND 2.2/ND 2.2	ND 2.2	ND 2.2	ND 2.2	18.3
Iron	µg/L	300 (1)		12000 J	32100/32300	ND 48.3	72500J	ND 40.3J	1630J
Lead	µg/L	15		2 J	4.2/4.0	ND 1.0	ND 4.6	ND 1.0	8.7
Magnesium	µg/L	NR		3200	2290/2310	ND 76.3	3810	1560	3070
Manganese	µg/L	300 (1)		170 J	314/315	1.0	390	7.8	402
Nickel	µg/L	NR		15 R	ND 3.2/ND 3.2	ND 3.2	ND 3.2	ND 3.2	5.4
Potassium	µg/L	NR		9600 J	1370J/1380J	1480J	2080	1110	3300
Selenium	µg/L	10		ND 2 J	ND 1.9/ND 1.9	ND 1.9	3.0	ND 1.9	ND 1.9
Silver	µg/L	50		ND 1 J	1.7/ND 1.7	ND 0.60	5.3	ND 0.60	ND 0.60
Sodium	µg/L	20000		25000 J	17500/17700	6830	11500	18400	19400
Thallium	µg/L	NL		ND 2	1.2/1.8	ND 1.2	ND 1.3	ND 1.5	ND 1.2
Vanadium	µg/L	NR		3 R	ND 1.9/ND 1.9	14.9	ND 1.9	ND 1.9	ND 1.9
Zinc	µg/L	300		52 J	ND 5.6/ND 6.1	ND 5.6	ND 6.3	ND 8.0	194
TAL Metals (filtered)									
Iron	µg/L	300 ⁽¹⁾		--	30700/32200	--	--	ND 16.6	452
Manganese	µg/L	300 ⁽¹⁾		--	316/331	--	--	7.7	374

TABLE 9

SUMMARY OF DETECTED INORGANICS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	Location ID:	MW-50J2	MW-50D2	Composite-1	MW-52I	MW-52S
		Collection Date:	01/18/90	12/16/98	12/16/98	12/16/98	12/17/98
General Chemistry (total)							
Cyanide	mg/L	ND 10	ND 0.010/ND 0.010	ND 0.010	ND 0.010	ND 0.010	ND 0.010
BOD5	mg/L	--	3/3	ND 2	9	ND 2	ND 2
COD	mg/L	--	ND 10.0/11.3	ND 10.0	ND 24.4	ND 10.0	ND 21.8
Hardness	mg/L	--	37.4/37.6	167	50.7	133	60.4
TSS	mg/L	--	66.4/63.6	6	151	ND 4	169
TDS	mg/L	--	115/ND 110	216	121	ND 92	133
TOC	mg/L	--	ND 1.5/ND 1.4	ND 1.1	ND 5.5	ND 1.1	ND 1.4

Notes:

NDx Not detected at or above x

TAL Target Analyte List

BOD Biological Oxygen Demand

COD Chemical Oxygen Demand

TSS Total Suspended Solids

TDS Total Dissolved Solids

TOC Total Organic Carbon

J Reported value is estimated

R Reported value was rejected

-- Not Analyzed

Exceeds TBC Criteria

Mercury was not detected and thus not listed.

NL Not Listed in Table 5.2 of Predesign Work Plan

For Operable Unit-1, Revision 2, dated Jan/99

NR Not Regulated

(1) Sum not to exceed 500 µg/L

(2) Not analyzed for inorganics during RI performed by Northrop

TABLE 9

SUMMARY OF DETECTED INORGANICS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

			Location ID:	MW-52D	GM-101 ⁽¹⁾	Composite-2	F-1		F-2	
Parameters	Units	TBC Criteria	Collection Date:	12/17/98	12/17/98	12/16/98	01/18/90	12/18/98	01/18/90	12/18/98
TAL Metals (total)										
Aluminum	µg/L	NR		ND 86.1J	ND 51.6J	300J	14 R	ND 15.1J	94	ND 21.7J
Antimony	µg/L	6		ND 2.9	ND 2.9	ND 2.9	22	ND 2.9	66 J	ND 2.9
Arsenic	µg/L	25		ND 2.4	ND 2.4	ND 2.4	45 J	32.1	40 J	75.4
Barium	µg/L	1000		30.5	29.3	21.6	57	34.6	16	18.1
Beryllium	µg/L	1		ND 0.30	ND 0.30	ND 0.30	ND 2	ND 0.30	ND 2	ND 0.30
Cadmium	µg/L	5		ND 0.50	ND 0.50	ND 0.50	ND 1	ND 0.50	3	ND 0.50
Calcium	µg/L	NR		19800	4410	12000	14000 J	13200	7500 J	7300
Chromium	µg/L	50		ND 0.90	ND 0.90	ND 0.90	1	ND 0.90	ND 1	ND 0.90
Cobalt	µg/L	NR		ND 3.6	5.7	ND 3.6	8	ND 3.6	4	ND 3.6
Copper	µg/L	200		ND 2.2	5.4	5.4	2.1	ND 2.2	0.3	ND 2.2
Iron	µg/L	300 (1)		299J	ND 16.6J	726J	84000 J	68600J	72000 J	101000J
Lead	µg/L	15		ND 1.6	ND 1.0	4.1	ND 2 J	3.7	ND 4 J	5.8
Magnesium	µg/L	NR		6420	1640	2460	29000	3000	1700	2390
Manganese	µg/L	300 (1)		11.1	214	219	120 J	156	970 J	255
Nickel	µg/L	NR		7.2	ND 3.2	ND 3.2	19 R	ND 3.2	16 R	ND 3.2
Potassium	µg/L	NR		1970	63000	2090	1800	1250	1400	1610
Selenium	µg/L	10		5.4	ND 1.9	ND 1.9	ND 2 J	ND 1.9	ND 20 J	ND 1.9
Silver	µg/L	50		ND 0.60	ND 0.60	ND 0.60	ND 1 J	3.2	ND 1 J	4.7
Sodium	µg/L	20000		20100	47900	19800	4900 J	12100	7300 J	9960
Thallium	µg/L	NL		ND 1.2	ND 1.5	ND 1.2	ND 2	ND 1.2	ND 2	ND 1.2
Vanadium	µg/L	NR		ND 1.9	ND 1.9	ND 1.9	ND 1	ND 1.9	ND 1	ND 1.9
Zinc	µg/L	300		ND 17.3	ND 9.3	87.6	33 R	ND 5.6	18 R	ND 5.6
TAL Metals (filtered)										
Iron	µg/L	300 ⁽¹⁾		--	ND 16.6	--	--	--	--	--
Manganese	µg/L	300 ⁽¹⁾		--	172	--	--	--	--	--

TABLE 9

SUMMARY OF DETECTED INORGANICS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

Parameters	Units	Location ID: MW-52D	GM-101 ⁽²⁾	Composite-2	F-1		F-2	
		Collection Date: 12/17/98	12/17/98	12/16/98	01/18/90	12/18/98	01/18/90	12/18/98
General Chemistry (total)								
Cyanide	mg/L	ND 0.010	ND 0.010	ND 0.010	ND 10	ND 0.010	ND 10	ND 0.010
BOD5	mg/L	ND 2	ND 2	2	--	3	--	2
COD	mg/L	ND 10.0	ND 10.0	10.0	--	16.5	--	29.7
Hardness	mg/L	75.9	17.7	40.0	--	45.4	--	27.9
TSS	mg/L	46.0	ND 4	35.2	--	8	--	38.4
TDS	mg/L	191	270	118	--	193	--	138
TOC	mg/L	ND 1.3	ND 1.1	ND 1.2	--	ND 2.8	--	ND 4.8

Notes:

NDx Not detected at or above x

TAL Target Analyte List

BOD Biological Oxygen Demand

COD Chemical Oxygen Demand

TSS Total Suspended Solids

TDS Total Dissolved Solids

TOC Total Organic Carbon

J Reported value is estimated

R Reported value was rejected

— Not Analyzed

Exceeds TBC Criteria

Mercury was not detected and thus not listed.

NL Not Listed in Table 5.2 of Predesign Work Plan

For Operable Unit-1, Revision 2, dated Jan/99

NR Not Regulated

(1) Sum not to exceed 500 µg/L

(2) Not analyzed for inorganics during RI performed by Northrop

TABLE 9

SUMMARY OF DETECTED INORGANICS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

			Location ID: MW-50D1	I-1		I-2	
Parameters	Units	TBC Criteria	Collection Date: 12/18/98	01/17/90	12/19/98	01/17/90	12/19/98
TAL Metals (total)							
Aluminum	µg/L	NR	929J	230/200	ND 11.5J	200 J	120J
Antimony	µg/L	6	ND 2.9	ND 20/ND 20	ND 2.9	ND 20	ND 2.9
Arsenic	µg/L	25	6.2	5/6	ND 2.4	2	5.7
Barium	µg/L	1000	ND 17.6	140/140	114	17	19.9
Beryllium	µg/L	1	ND 0.30	ND 2/ND 2	ND 0.30	ND 2	ND 0.30
Cadmium	µg/L	5	ND 0.50	1/ND 1	ND 0.50	ND 1	0.69
Calcium	µg/L	NR	37100	38000J/38000J	29200	15000 J	14600
Chromium	µg/L	50	3.3	ND 1/ND 1	ND 0.90	ND 1	3.2
Cobalt	µg/L	NR	ND 3.6	49/46	ND 3.6	ND 1	3.9
Copper	µg/L	200	7.2	ND 0.3/ND 0.3	ND 2.2	5.4	3.2
Iron	µg/L	300 (1)	1370J	5100J/5100J	38.7J	2700 J	14000J
Lead	µg/L	15	4.1	ND 2J/ND 2J	ND 1.0	3 J	2.8
Magnesium	µg/L	NR	3120	4500/4600	5060	2900	4200
Manganese	µg/L	300 (1)	38.1	470J/460J	159	680 J	1230
Nickel	µg/L	NR	5.1	23R/11R	5.7	14 R	37.8
Potassium	µg/L	NR	ND 1110	3000/2900	2500	2400	2430
Selenium	µg/L	10	ND 1.9	ND 2J/ND 2J	2.4	ND 2 J	ND 1.9
Silver	µg/L	50	ND 0.60	ND 1J/ND 3J	ND 0.60	3 J	ND 0.60
Sodium	µg/L	20000	16000	21000J/21000J	11700	20000 J	12900
Thallium	µg/L	NL	ND 1.2	ND 2/ND 2	ND 1.2	ND 2	ND 1.2
Vanadium	µg/L	NR	13.5	ND 1/ND 1	ND 1.9	ND 1	ND 1.9
Zinc	µg/L	300	12.6	78R/78R	8.6	23 R	6.1
TAL Metals (filtered)							
Iron	µg/L	300 ⁽¹⁾	ND 16.6	--	--	--	13900
Manganese	µg/L	300 ⁽¹⁾	4.6	--	--	--	1240

TABLE 9

SUMMARY OF DETECTED INORGANICS - GROUNDWATER
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

		Location ID: MW-50D1	I-1		I-2	
		Collection Date: 12/18/98	01/17/90	12/19/98	01/17/90	12/19/98
Parameters	Units					
General Chemistry (total)						
Cyanide	mg/L	ND 0.010	ND 10/ND 10	ND 0.010	ND 10	ND 0.010
BOD5	mg/L	ND 2	--	4	--	.2
COD	mg/L	11.3	--	ND 10.0	--	ND 10.0
Hardness	mg/L	104	--	91.8	--	53.6
TSS	mg/L	418	--	4.4	--	42
TDS	mg/L	187	--	146	--	121
TOC	mg/L	ND 1.1	--	ND 1.8	--	ND 1.0

Notes:

NDx Not detected at or above x

TAL Target Analyte List

BOD Biological Oxygen Demand

COD Chemical Oxygen Demand

TSS Total Suspended Solids

TDS Total Dissolved Solids

TOC Total Organic Carbon

J Reported value is estimated

R Reported value was rejected

-- Not Analyzed

Exceeds TBC Criteria

Mercury was not detected and thus not listed.

NL Not Listed in Table 5.2 of Predesign Work Plan

For Operable Unit-1, Revision 2, dated Jan/99

NR Not Regulated

(1) Sum not to exceed 500 µg/L

(2) Not analyzed for inorganics during RI performed by Northrop

TABLE 10

SUMMARY OF REDOX PARAMETERS
PREDESIGN INVESTIGATION
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

		Location ID:	R-1	A-1	MW50J1	MW50J2	MW50J2	MW521	MW52S	GM-101
		Sample ID:	DJT-001	DJT-002	DJT-011	DJT-012	DJT-013	DJT-017	DJT-018	DJT-020
		Collection Date:	12/14/98	12/14/98	12/16/98	12/16/98	12/16/98	12/17/98	12/17/98	12/17/98
Parameters	Units						Duplicate			
T. Organic Carbon (TOC)	mg/L	-	-	-	13.9	ND 1.5	ND 1.4	ND 1.1	ND 1.4	ND 1.1
Dissolved Oxygen (DO)	mg/L	10.46	11.82	5.94	1.62	-	2.82	0.71	5.16	
ORP	mV	225	241	-38	-63	-	133	80	1.9	
Nitrate-Nitrite (As N)	mg/L	1.1	2.3	ND 0.24	ND 0.11	ND 0.15	1.2	ND 0.10	4.9	
Nitrite (As N)	mg/L	ND 0.05J	ND 0.05	0.12	ND 0.05	0.05	ND 0.05	ND 0.05	ND 0.05	
Ammonia (As N)	mg/L	0.14	ND 0.05	2.1	1.3	1.1	ND 0.12	0.48	0.49	
Manganese (dissolved-lab)	mg/L	0.003	0.020	0.407	0.316	0.331	0.008	0.374	0.172	
Iron (dissolved-lab)	mg/L	ND 0.0166	ND 0.0166	106	30.7	32.2	ND 0.0166	0.452	ND 0.0166	
Iron (dissolved-field)	mg/L	0.26	0.04	5.2	5.45	-	0.05	0.47	NA	
Sulfate	mg/L	27.9	43.1	ND 1.0	17.3	17.1	24.3	24.3	14.2	
Sulfide	mg/L	ND 0.5	ND 0.5	ND 0.5	ND 0.5	ND 0.5	ND 0.5	ND 0.5	ND 0.5	
Methane	mg/L	ND 0.001	ND 0.001	13	0.430J	0.120J	0.016	0.42	ND 0.0019	
Ethane	mg/L	ND 0.001	ND 0.001	0.51	0.0039	0.0016	ND 0.0005	0.0038	ND 0.0005	
Ethene	mg/L	ND 0.001	ND 0.001	0.0017	0.055J	0.026J	0.65	0.81	0.0016	

Notes:

- Not Applicable.

J Estimated.

NDx Not detected at or above x.

TAL Target Analyte List.

TCL Target Compound List.

TABLE 11

MOORE CHEMICAL/RUCO POLYMER SITE
SUMMARY OF CHEMICAL COMPOUNDS (DETECTS + UNDETECTS/2)
GROUNDWATER

COMPOUND	VALID	UN- OCCUR	DETECT	EST	REJECT	DETECT	MINIMUM DETECTED CONCENTRATION	SAMPLE ID	MAXIMUM DETECTED CONCENTRATION	SAMPLE ID	MEDIAN CONCENTRATION	GEOMETRIC MEAN	MEAN CONCENTRATION	LOWER QUANTILE	UPPER QUANTILE	STANDARD DEV.	95% CI UPPER LIMIT
1) Low Detection Limit Volatile (LDL VOA) ug/L																	
(Halogenated Volatiles)																	
Chlorobenzene	36	3	33	0	0	0.08	2.000	E1	6.000	P1	0.020	0.027	0.241	0.020	0.020	3.335	0.100
Chloromethane	36	3	33	1	0	0.08	9.000	N 1059 J	10.000	N1, 0	0.065	0.066	0.589	0.065	0.065	3.183	0.290
Tetrachloroethene	34	14	20	6	2	0.41	0.800	S2	98.000	D1	0.070	0.507	11.979	0.070	5.000	15.382	275.570 x
trans-1,2-Dichloroethene	36	16	20	13	0	0.44	1.000	D2	54.000	D1	0.050	0.358	4.863	0.050	3.000	12.117	55.590 x
Trichloroethene	36	11	25	1	0	0.31	2.000	C2	18.000	D1	0.095	0.297	2.096	0.095	2.000	6.694	6.150
Vinyl Chloride	36	8	28	3	0	0.22	7.000	D2	560.000	N 1059 J	0.085	0.278	22.180	0.085	0.085	12.565	68.530
							TOTAL	====>	21.000								746.000
(Non-Halogenated Volatiles)																	
2-Butanone	36	2	34	1	0	0.06	3.000	J2	3.000	J2	5.000	4.930	4.944	5.000	5.000	1.089	5.070 x
4-Methyl-2-Pentanone	36	4	32	2	0	0.11	11.000	J1	320.000	P1	5.000	5.953	16.306	5.000	5.000	2.073	10.190
Acetone	35	35	0	0	1	1.00	10.000	A1	10.000	S2	10.000	10.000	10.000	10.000	10.000	1.000	10.000
Benzene	36	2	34	0	0	0.06	10.000	N 1059 J	10.000	N 1059 J	0.020	0.024	0.297	0.020	0.020	2.817	0.070
Carbon Disulfide	33	6	27	4	3	0.18	1.000	D2	4.000	F1	2.500	2.367	2.455	2.500	2.500	1.349	2.720
Ethylbenzene	36	4	32	1	0	0.11	3.000	E1	8.000	P1	0.030	0.046	0.528	0.030	0.030	4.337	0.290
Xylene (total)	36	7	29	3	0	0.19	1.000	F1	15.000	P1	0.050	0.100	0.903	0.050	0.050	5.088	0.970
							TOTAL	====>	39.000								370.000

NOTE: (x), IN 95% CI COLUMN, INDICATES VALUE IS GREATER THAN MAXIMUM CONCENTRATION; (*), ASTERISKS, INDICATE THAT THE NUMBER OF OCCURRENCES IS TOO SMALL TO ALLOW CALCULATION

TABLE II

MODER CHEMICAL/BLDC POLYMER SITE
SUMMARY OF CHEMICAL COMPOUNDS (DETECTS + UNDETECTS/2)
GROUNDWATER

COMPOUND	UN- VALID OCCUR	DETECT	EST	REJECT	DETECT	MINIMUM DETECTED CONCENTRATION	SAMPLE ID	MAXIMUM DETECTED CONCENTRATION	SAMPLE ID	MEDIAN CONCENTRATION	GEOMETRIC MEAN	MEAN CONCENTRATION	LOWER QUANTILE	UPPER QUANTILE	STANDARD DEV.	95% CI UPPER LIMIT
(I) Base Neutral Acid (RNA) ug/L																
(Polycyclic Aromatic Hydrocarbons)																
NAPHTHALENE	34	1	33	1	0	0.03	2,000 E1	2,000 E1		5,000	4,867	4,912	5,000	5,000	1,170	5,168 x
TOTAL	*****					2,000		2,000								
(Phthalate Esters)																
BIS(2-ETHYLHEXYL)PHTHALATE	29	16	13	16	5	0.55	1,000 M1 D	6,000 I2		5,000	3,557	3,897	2,000	5,000	1,603	4,747
DI-n-BUTYLPHthalATE	34	1	33	0	0	0.03	45,000 P1	45,000 P1		5,000	5,354	6,176	5,000	51,000	1,458	6,468
DI-n-OCTYL PHTHALATE	34	1	33	1	0	0.03	2,000 D1	2,000 D1		5,000	4,867	4,912	5,000	5,000	1,170	5,168 x
TOTAL	*****					48,000		53,000								
(I) Pesticide/Polychlorinated Biphenyl (PEST/PCB) ug/L																
(Pesticides)																
DIENDRIN	35	1	34	1	0	0.03	0,004 G2	0,004 G2		0,050	0,050	0,062	0,050	0,050	1,799	0,073 x
HEPTACHLOR EPOXIDE	35	2	33	2	0	0.06	0,003 G2	0,015 I1		0,025	0,025	0,031	0,025	0,025	1,724	0,035 x
TOTAL	*****					0,007		0,019								
(I) Inorganic (INORG) ug/L																
ALUMINUM	31	31	0	20	4	1.00	12,000 A2	1200,000 S2		230,000	198,538	345,194	160,000	580,000	3,446	791,917
ARSENIC	35	3	32	1	0	0.09	22,000 F1	66,000 F2		17,000	15,363	17,264	10,000	17,000	1,543	19,478
ARSENIC	35	13	22	7	0	0.37	2,000 I2	68,000 J1		1,000	2,999	11,314	1,000	8,000	4,882	26,846

NOTE: (*), IN 95% CI COLUMN, INDICATES VALUE IS GREATER THAN MAXIMUM CONCENTRATION; (*), ASTERISKS, INDICATE THAT THE NUMBER OF OCCURRENCES IS TOO SMALL TO ALLOW CALCULATION

TABLE 11

MOORE CHEMICAL/ROCKY MOUNTAIN SITE
SUMMARY OF CHEMICAL CONCENTRATIONS (DETECTED + UNDETECTED)
GROUNDWATER

COMPOUND	UN-				RECEIVED		MINIMUM		MAXIMUM		MEDIAN		GEOMETRIC		MEAN		LOWER		UPPER		STANDARD		95% CI	
	VALID	OCCUR	DETECT	EST	REJECT	DETECT	DETECTED	SAMPLE ID	DETECTED	SAMPLE ID	CONCENTRATION	CONCENTRATION	CONCENTRATION	MEAN	CONCENTRATION	CONCENTRATION	QUANTILE	QUANTILE	DEV.	UPPER	UPPER			
BARIUM	35	35	0	2	0	1.00	0.000	52	140,000	11	D	39,000	36,235	51,316	19,000	74,000	2,402	75,258						
BERYLLIUM	35	0	27	0	0	0.23	0.210	G2	2,000	A1	1,000	0.611	0.799	0.585	1,000	2,400	1,566	1,566						
CADMIUM	35	14	21	1	0	0.40	1,000	D2	130,000	C1	1,000	1,329	5,129	1,000	1,500	2,789	3,640	3,640						
CALCIUM	35	35	0	29	0	1.00	2400,000	A2	150000,000	S1	D	14381,603	23140,000	8,383	8650,000	21000,000	2,465	31423,703						
CHROMIUM	30	17	13	2	5	0.57	1,000	F1	160,000	D1	2,000	1,788	0.303	0.500	0.500	4,000	4,066	11,326						
COBALT	35	19	16	1	0	0.54	2,000	E1	49,000	I1	3,000	3,025	7,145	1,500	6,000	3,631	13,720							
COPPER	33	17	16	2	2	0.52	0.340	F2	16,000	A1	2,000	1,123	3,230	0.150	4,300	5,253	12,181							
IRON	34	34	0	26	1	1.00	49,000	H1	64000,000	F1	3900,000	2206,835	15496,971	370,000	23000,000	11,469	303657,356							
LEAD	31	13	18	13	4	0.42	2,000	B2	45,000	H 1059	3	1,790	3,290	1,000	3,000	2,300	3,596							
MAGNESIUM	35	35	0	4	0	1.00	360,000	S1	6400,000	C1	2600,000	1977,031	2657,429	1250,000	3150,000	2,076	3401,812							
MANGANESE	33	33	0	25	2	1.00	4,000	B1	1700,000	H 1059	3	80,425	276,121	23,000	460,000	5,990	1469,572							
MERCURY	35	1	34	0	0	0.03	0.200	B1	0.200	B1	0.100	0.102	0.103	0.100	0.100	0.100	1,124	0.106						
NICKEL	22	7	15	1	13	0.32	3,000	D1	150,000	H2	3,000	4,079	11,318	3,000	7,000	2,999	15,020							
POTASSIUM	34	34	0	5	1	1.00	660,000	A2	22000,000	S2	1600,000	2074,450	3169,706	1100,000	3600,000	2,294	4089,514							
SELENIUM	35	1	34	1	0	0.03	4,000	L1	1,000	L1	1,000	1,354	2,114	1,000	1,000	2,150	2,422							
SILVER	33	7	26	6	2	0.21	1,000	D1	6,000	A1	1,000	0,954	1,182	0.500	1,000	1,812	1,406							
SODIUM	35	35	0	30	0	1.00	1200,000	E1	54000,000	A1	17000,000	11648,655	15551,429	6200,000	20500,000	2,336	23383,772							
VANADIUM	28	6	22	2	7	0.21	4,000	H1	16,000	S2	2,000	1,720	2,679	0.500	2,000	2,567	4,270							
ZINC	22	11	11	6	13	0.50	3,000	E1	100,000	L1	4,000	5,209	13,273	3,000	10,000	3,663	30,911							
TOTAL	****	****	****	****	****	****	4736,750	****	320351,200	****	****	****	****	****	****	****	****	****	****	****	****			

TABLE 12

PARAMETERS AND ASSUMPTIONS TO CALCULATE
GROUND WATER EXPOSURE PATHWAYS
FUTURE USE SCENARIO
HOOKER/RUCO SITE

Receptor: Residents—Adults

Exposure Route	Ingestion	Dermal Contact	Inhalation
Exposure Frequency <i>days/year</i>	350	350	350
Exposure Duration <i>years/life time</i>	30	30	30
Body Weight <i>kg</i>	70	70	70
Bioavailability Factor	1	-	1
Ingestion Rate <i>L/day</i>	2	-	-
Skin Surface Area <i>cm²</i>	-	20000	-
Exposure Time <i>hours/day</i>	-	0.25	0.33
Inhalation Rate <i>M3/Hr</i>	-	-	1.4

Parameters for Shower

Shower Frequency=1/day
 Shower Room Vol.(m³)=12.0
 Droplet Diam.(mm)=1.0
 Shower Water Flow Rate (l/min.)=10.0
 Bathroom Air Exchange Rate (exch/hr)=1.0

Shower Water Temperature (C)=45.0
 Droplet Drop Time (sec.)=2.000
 Shower Duration (min.) =15.0
 Time in Room After Shower (min.) =5.0
 Viscosity of Shower Water (cp) = 0.601

TABLE 13

PARAMETERS AND ASSUMPTIONS TO CALCULATE
GROUND WATER EXPOSURE PATHWAYS
FUTURE USE SCENARIO
HOOKER/RUCO SITE

Receptor: Residents—Children

Exposure Route	Ingestion	Dermal Contact	Inhalation
Exposure Frequency <i>days/year</i>	350	350	350
Exposure Duration <i>years/life time</i>	6	6	6
Body Weight <i>kg</i>	35	35	35
Bioavailability Factor	1	-	1
Ingestion Rate <i>L/day</i>	2	-	-
Skin Surface Area <i>cm²</i>	-	12000	-
Exposure Time <i>hours/day</i>	-	0.25	0.33
Inhalation Rate <i>M3/Hr</i>	-	-	1.5

Parameters for Shower

Shower Frequency=1/day
Shower Room Vol.(m³)=12.0
Droplet Diam.(mm)=1.0
Shower Water Flow Rate (l/min.)=10.0
Bathroom Air Exchange Rate (exch/hr)=1.0

Shower Water Temperature (C)=45.0
Droplet Drop Time (sec.)=2.000
Shower Duration (min.) =15.0
Time in Room After Shower (min.) =5.0
Viscosity of Shower Water (cp) = 0.601

TABLE 14

HOOKER/RUCO SITE
TOXICITY DATA FOR NONCARCINOGENIC
AND POTENTIAL CARCINOGENIC EFFECTS
DOSE RESPONSE EVALUATION

Chemical Name	Noncarcinogen Reference Dose		Subchronic Noncarcinogen Reference Dose		Carcinogen Slope Factor				Compounds w/o Criteria
	RfD(oral) (mg/Kg-day)	RfD(Inhalation) (mg/Kg-day)	RfD (oral sub) (mg/Kg-day)	RfD(Inhalation, sub) (mg/Kg-day)	Oral SF (mg/Kg-day) ⁻¹	Weight	Inhalation SF (mg/Kg-day) ⁻¹	Weight	
Volatiles:									
1,1,1-Trichloroethane	9.00E-02	3.00E-01	9.00E-01	3.00E+00	NA	D	NA	D	
1,1,2,2-Tetrachloroethane	NA	NA	NA	NA	2.00E-01	C	2.00E-01	C	
1,1-Dichloroethene	9.00E-03	ND	9.00E-03	ND	6.00E-01	C	1.20E+00	C	
2-Butanone	5.00E-02	9.00E-02	5.00E-01	9.00E-01	NA	D	NA	D	
4-Methyl-2-pentanone	5.00E-02	2.00E-02	NA	NA	NA	NA	NA	NA	
Acetone	1.00E-01	NA	1.00E+00	NA	NA	D	NA	D	
Benzene	NA	NA	NA	NA	2.90E-02	A	2.90E-02	A	
Bromodichloromethane	2.00E-02	ND	2.00E-02	ND	1.30E-01	B2	ND	B2	
Carbon Disulfide	1.00E-01	2.90E-03	1.00E-01	2.90E-03	NA	NA	NA	NA	
Carbon Tetrachloride	7.00E-04	ND	7.00E-03	ND	1.30E-01	B2	1.30E-01	B2	
Chlorobenzene	2.00E-02	5.00E-03	2.00E-01	5.00E-02	NA	D	NA	D	
Chloroform	1.00E-02	NA	1.00E+00	NA	6.10E-03	B2	8.10E-02	B2	
Chloromethane	NA	NA	NA	NA	1.30E-02	C	6.30E-03	C	
Ethylbenzene	1.00E-01	2.90E-01	1.00E+00	2.90E-01	NA	D	NA	D	
Styrene	2.00E-01	ND	2.00E+00	ND	3.00E-02	B2	2.00E-03	B2	
Tetrachloroethene	1.00E-02	NA	1.00E-01	NA	5.10E-02	B2	1.80E-03	B2	
Toluene	2.00E-01	5.70E-01	2.00E+00	2.70E-01	NA	D	NA	D	
Total Xylenes	2.00E+00	8.60E-02	4.00E+00	8.60E-02	NA	D	NA	D	
Trans-1,2-Dichloroethene	2.00E-02	ND	2.00E-01	ND	NA	NA	NA	NA	
Trichloroethene	NA	NA	NA	NA	1.10E-02	B2	1.70E-02	B2	
Vinyl Chloride	NA	NA	NA	NA	1.90E+00	A	2.90E-01	A	

EPA Weight of Evidence Classifications are as follows:

- Group A:- Human Carcinogen. Sufficient evidence from epidemiologic studies to support a causal association between exposure and cancer.
 Group B1:- Probable Human Carcinogen. Limited evidence of carcinogenicity in human from epidemiological studies.
 Group B2:- Probable Human Carcinogen. Sufficient evidence of carcinogenicity in animals. Inadequate evidence of carcinogenicity in humans.
 Group C:- Possible Human Carcinogen. Limited evidence of carcinogenicity in animals.
 Group D:- Not Classified. Inadequate evidence of carcinogenicity in animals.

Note: All toxicity values unless otherwise noted are from Integrated Risk Information System (IRIS) June 1992 sessions, and from Health Effects Assessment Summary Tables (HEAST)-1990 4th Quarter (USEPA, 1990).
 NA :Not Available
 ND : Not Determined

TABLE 14

HOOKER/RUCO SITE
TOXICITY DATA FOR NONCARCINOGENIC
AND POTENTIAL CARCINOGENIC EFFECTS
DOSE RESPONSE EVALUATION

Chemical Name	Noncarcinogen Reference Dose		Subchronic Noncarcinogen Reference Dose		Carcinogen Slope Factor				Compounds w/o Criteria
	RfD(oral) (mg/Kg-day)	RfD(Inhalation) (mg/Kg-day)	RfD (oral sub) (mg/Kg-day)	RfD(Inhalation, sub) (mg/Kg-day)	Oral SF (mg/Kg-day)-1	Weight	Inhalation SF (mg/Kg-day)-1	Weight	
Semi-Volatiles;									
Benzole Acid	4.00E+00	NA	4.00E+00	NA	NA	D	NA	D	2-Methylnaphthalene
Bis(2-ethylhexyl)phthalate	2.00E-02	ND	2.00E-02	NA	1.40E-02	B2	ND	B2	Benzo (g,h,i) perylene
Butyl benzyl phthalate	2.00E-01	NA	2.00E+00	NA	NA	C	NA	C	4-Methylphenol
Di-n-butyl phthalate	1.00E-01	NA	1.00E+00	NA	NA	D	NA	D	Phenanthrene
Di-n-octyl phthalate	2.00E-02	NA	2.00E-02	NA	NA	NA	NA	NA	Dibenzofuran
Hexachlorobenzene	8.00E-04	ND	8.00E-04	ND	1.60E+00	B2	1.60E+00	B2	
n-Nitrosodiphenylamine	NA	NA	NA	NA	4.90E-03	B2	NA	B2	
Phenol	6.00E-01	NA	6.00E-01	NA	NA	D	NA	D	
Carcinogenic PAHs (1)	NA	NA	NA	NA	5.80E+00	B2	6.10E+00	B2	
Noncarcinogenic PAHs									
Acenaphthene	6.00E-02	NA	6.00E-01	NA	NA	D	NA	D	
Anthracene	3.00E-01	NA	3.00E+00	NA	NA	D	NA	D	
Fluoranthrene	4.00E-02	NA	4.00E-01	NA	NA	NA	NA	NA	
Fluorene	4.00E-02	NA	4.00E-01	NA	NA	D	NA	D	
Naphthalene	4.00E-03	NA	4.00E-02	NA	NA	D	NA	D	
Pyrene	3.00E-02	NA	3.00E-01	NA	NA	D	NA	D	

EPA Weight of Evidence Classifications are as follows:

- Group A:- Human Carcinogen. Sufficient evidence from epidemiologic studies to support a causal association between exposure and cancer.
 Group B1:- Probable Human Carcinogen. Limited evidence of carcinogenicity in human from epidemiological studies.
 Group B2:- Probable Human Carcinogen. Sufficient evidence of carcinogenicity in animals. Inadequate evidence of carcinogenicity in humans.
 Group C:- Possible Human Carcinogen. Limited evidence of carcinogenicity in animals.
 Group D:- Not Classified. Inadequate evidence of carcinogenicity in animals.

Note: All toxicity values unless otherwise noted are from Integrated Risk Information System (IRIS) June 1992 sessions, and from Health Effects Assessment Summary Tables (HEAST)-1990 4th Quarter (USEPA, 1990).

(1). All carcinogenic PAHs are evaluated as Benzo(a)pyrene

NA :Not Available

ND : Not Determined

TABLE 14

HOOKER/RUCO SITE
TOXICITY DATA FOR NONCARCINOGENIC
AND POTENTIAL CARCINOGENIC EFFECTS
DOSE RESPONSE EVALUATION

Chemical Name	Noncarcinogen Reference Dose		Subchronic Noncarcinogen Reference Dose		Carcinogen Slope Factor				Compounds w/o Criteria
	RfD(oral) (mg/Kg-day)	RfD(inhalation) (mg/Kg-day)	RfD (oral sub) (mg/Kg-day)	RfD (inhalation, sub) (mg/Kg-day)	Oral SF (mg/Kg-day) ⁻¹	Weight	Inhalation SF (mg/Kg-day) ⁻¹	Weight	
PCBs And Pesticide:									
4,4'-DDD	NA	NA	NA	NA	2.40E-01	B2	NA	B2	
4,4'-DDE	NA	NA	NA	NA	3.40E-01	B2	NA	B2	
4,4'-DDT	5.00E-04	NA	5.00E-04	NA	3.40E-01	B2	3.40E-01	B2	
Beta-BHC	NA	NA	NA	NA	1.80E+00	C	1.80E+00	C	
Chlordane (2)	6.00E-05	ND	6.00E-05	ND	1.30E+00	B2	1.30E+00	B2	
Dieldrin	5.00E-05	NA	5.00E-05	NA	1.60E+01	B2	1.60E+01	B2	
Heptachlor Epoxide	1.30E-05	NA	5.00E-04	NA	9.10E+00	B2	9.10E+00	B2	
Total PCBs (3)	ND	ND	NA	NA	7.70E+00	B2	ND	B2	

EPA Weight of Evidence Classifications are as follows:

- Group A:- Human Carcinogen. Sufficient evidence from epidemiologic studies to support a causal association between exposure and cancer.
 Group B1:- Probable Human Carcinogen. Limited evidence of carcinogenicity in human from epidemiological studies.
 Group B2:- Probable Human Carcinogen. Sufficient evidence of carcinogenicity in animals. Inadequate evidence of carcinogenicity in humans.
 Group C:- Possible Human Carcinogen. Limited evidence of carcinogenicity in animals.
 Group D:- Not Classified. Inadequate evidence of carcinogenicity in animals.

Note: All toxicity Values unless otherwise noted are from Integrated Risk Information System (IRIS) June 1992 sessions, and from Health Effects Assessment Summary Tables (HEAST)-1990 4th Quarter (USEPA, 1990).

NA :Not Available

ND : Not Determined

(2) Alpha chlordane is evaluated as chlordane.

(3) All PCBs are evaluated as Aroclor 1260

TABLE 14

HOOKER/RUCO SITE
TOXICITY DATA FOR NONCARCINOGENIC
AND POTENTIAL CARCINOGENIC EFFECTS
DOSE RESPONSE EVALUATION

Chemical Name	Noncarcinogen Reference Dose		Subchronic Noncarcinogen Reference Dose		Carcinogen Slope Factor				Compounds w/o Criteria
	RfD(oral) (mg/Kg-day)	RfD(Inhalation) (mg/Kg-day)	RfD (oral sub) (mg/Kg-day)	RfD(Inhalation, sub) (mg/Kg-day)	Oral SF (mg/Kg-day) ⁻¹	Weight	Inhalation SF (mg/Kg-day) ⁻¹	Weight	
Inorganics:									
Antimony	4.00E-04	NA	4.00E-04	NA	NA	NA	NA	NA	Cobalt Copper Iron Lead
Arsenic	3.00E-04	NA	1.00E-03	NA	1.75E+00	A	1.50E+01	A	
Barium	7.00E-02	1.00E-04	5.00E-02	1.00E-03	NA	NA	NA	NA	
Beryllium	5.00E-03	NA	5.00E-03	NA	4.30E+00	B2	8.40E+00	B2	
Cadmium	1.00E-03food 5.00E-04water	NA	NA	NA	NA	B1	6.30E+00	B1	
Chromium (III)	1.00E+00	NA	1.00E+00	NA	NA	NA	NA	NA	
Chromium (VI)	5.00E-03	NA	2.00E-02	NA	NA	NA	4.20E+01	A	
Manganese	1.00E-01	1.10E-04	1.00E-01	1.10E-04	NA	D	NA	D	
Mercury	3.00E-04	8.60E-05	3.00E-04	8.60E-05	NA	D	NA	D	
Nickel	2.00E-02	NA	2.00E-02	NA	NA	A	8.40E-01	A	
Selenium	5.00E-03	NA	NA	NA	NA	D	NA	D	
Silver	3.00E-03	NA	3.00E-03	NA	NA	D	NA	D	
Thallium	8.00E-05	NA	7.00E-04	NA	NA	D	NA	D	
Vanadium	7.00E-03	NA	7.00E-03	NA	NA	NA	NA	NA	
Zinc	2.00E-01	NA	2.00E-01	NA	NA	D	NA	D	

EPA Weight of Evidence Classifications are as follows:

- Group A:- Human Carcinogen. Sufficient evidence from epidemiologic studies to support a causal association between exposure and cancer.
 Group B1:- Probable Human Carcinogen. Limited evidence of carcinogenicity in human from epidemiological studies.
 Group B2:- Probable Human Carcinogen. Sufficient evidence of carcinogenicity in animals. Inadequate evidence of carcinogenicity in humans.
 Group C:- Possible Human Carcinogen. Limited evidence of carcinogenicity in animals.
 Group D:- Not Classified. Inadequate evidence of carcinogenicity in animals.

Note: All toxicity Values unless otherwise noted are from Integrated Risk Information System (IRIS) June 1992 sessions,
 and from Health Effects Assessment Summary Tables (HEAST)-1990 4th Quarter (USEPA, 1990).

NA :Not Available

ND : Not Determined

TABLE 15
HOOKER/RUCO SITE
SUMMARY ACROSS EXPOSURE PATHWAYS
PRESENT/FUTURE USE SCENARIOS-RESIDENTS ADULTS

Future Use Scenarios: Fence-Line Adult Residents	Carcinogenic Risk Levels Reasonable Maximum Exposure	Noncarcinogenic Hazard Index Values Reasonable Maximum Exposure
---	---	--

1) Exposure to Ground Water

Ingestion	2.21E-03	4.89E+00
Inhalation	5.06E-04	5.82E-02
Dermal Contact	1.12E-04	2.01E-01

2) Exposure to Surface Soil

Inhalation	6.40E-09	1.64E-09
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Total Health Risk = Ground water ingestion + Ground water inhalation + Ground water dermal contact + Surface soil inhalation

SUMMATION RESULTS

Carcinogens

Reasonable Maximum Exposure=	2.83E-03
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Noncarcinogens

Reasonable Maximum Exposure=	5.15E+00
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TABLE 15

HOOKER/RUCO SITE
SUMMARY ACROSS EXPOSURE PATHWAYS
PRESENT/FUTURE USE SCENARIOS-RESIDENTS ADULTS

Present/Future Use Scenarios: Off-Site Adult Residents	Carcinogenic Risk Levels Reasonable Maximum Exposure	Noncarcinogenic Hazard Index Values Reasonable Maximum Exposure
1) Exposure to Surface Soil Inhalation	6.40E-09	1.64E-09
Total Health Risk = Surface soil Inhalation		
SUMMATION RESULTS		
Carcinogens		
Reasonable Maximum Exposure=	6.40E-09	
Noncarcinogens		
Reasonable Maximum Exposure=	1.64E-09	

TABLE 16

HOOKER/RUCO SITE
SUMMARY ACROSS EXPOSURE PATHWAYS
PRESENT/FUTURE USE SCENARIOS-RESIDENT CHILDREN

Future Use Scenarios: Off-Site Child Residents	Carcinogenic Risk Levels Reasonable Maximum Exposure	Noncarcinogenic Hazard Index Values Reasonable Maximum Exposure
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1) Exposure to Ground Water

Ingestion	8.84E-04	1.02E+01
Inhalation	1.09E-04	1.25E-01
Dermal Contact	1.34E-05	1.22E-01

2) Exposure to Surface Soil

Inhalation	2.56E-09	3.28E-09
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Total Health Risk = Ground water ingestion + Ground water inhalation + Ground water dermal contact + Surface soil inhalation

SUMMATION RESULTS

Carcinogens

Reasonable Maximum Exposure=	1.01E-03
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Noncarcinogens

Reasonable Maximum Exposure=	1.04E+01
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TABLE 16

HOOKER/RUCO SITE
SUMMARY ACROSS EXPOSURE PATHWAYS
PRESENT/FUTURE USE SCENARIOS-RESIDENT CHILDREN

Present/Future Use Scenarios: Off-Site Child Residents	Carcinogenic Risk Levels Reasonable Maximum Exposure	Noncarcinogenic Hazard Index Values Reasonable Maximum Exposure
1) Exposure to Surface Soil Inhalation	2.56E-09	3.28E-09

Total Health Risk = Surface soil inhalation

SUMMATION RESULTS

Carcinogens

Reasonable Maximum Exposure= 2.56E-09

Noncarcinogens

Reasonable Maximum Exposure= 3.28E-09

TABLE 17

ARARs/TBCs FOR GROUNDWATER CHEMICALS OF CONCERN (µg/L)
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

Compound	RI Results			Federal Standards MCLs/MCLGs	NY State Standards		NY State Guidance TAGM ^(f)	NY State GW Effluent Standard	PRG
	CRQL/ CRDL	Location of Maximum Conc. ^(a)	Range of Detected Conc.		MCLs ^{(b)(c)}	GW Quality Standards			
Volatile Organics (Geraghty & Miller, 1994; HNUS, 1994)									
Trichloroethene	5	HN24I	ND-58,000	5 (FMCL)	5	5	5	10	5
Toluene	5	HN29S	ND-39	1,000 (FMCL)	5	5	5	NA	5
1,1-Dichloroethane	5	HN29S	ND-880	---	5	5	5	NA	5
1,2-Dichloroethene	5	HN29S	ND-3,600	70 cis (FMCL)	5	5	5 (cis) ^(g)	NA	5
				100 trans			5 (trans) ^(h)		
1,1,1-Trichloroethane	5	HN29S	ND-10,000	200 (FMCL)	5	5	5	NA	5
Tetrachloroethene	5	HN-29S	ND-1,400	5 (FMCL)	5	5	5	NA	5
1,1-Dichloroethene	5	GP-8	ND-420	7 (FMCL)	5	5	5	NA	5
Carbon tetrachloride	5	HN24I	ND-8	5 (FMCL)	5	5	5	5	5
Xylenes	5	HN29S	ND-19	10,000 (FMCL)	5	5	5 (ortho)	NA	5
							5 (meta) 5 (para)		
Vinyl chloride	2	MW-52I	ND-2,300	2 (FMCL)	2	2	2	NA	2
Semi-Volatile Organics (HNUS, 1994)									
Bis(2ethylhexyl)phthalate	10	GP-11	ND-150	6 (FMCL)	50	50	50	4,200	6
Total Phenols ^(h)	10(individual)	HN29S	ND-11 J	---	50	1 (total phenols)	1 (total phenols)	NA	1 (total phenols)
Benzo(b)fluoranthene	10	USGS N10623 ⁽ⁱ⁾	ND-2 J	0.2 (FMCL)	50	---	0.002	NA	0.002 (TOGS)
Inorganics (Total) (HNUS, 1994) (Legette, Brashears, & Graham, Inc. 1990) (Geraghty and Miller, 1994) ^(g)									
Aluminum	200	HN27S	ND-33,800	200 (FSMCL)	---	---	---	2,000	200 (FMCL)
Arsenic	10	K-2	ND-59	50 (Review)	50	25	25	50	25
Cadmium	5	HN27S	ND-392	5 (FMCLG)	10	10	5 ^(k)	20	5
Chromium, Total	10	HN27S	ND-169	100 (FMCLG)	100	50	50	NA	50
Chromium, Hexavalent	10	HN25	ND-174 J	---	---	50	50	100	50
Copper	100	GM13S	ND-838 J	1,300 (FMCLG)	1,000 (SMCL)	200	200	1,000	200
Iron	3	GM15S	114-229,000	300 (FSMCL)	300 (SMCL) ^(e)	300 ^(e)	300 ^(e)	600	300
Lead	5,000	GM15S	ND-169	15 (Action Level)	15 (Action Level)	25	15 ^(k)	50	15

TABLE 17

ARARs/ILBCs FOR GROUNDWATER CHEMICALS OF CONCERN (µg/L)
HOOKER/RUCO SITE
HICKSVILLE, NEW YORK

Compound	RI Results			Federal Standards MCLs/MCLGs	NY State Standards		NY State Guidance TAGM ^(f)	NY State GW Effluent Standard	PRG
	CRQL/ CRDL	Location of Maximum Conc. ^(a)	Range of Detected Conc.		MCLs ^{(b)(c)}	GW Quality Standards			
Manganese	0.2	GM13S	7.65-1,720 J	200 (LMCLG)	300 (SMCL) ^(e)	300 ^(e)	300 ^(e)	600	200 (LMCLG)
Thallium	50	HN24I	ND-3.1 J	2 (FMCL)	---	---	4	NA	2 (FMCL)
Vanadium	20	HN29S	ND-419	---	---	---	250	NA	250
Cyanide	---	HN27S	ND-2,690	200 (FMCL)	---	100	100	400	100 (FMCL)
Nickel	5,000	GM13S	ND-132	100 (FMCL)	---	---	100	2,000	100 (FMCL)

Notes:

- - Not Detected
- F - Final
- L - Listed
- P - Proposed
- S - Secondary
- CRDL - Contract Required Detection Limit
- CRQL - Contract Required Quantitation Limit
- IDL - Instrument Detection Limit
- MCL - Maximum Contaminant Level
- MCLG - Maximum Contaminant Level Goals
- PRG - Preliminary Remedial Action Goal = most stringent of FMCLs Groundwater Quality Standard or Contained in Policy.
- ^(a) - Includes data from all sampling rounds since 1990.
- ^(b) - Total Principal Organic Contaminants (POCs) (i.e., includes listed volatile organics and Unspecified Organic Contaminants (UOCs) not to exceed 100 µg/L total.
- ^(c) - Reference: New York Public Supply Regulations, Part 5-1, 07/17/92
- ^(d) - Reference: New York Water Classifications and Quality Standards, Title 6, Chapter V, Part 703.
- ^(e) - Combined concentration of iron and manganese shall not exceed 500 µg/L. Iron and manganese not to exceed 300 µg/L.
- ^(f) - Reference: New York Technical Manual, "Contained In" Criteria for Environmental Media.
- ^(g) - Only monitoring wells on NWIRP property (designated with prefix HN-) and Hooker/Ruco Site (such as K-2) were sampled and analyzed for semi-VOCs.
Only a summary of analytical data is available from the Hooker/Ruco Site.
- ^(h) - Total Phenols = 2-Methylphenol + 4-Methylphenol + 2,4-Dimethylphenol.
- ⁽ⁱ⁾ - Benzo(b)fluoranthene was detected only in USGS well NI0623. This detection is suspected to be due to runoff from a nearby asphalt road through leakage in the well cap.

TABLE 18
SELECTED REMEDY (ALTERNATIVE 3) COST ESTIMATES

CAPITAL COST		
Well Installation	A. Injection	\$270,000
	B. Monitoring	\$90,000
Forcemain	A. Header Pipe	\$190,000
	B. Down Well Piping	\$0
Land Purchase		\$150,000
Materials and Installation	A. Site Improvements	\$17,000
	B. Equipment	\$135,000
	C. Mechanical	\$25,000
	D. Electrical	\$36,000
Engineering (10%)		\$91,300
Field Construction (5%)		\$45,650
Contingency (20%)		\$209,990
TOTAL CAPITAL COST		\$1,259,940
ANNUAL O&M COST		
VCM Monitoring		\$28,000
Utilities - Electric		\$93,000
Reporting		\$34,000
Labor (full time)		\$65,000
Equipment Replacement (5%)		\$45,650
Contingency (20%)		\$53,130
TOTAL ANNUAL COST		\$318,780
PRESENT WORTH COST*		\$3,800,000

* assumes a 10-year operating period plus 2 supplemental years of nutrient addition and a 7% discount rate

TABLE 19
CONTINGENCY REMEDY (ALTERNATIVE 2) COST ESTIMATE

CAPITAL COST	
Well Installation	\$560,000
Well Pumps	\$50,000
Forcemain	\$445,000
Recharge Basin	\$55,000
Land Purchase / Access Payments	\$300,000
VCM Treatment System - Equipment	\$725,000
VCM Treatment System - Materials & Installation	\$905,000
Engineering and Procurement	\$304,000
Field Construction Expense	\$152,000
Contingency (20%)	\$699,000
TOTAL CAPITAL COST	\$4,195,000
ANNUAL O&M COST	
VCM Treatment System	\$300,000
VCM Monitoring	\$47,000
Reporting (monthly)	\$34,000
Labor (1 person - full time)	\$65,000
Equipment Replacement (5%)	\$160,000
Contingency (20%)	\$121,000
TOTAL ANNUAL O&M COST	\$727,000
PRESENT-WORTH COST*	\$13,200,000

* assumes an 30-year operating period and a discount rate of 7%.

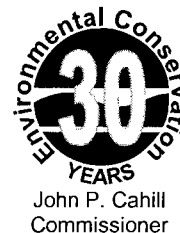
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Mr. Richard L. Caspe
Emergency Response and Remedial Division
USEPA Region 2
290 Broadway, 20th Floor
New York, New York 10007-1866

RE: Hooker/Ruco Federal Superfund Site
Nassau County Site No. 1-30-004

Dear Mr. Caspe:

The New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH) have reviewed the Hooker Chemical/Ruco Polymer (Hooker Ruco Site) Operable Unit 3 (OU3) Record of Decision (ROD). The selected remedy includes in-situ treatment of vinyl chloride monomer (VCM) through bio-sparging. If necessary, nutrients will be added to enhance biological activity. The ROD contains a contingency plan for groundwater extraction and treatment to contain and remove the VCM subplume if in-situ bioremediation fails to prevent the VCM from reaching the Northrop Grumman Onsite Containment (ONCT) system. The ROD also merges the onsite groundwater extraction and treatment and soils flushing component of the OU1 ROD with OU3 and also recognizes that the downgradient Northrop Grumman Onsite Containment (ONCT) System is intercepting this plume.

There will be a monitoring plan that will verify the effectiveness of all the components of the Hooker Ruco Site OU3 groundwater remedy including the fate and transport of VCM, the capture of residual VOC contamination by the Northrop Grumman ONCT system, and the attenuation of the tentatively identified compounds (TICs). This will include groundwater sampling for VCM, total volatile organics including site related perchloroethylene (PCE) and trichloroethylene (TCE) and TICs. Special monitoring of the vadose zone for site related contaminants will also take place in the area of the bio-sparging.

Therefore, the remedy selected in the Hooker Ruco OU3 ROD, in conjunction with existing and proposed controls addressing the regional VOC groundwater contaminant plume, will be protective of human health and the environment. The NYSDEC concurs with this remedy.

Sincerely,

MOT

Michael J. O'Toole, Jr.,
Director
Division of Environmental Remediation

c: J. La Padula, USEPA
K. Lynch, EPA
A. Carlson, NYSDOH
W. Gilday, NYSDOH

C. Hodgeman, NCDOH

bc: T. Quinn
S. Ervolina
S. Scharf
Project File

RESPONSIVENESS SUMMARY
HOOKER CHEMICAL/RUCO POLYMER SUPERFUND SITE

INTRODUCTION

A responsiveness summary is required by Superfund regulation. It provides a summary of public comments and concerns received during the public comment period and the responses of the United States Environmental Protection Agency (EPA) and the New York State Department of Environmental Conservation (NYSDEC) to those comments and concerns. All comments summarized in this document have been considered in EPA and NYSDEC's final decision for the selected remedy for the Hooker Chemical/Ruco Polymer Superfund Site (Site).

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

Community involvement at the Site has been moderate. EPA has served as the lead agency for community relations and remedial activities at the Site.

The Remedial Investigation/Feasibility Study (RI/FS) Report for Operable Unit 3 and the Proposed Plan for the Site were released to the public for comment on July 28, 2000. These documents, as well as other documents in the administrative record (see Administrative Record Index, Appendix III) have been made available to the public at information repositories maintained at the EPA Region II Docket Room located at 290 Broadway, New York, New York and the Hicksville Public Library, Hicksville, New York. A public notice announcing the public meeting on the Proposed Plan as well as the availability of the above-referenced documents was published in Newsday on July 28, 2000. The public comment period established in the public notice was from July 28 to August 28, 2000. A request for a 2-week extension to the public comment period was granted by EPA and the public comment period was extended through September 12, 2000. EPA's decision to extend the comment period was announced at the August 15, 2000 public meeting, as well as publicized through mailings to the more than 400 citizens and other interested parties on the Site mailing list.

The August 15th public meeting was held at the Oyster Bay Town Hall, 54 Audrey Avenue, Oyster Bay, New York to present the Proposed Plan and to address questions and comments concerning the Plan and other details related to the RI/FS Report raised by local officials, residents and other interested parties. Responses to the comments and questions received at the public meeting, along with other written comments received during the public comment period, are included in this Responsiveness Summary.

OVERVIEW

The selected remedy includes in-situ biosparging technology to treat the vinyl chloride monomer (VCM) subplume to a level whereby supplemental treatment for VCM at the groundwater extraction and treatment system¹ at the downgradient Northrop Grumman Aerospace Corporation (Northrop) facility is not required. If necessary, this alternative would also utilize a supplemental bioremediation technology (nutrient addition) following the biosparging treatment to enhance the degradation of VCM in the aquifer. The addition of nutrients to stimulate the microbial population would also enhance the degradation of volatile organic compounds (VOCs) such as trichloroethylene (TCE), perchloroethylene (PCE) as well as other VOCs which have been tentatively identified (TICs). It is estimated that biosparging will be required for a maximum period of 10 years and the supplemental nutrient addition would occur over a two-year period to effectively enhance the degradation of the VOCs.

If it is determined during the implementation and long-term monitoring of the selected remedy that the technology selected is not effective in effectively reducing the VCM concentrations in a reasonable time frame, then VCM subplume extraction and treatment would be implemented as a contingency remedy. Further, if the treatment system at the Northrop facility ceases operation before the regional aquifer is restored, EPA would re-evaluate the protectiveness of the selected remedy.

The selected remedy for Operable Unit 3 also amends the ROD for components of the Operable Unit 1 remedy.

Attached to this Responsiveness Summary are the following Appendices:

- Appendix A - Proposed Plan
- Appendix B - Public Notice
- Appendix C - August 15, 2000 Public Meeting Attendance Sheet
- Appendix D - Letters Submitted During the Public Comment Period

SUMMARY OF COMMENTS AND EPA'S RESPONSES

Specific comments have been organized as follows:

¹ This treatment system is being operated as an Interim Remedial Measure (IRM).

- General Site Issues
- Site Characteristics and Aquifer Characteristics
- Public Health and Risk Assessment Issues
- Remedy Selection Issues
- Remedy Implementation Issues
- Miscellaneous

A summary of comments and concerns regarding the Site investigation and remedy selection process and EPA's responses are provided below. A number of comments which were addressed to the New York Department of Health (NYSDOH) and pertained to their activities. EPA has also received questions directed to the NYSDEC concerning the Northrop and Navy sites. Those questions were not addressed in this responsiveness summary but have been forwarded to the respective agencies.

General Site Issues

Comment # 1: Were soil samples collected from the surrounding properties?

Response # 1: Soil samples were collected in the suspected source areas at the Hooker/Ruco Facility. Sampling continued outward from the source area until the contamination was fully delineated. There has been extensive sampling of the soils on the Northrop and Naval Weapons Industrial Reserve Plant (NWIRP) sites as portions of these sites were remediated and removed from the State superfund list or are undergoing closure pursuant to the Resource Conservation and Recovery Act (RCRA).

Comment # 2: Will the liability provisions of CERCLA prevent anyone from purchasing the property?

Response # 2: The liability provision of CERCLA should not deter purchasing the Site property. EPA encourages responsible redevelopment of sites and believes that environmental cleanup and economic redevelopment are not mutually exclusive. EPA promotes the redevelopment of previously contaminated properties by facilitating the transfer of property, removing liability barriers, and providing financial assistance to States and Tribes. Over the past several years, EPA has initiated several administrative reforms to aid in this task and has identified various options to encourage the cleanup and redevelopment of contaminated properties, giving prospective purchasers, lenders, and property owners more assurances that acquisition of such property will not also mean acquisition of liability. Two of the most effective tools have been development of prospective purchaser agreements (PPAs) and

issuance of comfort letters. EPA guidance documents and fact sheets on these tools and others can be found at:

<http://www.epa.gov/superfund/programs/reforms/types/econ.htm>

Site Characteristics and Aquifer Characteristics

Comment # 3: Specifically, where does the Site lie in relation to the Long Island groundwater divide? Does the clay identified in some borings cause the groundwater to flow north? The validity of the interpretation of the groundwater data in the FS Report was also questioned.

Response # 3: The groundwater divide is at least two to three miles to the north of the Site. The general groundwater flow in the area of the Site is south from the groundwater divide. During the years that Grumman was in operation, pumping from its production wells exerted an influence of the groundwater inducing an eastward component of flow. During the various investigations, a series of monitoring wells have been placed in the area. Measurements from those wells confirm that the direction of ground water flow in the area is to the south-southeast. While there have been sporadic findings of clay in some of the borings, there is no indication that there is any connection between those areas, i.e., there is no continuous layer of clay where water or contaminants entering the ground would pool or move in a northward direction for any distance. Water entering the ground moves downward until it reaches the water table then migrates in a south-southeasterly direction. The groundwater movement as depicted in the FS report has been reviewed by EPA, NYSDEC, the United States Geological Survey, and by consultants hired by the Occidental Chemical Corporation (Oxy), Grumman and the U.S. Navy. All reviewers have concluded that the interpretation of the groundwater flow depicted in the FS Report is valid.

Comment # 4: Metals are present in the groundwater beneath the Site and arsenic and manganese exceeded the to-be-considered (TBC) criteria. However, these excursions were limited to only a few wells and at concentrations only slightly above the published health standard criteria. Consequently, the presence of the two metals in a few wells does not make metals contaminants of concern at the Site, especially when compared to the organic chemicals present.

Response # 4: Metals were not identified as primary contaminants of concern in the Proposed Plan, but rather as secondary contaminants. This classification is intended to place the emphasis on VOCs, but notes the presence of metals above levels of

concern in a manner consistent with the comment.

Comment # 5: How large is the plume of contamination and what are the geographic boundaries using New South Road and Route 107 as reference points?

Response # 5: The regional VOC plume is approximately 12,100 ft long, 9,600 ft wide and 580 ft deep. Approximate boundaries are New South Road and Route 107 to the West and Stewart Avenue to the East. In the deeper groundwater to the South, the plume approaches Hempstead Turnpike.

Public Health and Risk Assessment Issues

Comment # 6: What health studies have been performed in the area of the Site?

Response # 6: NYSDOH has done several cancer incidence investigations in and around the Bethpage area. Information about these can be obtained by calling the toll-free telephone number for the NYSDOH Center for Environmental Health: 1-800-458-1158, extension 2-7530.

Comment # 7: Are Bethpage and the other water districts prepared for any situation that may arise from the local plume of groundwater contamination?

Response # 7: The Bethpage Water District has VOC removal treatment systems at its three well fields downgradient of the sites. The IRM that is being performed by Northrop under NYSDEC oversight (Northrop IRM) is designed to prevent further migration of the contaminant plume to the area of the wells. Monitoring programs will continue to track the movement of the plume and to evaluate the effectiveness of the VOC removal treatment systems. If other wells become threatened by the plume or if the treatment systems fails, these monitoring systems will alert authorities in sufficient time to take action to ensure the continued supply of clean water to the public.

Comment # 8: EPA has established an acceptable cancer risk range of one-in-a-million (1×10^{-6}) to one-in-ten-thousand (1×10^{-4}) for known or suspected carcinogens. A remedial action is generally warranted when excess lifetime cancer risk exceeds one-in-ten-thousand. The future exposure scenario outlined in the Proposed Plan is highly unlikely to occur considering that:

- i) a Nassau County ordinance permits obtaining drinking

- water only from a public supply source; and
- ii) the public supply sources are being monitored and treatment is being implemented as needed.

This unlikely future exposure scenario should be reiterated so that public concerns regarding the estimated future residential groundwater use scenario risks are put in perspective.

Response # 8: The ROD, the Proposed Plan, and the risk assessment state that the current use of groundwater at the Site does not pose a unacceptable risk to human health since no one is using the groundwater for domestic purposes. However, the purpose of the risk assessment is to determine whether unacceptable risk to the public would be incurred if groundwater at the Site is used without treatment. This determination is based upon conditions at the Site, irrespective of controls used at downgradient receptor locations. In this manner, appropriate action can be taken before contaminants are detected either in future on-Site wells or in downgradient water supply wells or public water distribution systems. The fact that public water supplies are monitored and treated is good, but not directly relevant to the baseline determination. It is agreed that the future on-Site groundwater use scenario is conservative, but it is appropriately so. The groundwater at the Site is classified as Class GA by New York State, suitable for potable supply. This is reflected in the ROD as follows:

"However, a resident was assumed to live at the downgradient property line and use the sole source aquifer as a water supply. Therefore, the baseline risk assessment focused on potential future health effects for both adults and children, in a residential setting, that could result from potential exposure to groundwater via ingestion, inhalation, and dermal contact." Thus, the future residential groundwater use scenario was evaluated and this evaluation showed unacceptable risks to human health.

It should be noted that at the public meeting, the public was informed that current drinking water supplies are protected from the groundwater plume of contamination.

By way of clarification, Nassau County Public Health Ordinance Article IV prohibits the installation of new private water wells in areas served by public water supplies. The installation of public water wells is not prohibited under Article IV.

Remedy Selection Issues

Comment # 9: Who will make the decision as to what remedy is

selected and are the local officials invited to participate?

Response # 9: After considering the comments received on the Proposed Plan and the FS Report, including comments from local officials, the Regional Administrator for EPA Region 2 will make the remedial decision. EPA will then issue this determination as a ROD for the Hooker/Ruco Site.

During the public meeting, Councilman Eisner and Councilman Macagnone from the Town of Oyster Bay indicated that they were involved in the public participation process and commented on the Proposed Plan.

Comment # 10: The Proposed Plan identifies Alternative 2 (pumping and treatment to groundwater to meet ARARs) as the contingency remedy if in-situ biosparging is not effective. It is possible, that during the operation of the biosparging remedy, new technologies may be developed. Thus, it is suggested that new treatment technologies be considered is a contingency remedy becomes necessary in the future, so that the most effective technology will be selected.

Given the recent acknowledgment of the value of natural attenuation, it may not be necessary to pump and treat down to concentrations that meet ARARs. Some monitored natural attenuation may also be included as part of the contingency remedy. Thus an alternative to the specified contingency remedy is to pump and treat to remove a sufficient mass of VCM such that supplemental VCM treatment of the air discharge from the Northrop IRM would not be needed. This would then be consistent with the level of remediation effort proposed for the preferred remedial alternative.

Response # 10: EPA's preferred remedy has as its goal achieving MCLs in groundwater. The contingency remedy was identified from alternatives that are currently available. If the selected remedy will not be effective in achieving these goals, the contingency remedy would be implemented. EPA can reevaluate remedy decisions where significant new scientific information, technological advancements or other considerations become available to achieve the proper level of protectiveness of human health and the environment while enhancing overall remedy and cost-effectiveness. Further, if the data collected by the monitoring program indicates that natural attenuation is occurring and will restore the aquifer to its beneficial use without further contaminant migration, it could be evaluated as part of this process.

Comment # 11: All remedial approaches considered should intercept

and treat the VCM subplume before it affects the downgradient Northrop IRM.

Response # 11: A major consideration in the evaluation of alternatives in selecting the remedy for the Site is that the potential remedy treat the VCM sufficiently so that the Northrop IRM is not impacted. In addition, the proposed sentry monitoring is intended to confirm that biosparging and supplemental enhanced bioremediation are effectively addressing the VCM contamination and provide sufficient lead time to implement the contingency remedy if VCM adequate reduction is not progressing as planned.

Comment # 12: If it is shown that biosparging is not effective and a pump and treat system is needed (as a contingency remedy), it should be designed so that it does not interfere with the goals of the downgradient Northrop IRM.

Response # 12: EPA agrees that if a pump and treat system is needed, it should not interfere with the Northrop IRM. Groundwater modeling would be undertaken to ensure that no detrimental interference occurs.

Comment # 13: Based on a review of the pre-design data collected by Conestoga Rovers & Associates (CRA), the subsurface environment at the Hooker/Ruco Facility and immediately downgradient is anaerobic and reducing. Biosparging, by its very nature of adding oxygen to the subsurface, will disrupt the anaerobic and reducing environment that exists at and south-southeast of the Site and will disrupt the natural degradation of the source-derived chlorinated compounds, i.e., TCE and PCE. Except for the TCE, PCE and DCE that is stripped during the biosparging process, there will be no additional remediation of these compounds via the biosparge system. Therefore, the Northrop IRM will have to treat these compounds from the Hooker/Ruco Facility and the previously anaerobic off-Site area. An evaluation must be made to assess the impact that the disruption of the anaerobic biodegradation zone and the resulting flux of TCE and PCE would have on the downgradient Northrop IRM.

Response # 13: It is true that the aquifer geochemical conditions immediately downgradient of the Site are reducing and that biosparging is intended to create more oxidizing conditions. Therefore, it is agreed that the aerobic biosparging process will disrupt the anaerobic and reducing environment in the area where the biosparging system will be injecting air/oxygen.

Due to the overall low concentrations of organic carbon, however, the degree of reductive chlorination, which appears to be occurring

in the area of strongly reducing conditions, is expected to be fairly limited. While some degradation of PCE and TCE is likely occurring under the present conditions, the impact of biosparging on these compounds is expected to be limited. Nevertheless, these compounds are believed to be present at the Site only in relatively low concentrations in the aqueous phase, so the downgradient flux will not increase significantly relative to the current treatment capacity at the Northrop IRM. The OU-1 predesign results show strongly reducing conditions in the area of wells MW-50J1, MW-50J2, and MW-52S. However, OU-1 predesign data also indicates a return to aerobic oxidizing conditions at MW-52I and GM-10I.

Pursuant to Oxy's proposed OU-3 Predesign Investigation Measures Plan, submitted on June 11, 1999, test injection wells are to be installed downgradient of GW-10I and MW-52, which are downgradient of the area of anaerobic reducing conditions. Furthermore, based on the data currently available, the full scale biosparging injection system will likely be installed downgradient of well cluster MW-52. Thus, the proposed OU-3 predesign testing and most likely the full scale biosparging system should not influence the area of anaerobic reducing conditions and will not disrupt the natural degradation of PCE and TCE in this area.

VCM, however, would significantly impact the existing Northrop IRM if it were not treated, so it is the focus of the treatment. Because VCM is a reduced compound, it is generally more easily oxidized than reduced. For this reason, biosparging was chosen, although it is acknowledged that reductive dechlorination is also possible. It should be noted that the Record of Decision allows for "supplemental bioremediation" in the event that biosparging is not achieving the remedial objectives.

Comment # 14: Biosparging downgradient of the source area (in the transitional and aerobic environments where VCM persists, but the aerobically degradable compounds, like ketones and alcohols, are depleted) should enhance the degradation of VCM.

Response # 14: EPA agrees.

Comment # 15: The FS evaluation and cost projections summarized in the Proposed Plan do not account for some of the biosparging process issues described in Comments 22A-22E of this Responsiveness Summary. There are ways to overcome some of these issues (such as the use of blended gases - air plus nitrogen for example - to control the concentration of dissolved oxygen that can enter the groundwater) but at higher cost. Such considerations should be included in the cost comparison. At a minimum, these issues and costs must be included in the pilot test program and in the

subsequent data evaluation and full-scale design and costing.

Response # 15: The issues identified are appropriate to consider at the detailed design and pilot testing phases and are not necessary to the evaluation of alternatives in the FS and Proposed Plan. In addition, the cost estimates presented in the Proposed Plan and the ROD contain a 20 percent contingency to account for issues such as those cited in the preceding comment. One purpose of the predesign activities is to determine the design and operating parameters of the full-scale biosparging system (e.g., spacing/number of injection wells needed).

The test results will be used to refine the cost estimates for the full-scale biosparging system. Other issues identified by the testing which were not specifically included in the Proposed Plan cost estimates will also be included in the cost estimate for the full scale system.

Comment # 16: The goal of the biosparge treatment system is to treat the VCM subplume to a level that will ensure that there will be no need for supplemental treatment of VCM at the Northrop IRM. However, a VCM contingency plan should be developed to protect the IRM from levels of untreated VCM that, if treated by the Northrop IRM, would result in excursions of air discharge standards.

Response # 16: The goal of the selected remedy is to restore the groundwater to meet MCLs. The selected remedy includes a contingency to pump and treat the VCM subplume if biosparging is not effective. Also, monitoring of the remedial action will provide an early warning if the VCM is migrating to the extent that the ability of the existing Northrop IRM to effectively treat the VCM subplume might be compromised. Should migration occur, ample time will be available to put measures in place to ensure the public is protected and air discharge limits are not exceeded. The biosparging system includes VCM monitoring at sentry wells which are located 1800 to 2400 feet up-gradient of the closest Northrop IRM system well (GP-1). If these sentry wells show VCM migration to well GP-1 at concentrations which could affect the operation of the Northrop IRM, sufficient time is available to select, design, and construct a VCM treatment component for the Northrop IRM off-gas.

Remedy Implementation Issues

Comment # 17: If EPA decides to use the contingency of pumping and treating the VCM subplume, will the local municipalities be notified?

Response # 17: Yes. Before the contingency is implemented, EPA would notify local authorities and addressees on the Site's mailing list.

Comment # 18: Is there a depth threshold for the organisms that will be breaking down the VCM by biotransformation?

Response # 18: In the last ten years, there has been a significant amount of research in subsurface microbiology. It has been learned that these microorganisms can live as deep as 3,000 feet or more below land surface. There is evidence that at this Site there is biological activity at least to the bottom of the plume which occurs at approximately 600 ft below ground surface.

Comment # 19: There are references in the Proposed Plan for Alternative 1 that state that the Northrop IRM will exceed its air discharge limitations and this statement is based upon the results of computer simulations. Because of the uncertainty associated with simulated results, it is suggested that text such as "could potentially exceed its air discharge limitations without the addition of supplemental treatment capability" be used instead of the more definitive phrasing used in the Proposed Plan.

Response # 19: It is true that the predicted VCM concentrations are based on computer simulations with inherent uncertainty. However, computer simulations are considered a useful tool to predict the behavior of the aquifer and many of the statements regarding other alternatives are based on computer simulations, including the predicted behavior of the VCM subplume.

Comment # 20: The Proposed Plan states that aerobic degradation of TCE and PCE is limited. While this is true for PCE, it is not correct for TCE. TCE degradation does readily occur under aerobic conditions, although not as quickly as occurs under anaerobic conditions. The text should be revised to reflect the different aerobic degradation rates for these two compounds.

Response # 20: It is true that TCE will more readily degrade under aerobic conditions, while PCE will not. Aerobic biodegradation of TCE requires the addition of a carbon energy source (such as methane) in addition to oxygen for degradation to proceed at adequate rates. The biotransformation remedy does not include a carbon source as an initial matter. Addition of nutrients and carbon sources are possible supplement. Under the conditions of strict biotransformation without the addition of a carbon source, TCE biodegradation will be limited. Appropriate sections of the ROD address the topic as follows: "aerobic conditions will not enhance

the degradation of PCE but will enhance the degradation of TCE only when sufficient quantities of a suitable carbon source such as methane are present; therefore, the effect of biosparging on TCE and PCE would be limited."

Comment # 21: Because it will be necessary to sparge at extreme depths (greater than 350 feet) air will have to be forced at pressures in excess of 180 pounds per square inch (psi) to overcome the head exerted by the water column. Thus, all the wellhead assemblies must be constructed in accordance with American Society of Mechanical Engineers (ASME) code requirements for similar pressures. Wellhead retrofits may be required at existing wellheads and proper health and safety precautions should be adhered to, particularly where public access cannot be controlled.

Response # 21: The biosparging system (wellhead assemblies and retrofits, flanges, fittings and piping) will be designed for the appropriate pressures according to ASME specifications. Proper health and safety procedures will be followed, especially where public access is an issue.

Comments # 22A-22E: Several comments were made that there are several biosparging process issues that may preclude the use of biosparging under the Site conditions as described in comment 22A-22E below:

Comment # 22A: Because of the high pressure at which the system must operate to successfully sparge to depths of 320 feet below the water table, the air is compressed when it is released into the groundwater. The pressure, upon release will be on the order of 140 to 180 PSI (i.e, 10 to 13 atmospheres). At this pressure, the actual airflow will be approximately 30 standard cubic feet per minute (scfm). As the air rises and the pressure declines, the air volume will increase. This phenomenon will lead to a reduction in aquifer permeability and a "damming-effect" (a decrease in the velocity of groundwater flow) can result. The more air forced in, the greater the effect on the permeability.

Response # 22A: The concern that large volumes of air might significantly reduce hydraulic conductivity in the formation near injection locations can be mitigated through the use of a pulsed injection strategy. It is anticipated that the cycle would consist of one day of injection (or possibly 1 or 2 hours per day) followed by a week or a month of no injections. The net result is that over the vast majority of the time, injection will not be occurring. This pulsing will allow the injected air/oxygen to dissipate and be solubilized by groundwater

flowing through the formation, thereby limiting the reduction in aquifer permeability and reducing the probability of a "damming-effect."

Comment # 22B: Because the air is released under 10 atmospheres of pressure, the saturation concentration of oxygen in the water is more than 10 times that under atmospheric pressure. This high oxygen concentration will poison the bacterial population.

Response # 22B: It is possible that the bacteria in close proximity to the injection location will not survive the high oxygen content of the injected air. Short distances from the injection locations, however, dissolve oxygen (DO) concentrations are expected to decrease to levels that are not toxic to the bacteria. Thus, it is believed that any die-off would be limited to the area in the immediate proximity of the injection location. Furthermore, groundwater will continue to flow, diluting the DO concentrations and will bring "new" bacteria to the area of the injection location. Thus, any die-off would be expected to be a short-term event and limited in extent. If this does occur, it may actually benefit the operation by preventing bacterial buildup around the injection well screen.

The testing to be performed during the predesign phase will be used to evaluate this potential issue.

Comment # 22C: When air is injected into the ground, it will rise along the path of least resistance to the water table. The geology at the Site is heterogeneous due to its depositional history. As a result, there are layers of variable permeability throughout the depth of the formation. This layering has some influence on groundwater flow, but has a much greater affect on airflow. This layering will lead to the preferential flow of the air along high permeability lenses horizontally. During pilot testing, it is critical that the farthest monitoring wells be located at a minimum of twice the total injection depth to monitor this effect. In addition, the air can carry stripped VCM outward from the target groundwater zone, thus potentially spreading the VCM impacts both in the groundwater and in the vadose zone. Monitoring points should be included to track this effect and accurately define it.

Response 22C: The heterogeneous layering of the formation will be considered when developing the scope of the predesign activities. Preferential horizontal flow along high permeability lenses beneath a low permeability lens is in fact desirable as it will enhance the areal distribution of the injected

air/oxygen. Also, the highly permeable zones are the pathways in which most of the groundwater flow and chemical flux occur. Thus, enhanced oxygenation in these zones is desirable.

Monitoring wells will be located from approximately 50 to 600 feet from the expected locations of the predesign injection wells. The 600-foot distance is approximately twice the depth of proposed injection wells. In addition, monitoring points for the vadose zone will be installed.

Comment # 22D: VCM is a very volatile organic compound. At the proposed rates of air injection, stripping of the VCM from groundwater will occur and could represent the chief mechanism of mass removal. Monitoring points should be added to track this effect and accurately define it. In addition, lower airflow rates should be tested to try to minimize this effect.

Response # 22D: It is again noted that the air/oxygen injection will be pulsed and will not be continuous. Therefore, stripping would be minimized and would be monitored.

Comment # 22E: The proposed rate of injection of 300 scfm is higher than typical biosparge applications, which will exacerbate all the negative potential effects described above. At a minimum, lower rates should be tested and the proposed rate of 300 scfm should be reconsidered.

Response # 22E: Pulsing was selected to enhance solubilization of the injected air/oxygen and reduce/eliminate air stripping and the potential detrimental impacts of VCM migration to the vadose zone.

The results of the predesign activities will be used to determine the appropriate air/oxygen injection rate and period/volume required to reduce the stripping of VCM from the groundwater.

Comment # 23: The Proposed Plan includes a contingency for the addition of nitrogen and phosphorous to supplement the aerobic biodegradation of VCM in the groundwater. Given the fact that the groundwater is used for drinking water supplies in the area, the application of nutrients will require extensive permitting and monitoring.

Response # 23: EPA agrees that the application of nutrients would be monitored closely. Such additions would be designed such that the nutrients are completely utilized within a defined treatment zone. Permits would not be required because the remedial action is

being conducted under CERCLA, but the substantive requirements of appropriate permits would need to be met. Initially, it is not planned to add nutrients to the biosparging system. The intent is to attempt to use injected air/oxygen only. The predesign testing will help determine whether any nutrient addition is necessary.

The amount of nutrients added, if any, will be limited to that amount estimated to be consumed during the biosparging process. Furthermore, the concentration of any nutrients added will be less than the drinking water standards and will be consumed before reaching the Northrop wells. In addition, monitoring for such nutrients, if utilized, will be performed.

Comment # 24: What is the time frame for the project?

Response # 24: After the ROD is issued, September, EPA will enter into a period of negotiations with the potentially responsible parties in a attempt to secure performance of the selected remedy. The remedial design will take approximately one year to complete. The remedy should then take six to eight months to be constructed.

Miscellaneous

Comment # 25: The Proposed Plan states that "...available data indicate that several public supply wells from the Bethpage Water District have been affected by VOCs which are likely attributed to all three sites." One commenter stated that the chemicals, however, could not have impacted the Bethpage public supply wells because the Hooker/Ruco VOC chemicals have not reached wells which are located upgradient of those public supply wells.

Response # 25: While it is true that VCM has not reached these public supply wells, other VOC such as TCE and PCE have been detected in wells between the Hooker/Ruco Facility and these public supply wells. The intent of the sentence was to communicate that there is a regional commingled VOC plume. For clarification the sentence has been worded in the appropriate section of the ROD as follows: "Available data indicate that several public supply wells from the Bethpage Water District have been affected by VOCs attributable to the commingled plume emanating from the three sites."

Comment # 26: A typographical error was identified in the Comparison of Alternatives Section of the Proposed Plan where the word "not" had been mistakenly omitted.

Response # 26: The text has been changed appropriately in the ROD,

which reads "[b]oth Alternatives 2 and 3 would reduce the concentration of the VCM subplume to the level that supplemental treatment for VCM at the Northrop IRM would not be required.

Comment # 27: In estimating present worth costs a discount factor of 5 percent is used in one section of the Proposed Plan and a value of 7 percent is used in another section.

Response # 27: EPA agrees and the appropriate text of the ROD has been changed to reflect that the 7 percent discount rate is used consistently.

Comment # 28: What products were made from vinyl chloride. and are they still being made at the plant located at the Hooker/Ruco Facility.

Response # 28: Vinyl chloride is a manufactured substance that is used to make polyvinyl chloride (PVC). PVC is used to make a variety of plastic products, including pipes, wire and cable coatings. These products were never made at the plant. The plant produces raw materials that are used by others in plastic manufacturing.

Comment # 29: Does biosparging have a proven track record?

Response # 29: While biosparging is a relatively new technology, it is being used successfully at a number of other Superfund sites, such as Eielson Air Force Base, Alaska; Oralska Municipal Landfill, Wisconsin; and Applied Environmental Services, New York.

Comment # 30: The Proposed Plan recognizes that a portion of the VOC plume originating from the Site is not addressed by the proposed remedy, but has been and continues to be treated by the downgradient Northrop treatment system and the VOC removal system for VOC impacted public supply wells funded by Northrop and the U.S Navy. Hence, Oxy should share the costs for these other treatment systems as well as the long-term operation and maintenance (O&M). Therefore, Oxy's share of these costs should be addressed in the consent order to be issued to Oxy for the Remedial Design/Remedial Action (RD/RA) phase of the project.

Response # 30: EPA's ROD acknowledges that the groundwater in the region has been contaminated by three sites: the Hooker/Ruco Facility, the NWIRP site, and the Northrop site. Two of these sites are State-lead sites (NWIRP and Northrop) and the Hooker/Ruco Site is a Federal-lead Site. EPA and NYSDEC agreed to undertake a coordinated effort to address the commingled groundwater plume.

This approach acknowledges that there are both jurisdictional and common sense considerations behind the division of responsibility for components of the remedial work so as to avoid duplication of effort and the resulting expense to all parties involved. As such, EPA's and the State's remedies will each target different facilities and different contaminants; when conducted together, these components will form a comprehensive remedy for the cleanup of the regional groundwater plume.

Following the issuance of the ROD, EPA will endeavor to negotiate a Consent Decree pursuant to CERCLA with Oxy for the RD/RA of the selected remedy. The selected remedy will not include the IRMs, as they were already constructed pursuant to NYSDEC's agreements with its PRPs and will become part of the State's proposed plan.

While it would be in the best interest of all PRPs involved with the three sites to negotiate an agreement concerning each others share of the expenses associated with the IRMs without resorting to litigation, CERCLA § 113(f)(1) guarantees PRPs the right to seek contribution against other PRPs that are liable under § 107 if such efforts prove unsuccessful.

Comment # 31: Figure 4.2 Shows the pollutants are entering the regional groundwater divide then entering the Lloyd Aquifer.

Response # 31: Figure 4.2 depicts a generalized regional hydrogeologic cross-section through Nassau County in the area of the Site and does not depict the contaminant plume but rather general groundwater flow direction for the area. The site is located several miles to the south of the regional groundwater divide. Contamination entering the groundwater from the site would flow toward the south.

Comment # 32 Comment Figure H.2.8 shows that rain water inside the study area would run into the Hicksville water wells at plant 9.

EPA Response: Figure H.2.8 depicts the lines of hydraulic head for a layer of the study area. The study area depicted on Figure H.2.8 includes an area larger than the area impacted by the site. The groundwater flows perpendicular to the lines of equal head from the higher numbers to the lower. This shows the groundwater generally flows to the south. The influence of pumping wells, including the Hicksville wells, is also shown. The figure shows that the influence of the Hicksville wells do not extend to the Site.

Comment # 33 Figure H.5.7 and Figure 5.1 shows the Ruco, Grumman

and Navy facilities and two public supply wells with contaminants falling into the Lloyd Aquifer by following the well casings.

EPA Response: Figure H.5.7 depicts the calculated hydraulic head in the Magothy Aquifer at a model layer from 360ft to 495ft below sea level. Figure 5.1 depicts trichloroethylene (TCE) concentrations detected in wells during the mid 1970's in the study area. The deepest monitoring wells are completed in the Magothy Aquifer. The Magothy Aquifer is separated from the Lloyd Aquifer by an extensive layer of clay (the Raritan Confining Unit). There are no wells in the study area that are deep enough to enter the Lloyd Aquifer. Therefore, contamination cannot enter the Lloyd by traveling down well casings.

Comment # 34 Since the contaminants are found at 600 ft deep the water tested is from the Lloyd Aquifer.

EPA Response: The Magothy Aquifer extends below 600 ft. in the area of the Site where the contaminants are at their deepest. Below the Magothy lies a low permeable layer known as the Raritan Confining Unit that averages 175 ft thick that would act as a barrier to prevent contaminants from moving from the Magothy to the Lloyd.

Comment # 35 Figure 5.12 shows pools heading to the north - north east.

EPA Response: Figure 5.12 depicts a schematic of aquifer zones of the Hooker/Ruco Site area at various depths. Included within each zone are contours showing the concentrations of TCE detected in monitoring wells. It is incorrect to interpret these contours as either underground streams or pools. The drawing also notes that the vertical direction is not to scale. The flow directions are not shown on the concentration schematic and it is incorrect to state that the water is running to the north based on this drawing. Groundwater and contaminant flow directions are depicted on other drawings.

Comment # 36 Why is biosparging being considered as a solution when it only addresses one of the many contaminants?

EPA Response: The contaminants other than vinyl chloride are being addressed by the treatment system in operation on the Northrop facility. Because that system would not be effective in treating vinyl chloride, the vinyl chloride will be treated using the biosparging.

Comment # 37 There were two dates for the public meeting given in

mailings. Should another meeting be scheduled as a remedy?

EPA Response: On July 28, 2000, an advertisement was placed in Newsday announcing the issuance of the Proposed Plan and that a public meeting would be held on August 15 to discuss the Site. EPA also sent notices to the Hooker Chemical/ Ruco Polymer Site mailing list. Due to a clerical error, the date for the public meeting was incorrect on the mailing. The error was detected and an additional mailing was sent to the same mailing list the next day. The meeting was well attended. Therefore, EPA not believe an additional meeting is warranted.

Comment # 38: The testing done at the site is spreading the contamination to the Lloyd Aquifer.

EPA Response: The deepest borings and wells installed during the investigations were completed in the Magothy Aquifer. The Magothy Aquifer is separated from the Lloyd Aquifer by an extensive layer of clay called the Raritan Confining Unit that averages 175 ft thick that would act as a barrier to prevent contaminants from moving from the Magothy to the Lloyd. There are no wells in the study area that are deep enough to enter the Lloyd Aquifer. There was no incursion into the Lloyd aquifer.