Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision
Monarch Chemicals Site
City of Utica, Oneida County
Site Number 6-33-030

March 2001

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* ERIN M. CROTTY, *Commissioner*

DECLARATION STATEMENT - RECORD OF DECISION

"Monarch Chemicals" Inactive Hazardous Waste Site
City of Utica, Oneida County, New York
Site No. 6-33-030

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the Monarch Chemicals class 2 inactive hazardous waste disposal site which was chosen in accordance with the New York State Environmental Conservation Law. The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300).

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Monarch Chemicals inactive hazardous waste site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential significant threat to public health and the environment.

Description of Selected Remedy

Based on the results of the Remedial Investigation/Feasibility Study (RI/FS) for the Monarch Chemicals Site and the criteria identified for evaluation of alternatives, the NYSDEC has selected soil vapor extraction and limited soil cover to remediate the contaminated soil, hydraulic control without barrier wall, natural attenuation of the downgraident edge of the plume, and ethanol anaerobic treatment technologies to treat affected groundwater, and institutional controls as the remedy for the site. The components of the remedy are as follows:

1. Source Remediation

- The source of the contamination in the sub-surface soils will be addressed by in-situ treatment of the PCE and TCE using soil vapor extraction (SVE).

- The most contaminated groundwater in the shallow aquifer, which serves as a source to the rest of the plume, will be aggressively treated using ethanol anaerobic treatment technology unless it is determined unnecessary.

2. Migration Control and Attainment:

- Employ hydraulic control to pump and treat the PCE and TCE contaminated groundwater in the shallow aquifer via extraction wells and treat it by using an air stripper in conjunction with granular activated carbon.

- Provide 2 ft. of soil and vegetative soil cover over areas where the total carcinogenic PAHs exceed 10 mg/kg in surface soils.

- Impose deed restrictions to prevent the use of on-site groundwater, restrict residential use of the property, and control any future excavation.

3. Monitored Natural Attenuation:

- Provide for monitored natural attenuation of the residual groundwater contamination with a contingency plan and effectiveness monitoring program.

- Provide for long term groundwater monitoring program.

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as being protective of human health.

Declaration

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

3/30/2001
Date

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

TABLE OF CONTENTS

RECORD OF DECISION

Monarch Chemicals Site
City of Utica,Oneida County
Site No.6-33-030
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SECTION 1: SUMMARY OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYSDOH) has selected a remedy to address the significant threat to human health and/or the environment created by the presence of hazardous waste at the Monarch Chemical site, a class 2 inactive hazardous waste disposal site owned by Jones Chemicals Inc. (JCI). As more fully described in Sections 3 and 4 of this document, the manufacturing and repackaging of chemicals at the site have resulted in spills and the disposal of a number of hazardous wastes consisting of several volatile organic compounds (VOCs) and semi volatile organic compounds (SVOCs). The significant chemicals of concern include tetrachloroethene (PCE) and trichloroethene (TCE), some of which were released or have migrated off site to surrounding areas, including the Mohawk Valley Oil inactive hazardous waste site. These disposal activities have resulted in the following significant threats to the public health and/or the environment:

- A potential threat to human health and the environment associated with chlorinated VOCs, polyaromatic hydrocarbons (PAHs), and benzene, toluene, ethylbenzene, and xylenes (BTEX) contamination in the groundwater.

- A significant threat to human health related to direct contact with surface soils contaminated with PAHs and chlorinated VOCs.

- A potential threat to human health associated with chlorinated VOC, PAH, and BTEX contaminated sub-surface soils.

In order to eliminate or mitigate the significant threats to the public health and/or the environment that the hazardous wastes disposed at the Monarch Chemical site have caused, the selected remedy will consist of:

1. Source Remediation

- The sub-surface soils will be addressed by in-situ treatment of the PCE and TCE using soil vapor extraction (SVE).

- The most contaminated groundwater in the shallow aquifer, which serves as a source to the rest of the plume, will be aggressively treated using ethanol anaerobic treatment technology unless it is determined unnecessary.

2. Migration Control and Attainment:

- Employ hydraulic control to pump the PCE and TCE contaminated shallow and intermediate groundwater via extraction wells and treat it by using an air stripper in conjunction with granular activated carbon.

- Provide 2 ft. of soil and vegetative soil cover over areas where the total carcinogenic PAHs exceed 10 mg/kg in surface soils.

- Impose deed restrictions to prevent the use of on-site groundwater, restrict residential use of the property, and control any future excavation.

3. Monitored Natural Attenuation:

- Provide for monitored natural attenuation of the residual groundwater contamination with a contingency plan and effectiveness monitoring program.

- Provide for long term groundwater monitoring program.

The selected remedy (Alternative 8), discussed in detail in Section 7 of this document, is intended to attain the remediation goals selected for this site in Section 6 of this Record of Decision (ROD), in conformity with applicable standards, criteria, and guidance (SCGs).

SECTION 2: SITE LOCATION AND DESCRIPTION

The Monarch Chemicals Site (site number 6-33-030) is located at 37 Meadow Street, Utica, New York ***(Figure 1)***. The Monarch Chemical site is located in southeastern Oneida County in central New York State. The site lies within the Harbor Point Area, a historical industrial zone, where the majority of the industrial facilities have been demolished or razed. The Niagara Mohawk Manufactured Gas Plant site, Mohawk Valley Oil (MVO), and New York Tar Emulsion Products Site (NYTEP) are listed on the registry of inactive hazardous waste sites and are located within the Harbor Point area.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The Monarch Chemical site consists of two parcels totaling 7.56 acres (one of 6 acres and the other of 1.56 acres). JCI purchased the 6-acre parcel from the Charles C. Kellogg and Sons Company ("Kellogg") in 1966. JCI purchased the 1.56-acre parcel to the south of the 6-acre parcel from the Owasco River Railway, Inc., a subsidiary of the Penn Central Corporation.

Before Monarch Chemical's shutdown in May 1995, operations at the Monarch Chemical site included:

- Repackaging of chlorine, ferric chloride, hydrochloric acid, hydrofluosilic acid, nitric acid, and sulfuric acid.
- Manufacture of sodium hypochlorite (bleach).
- Dilution and repackaging of sodium hydroxide and muriatic acid.
- Distribution of various organic and inorganic (water treatment-related) chemicals.

Chlorine gas was brought to the Monarch Chemical site via 90-ton rail cars. The material was repackaged on site in a closed-loop system into 2,000 and 150-pound steel containers or cylinders. Residual chlorine was absorbed in dilute sodium hydroxide to make sodium hypochlorite. Sodium hydroxide was either diluted from 50 to 19 percent to make sodium hypochlorite or repackaged into 55-gallon drums for commercial sale.

Ferric chloride, hydrochloric acid, hydrofluosilicic acid, nitric acid, and sulfuric acid were repackaged from bulk storage tanks into 55-gallon drums and 15-gallon containers. Due to the lack of routine corporate file retention procedures, a complete list of organic chemicals handled at the Monarch Chemical site before 1991 is not available. A NYSDEC Site Inspection Report (report of a site inspection conducted in May 1990), indicated that some of the organic chemicals handled at the Monarch Chemical site included acetic acid, methyl ethyl ketone, methyl isobutyl ketone, toluol (commercial grade of toluene), tetrachloroethene (PCE), and trichloroethene (TCE). Other records indicate that methylene chloride (MeCl), 1,1,1-trichloroethane (TCA), and xylenes were also handled and repackaged at the Monarch Chemical site. The organic chemicals were primarily stored in 30 or 55-gallon drums.

The above ground storage tanks (ASTs) that formerly existed on the Monarch Chemical site were used to store a variety of inorganic chemicals. The ASTs were located inside the large building and outside on the concrete pads. A 2,000-gallon diesel underground storage tank (UST), removed in April 1986, had been located south of the storage barn, along the eastern fence line (Figure 2). The UST had been used to store fuel for Monarch Chemical's vehicles.

Production of bleach occurred primarily in the western portion of the large building. During the production of bleach and the handling of other products, two waste streams were generated. One

waste stream was aqueous wastewater, which was designated hazardous because of its corrosive nature. Aqueous wastewater was generated from rinsing and cleaning storage tanks, cleaning and testing empty containers, washing floors, and other regular maintenance activities. This liquid waste was treated in an on-site elementary neutralization system (ENS), which was exempt from Resource Conservation and Recovery Act (RCRA) regulations. The neutralized material was discharged to the Oneida County Sewer Department (OCSD) sanitary sewer system in accordance with Discharge Permit Number 012. An industrial drain line exited the building to connect with the OCSD sanitary sewer along Lee Street.

The second waste stream consisted of a residue generated during the cleaning of brass valve components from chlorine containers. This residue was considered hazardous because of its cadmium and lead components. This waste was regularly collected in 55-gallon drums and disposed of at an off-site treatment, storage, and disposal facility. Lead contamination is found throughout the Harbor Point area. The majority of the target metals detected are known to occur naturally. Background levels for these metals fall within the expected range for an industrial area and are not of concern at this site.

As a result of the above activities that were performed at the Monarch Chemical Inc. site, chemical releases and the disposal of hazardous wastes occurred on site. There are allegations that Monarch employees dumped the contents of nearly 400 drums on the grounds of the facility in 1981. There are several spills documented from 1979 until operational procedures ceased in 1995.

3.2: Remedial History

On June 24, 1985, an environmental criminal investigator observed a commercial waste hauler leaving the Monarch Facility with a 30 cubic foot "roll off" containing numerous bags of waste chemical products including: sodium bichromate, sodium thiosulfate, sodium bisulfate, boric acid, citric acid and calcium chloride. The hauler did not have a valid permit and a ticket was issued to Monarch.

NYSDEC had documentation of releases that occurred on site and suspected others. The NYSDEC and JCI executed an Order-on-Consent that became effective on November 30, 1994. This required JCI to perform a Remedial Investigation for the Monarch Chemical site.

SECTION 4: SITE CONTAMINATION

To evaluate the contamination present at the site and the alternatives to address the significant threat to human health and the environment posed by the presence of hazardous waste, the PRP has recently conducted a Remedial Investigation and Feasibility Study (RI/FS).

4.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site.

The RI was conducted in three phases. The first phase was conducted between October 1996 and November 1996, the second phase during May 1997, and the third phase during October 1998. A report entitled "Remedial Investigation Report, Former Monarch Chemicals, Inc. Site" dated March 16, 1999 has been prepared which describes the field activities and findings of the RI in detail.

The RI included the following activities:

- A passive soil gas survey.
- Collection and analysis of surface soil samples (0-3 in.).
- Organic vapor screening of soil sample headspace.
- Test pits excavations with the collection and analysis of soil samples to evaluate the possible presence and extent of non-aqueous phase liquids (NAPLs).
- Soil borings and the collection and analysis of soil samples from shallow and intermediate depths.
- Characterizing sub-surface stratigraphy.
- Installing monitoring wells.
- Collection and analyzing multiple rounds of groundwater samples.
- Measured groundwater elevations to estimate groundwater flow directions and hydraulic gradients.
- Performed slug tests to estimate hydraulic parameters of the sub-surface water-bearing zones.

To determine which media (soil, groundwater, etc.) are contaminated at levels of concern, the RI analytical data was compared to environmental Standards, Criteria, and Guidance values (SCGs). Groundwater, drinking water, and surface water SCGs identified for the Monarch Chemicals site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part V of New York State Sanitary Code. For soils, NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 provides soil cleanup guidelines for the protection of groundwater, background conditions, and health-based exposure scenarios. In addition, for soils, site specific background concentration levels can be considered for certain classes of contaminants.

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the RI Report.

Chemical concentrations are reported in parts per billion (ppb) and parts per million (ppm). For comparison purposes, where applicable, SCGs are provided for each medium.

4.1.1: Site Geology and Hydrogeology

Geology

The subsurface at the Monarch Chemical site is underlain by four distinct stratigraphic units consisting of fluvial and glaciolacustrine sediments. In descending order, these units are the upper sand/fill unit, the silty clay unit, the clayey sand/silty sand unit, and the glacial till unit.

- The upper sand/fill unit is composed primarily of sand and fill material. The thickness of this unit ranges between 3 and 10 feet. The sand is dark gray, predominantly well-graded (poorly sorted), fine to coarse-grained, and subangular to subrounded. Fill material consists of a variety of waste materials, including gravels, coal cinders, coal ash, glass bottles, brick fragments, wood chips, ceramics, boots, garments, scrap metals, and MGP combustion waste. Similar types of fill materials were found on the neighboring Niagara Mohawk and MVO sites.

- The silty clay unit underlies the upper sand/fill unit; contact between these units is gradational. The silty clay unit occurs at depths ranging from 8 to 12feet bgs. The thickness of the silty clay ranges between 10 and 20 feet. Although the silty clay unit was found in a majority of the soil borings, it was absent in the southwest corner of the Monarch Chemical site, where a peat layer approximately 4 feet thick was found below the upper sand/fill unit. The silty clay unit is predominantly a clay unit with varying amounts of silt. The silty clay unit is an aquatard and has slowed the downward migration of contaminats, but has not been completely effective in preventing the downward migration of chemicals into underlying sediments.

- The clayey sand/silty sand unit underlies the silty clay confining unit. The clayey sand/silty sand unit occurs at depths between 15 and 20 feet bgs and ranges from 10 to 25 feet in thickness. The clayey sand unit is primarily a sand unit with varying amounts of clay and silt. The sand is heterogeneous, ranging from very fine- to coarse-grained, and its grain texture ranges from poorly graded to well graded.

- The glacial till unit underlies the clayey sand/silty sand unit with sharp contact. The glacial till unit occurs at depths between 34 and 36 feet bgs and is composed of clay and silt with minor amounts of gravel. Although the overlying clayey sand/silty sand unit was saturated with NAPLs (coal tar and light fuel oil), NAPLs had not penetrated the glacial till unit according to the soil borings. This indicates that the unit forms an effective barrier to downward migraton of chemicals. The thickness of the glacial till unit at the Monarch Chemical site was not determined; however, the RI conducted at the Niagara Mohawk site indicates the thickness of this unit to range between 5 to 15 feet.

- The bedrock of the Mohawk river valley is the Ordovician shale. The bedrock in the region is commonly referred to as Utica Shale. The bedrock is marine in origin, black, finely laminated, and has sporadic pyrite concentrations. The bedrock was encountered at depths of 50 feet bgs in the southern end of the Monarch Chemical site and its vicinity to more than 120 feet bgs in the northern end of the Monarch Chemical site and its vicinity.

Hydrogeology

At the Monarch Chemical site, depths to groundwater typically range from 4 to 7 feet below the ground surface. The upper sand/fill unit and clayey sand/silty sand unit constitute significant water-bearing zones at the Monarch Chemical site; these were termed the shallow and intermediate zones, respectively.

- Groundwater flow in the shallow zone is primarily toward the east-northeast and in the intermediate zone, is generally toward the north ***(Figure 3)***. Groundwater mounding was observed in both the shallow and intermediate zones in the west-central portion of the Monarch Chemical site. Groundwater flows radially from the localized groundwater mounding.

- The horizontal hydraulic gradient in the shallow zone ranges from 0.002 to 0.005 foot per foot. The horizontal gradient in the intermediate zone ranges from 0.008 to 0.010 foot per foot. Estimated vertical hydraulic gradients were 0.086 and 0.139 foot per foot. The vertical hydraulic gradient is downward, indicating there is a downward component of groundwater flow from shallower to intermediate aquifer.

- Hydraulic conductivity for the shallow zone was estimated using the hydraulic testing data. Estimated hydraulic conductivities in the shallow zone ranged from 0.05 to 18.72 feet per day. In the intermediate zone, estimated hydraulic conductivities ranged from 1.40 to 28.80 feet per day. The linear groundwater velocities in the shallow zone were estimated to range from 0.0007 to 0.27 foot per day; and between 0.21 and 0.43 foot per day in the intermediate zone.

4.1.2: Nature of Contamination

The significant contaminants of concern are VOCs and SVOCs. PCE, TCE, and BTEX, limited to benzene, are the predominant VOCs. Seven carcinogenics PAHs: benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, and indo(1,2,3-cd)pyrene were the most common SVOCs. RI data shows that higher concentrations of VOCs and SVOCs are present in the shallow water-bearing zone rather than in the intermediate zone. Exposure routes of direct contact and ingestion exist for both human and wildlife receptors. As described in the RI Report, many soil and groundwater samples were collected at the site to characterize the nature and extent of contamination. Additionally, there have been many samples collected at the Niagara Mohawk and Mohawk Valley Oil sites. The main categories of contaminants which exceed their SCGs are VOC and SVOCs.

4.1.3: Extent of Contamination

Table 1 summarizes the extent of contamination for the contaminants of concern in soil and groundwater and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Soil

Surface soil samples (0-3 in.), test pit soil samples, and sub-surface soil samples were collected from the Monarch Chemical site to evaluate soil quality. It has been determined for this site and the other class 2 Inactive Hazardous Waste Sites on the Harbor Point Peninsula that the soil from 0-2 ft. below ground surface (bgs) will be considered the "surface soils" and all other soils at depth greater then 2ft. are "sub-surface soils". Soil sample analytical results indicate that the. surface soils on the Monarch Chemicals site are affected by SVOCs. PAHs were the most common SVOCs detected in the surface soil. The sub-surface soil at the site are affected primarily by VOCs. PCE, TCE, and BTEX were the most predominant VOCs in the sub-surface soils.

Analytical results of surface soil sampling indicate the following:

- Several SVOCs, including the seven PAHs with carcinogenic characteristics, were detected in thesurface soils at the site. The concentrations of these individual SVOCs ranged from 13 to 13,000 ug/kg. The highest areas of concern are along both sides of the warehouse building, particulary SS-8, and SS-9. The highest concentration is located south of the warehouse near MWI-24 ***(Figure 2)***.

Analytical results of sub-surface soil sampling indicate the following:

- PCE and TCE concentrations up to 57,000 and 29,000 ug/kg were detected in unsaturated sub-surface samples at a depth of 4-6 ft bgs. The highest concentration of PCE is located near the northwestern corner of the storage barn. The highest concentration of TCE is located west of MWS-10. ***(Figure 2)***.

Groundwater

Groundwater at the Monarch Chemical site is affected primarily by chlorinated solvents. Groundwater in the western portion of the Monarch Chemical site is affected by BTEX and PAHs from the source areas located on the former Water Gas Plant property. RI data shows that higher concentrations oftVOCs and SVOCs are present in the shallow water-bearing zone rather than in the intermediate zone. Affected groundwater extends to the intermediate water-bearing zone, approximately 35 feet below ground surface. VOCs detected include relatively high concentrations ofPCE, TCE, TCA, and BTEX. Degradation products 1,2-dichloroethene (1,2-DCE), vinyl chloride, and 1,1-dichloroethane (1,1-DCA) were also detected at elevated concentrations, indicating that biodegradation may be occurring. The source areas of the chlorinated solvents are present in the vicinity of the loading dock, pole barns and railroad spurs on the Monarch Chemical site as indicated by elevated PCE and TCE concentrations detected in the shallow-zone wells

Analytical results of groundwater sampling indicate the following:

- PCE and TCE concentrations up to 84,000 μg/L and 5,600 μg/L were detected at the Monarch Chemical site in the shallow aquifer. PCE concentrations such as these that are greater than 57% of the pure phase solubility of 160,000 ug/L indicate the potential presence of dense non-aqueous phase liquid (DNAPL) ***(Figure 3&4)***. PCE and TCE concentrations up to 77 and 620 μg/L were detected at the Monarch Chemical site in the intermediate aquifer ***(Figure 3&4)***.

- TCA is present in concentrations up to 1,100 μg/L, primarily in the western and north-central portions of the Monarch Chemical site.

4.2: Interim Remedial Measures

An Interim Remedial Measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

No IRMs were conducted at the Monarch Chemical Site. However, groundwater contamination at the western edge of the Monarch Chemical property is commingled with wastes generated, by the manufacturing of gas, at the adjacent Niagara Mohawk Water Gas Plant parcel (WGP). The WGP is part of the Niagara Mohawk Harbor Point Inactive Hazardous Waste Disposal Site. Hazardous substances attributable to Niagara Mohawk or their predecessor company will be addressed through a separate PRAP and ROD for the Harbor Point Site. In addition, Niagara Mohawk has proposed an IRM at the WGP which would likely include the western part of the Monarch Chemical site which is contaminated with high concentrations of chlorinated organic compounds, attributable to Monarch Chemical, commingled with high concentrations of BTEX and PAHs directly attributed to Niagara Mohawk. The proposed IRM consists of a containment system ***(Figure 2)*** that would encompass, where practicable, all sources of MGP groundwater contamination at the WGP parcel and at the adjacent Monarch Chemical property. Niagara Mohawk will be responsible for the remediation of all waste within their proposed barrier wall.

Analytical results at the western edge of the Monarch Chemical property, within the barrier wall, show:

- The surface soils are contaminated with PAH concentrations as high as 170,150 ug/kg and in the sub-surface soils as high as 50,262,010 ug/kg.

- The shallow and intermediate aquifers are contaminated with concentrations of PAHs that are as high as 2,648 ug/L and 2,572 ug/L respectfully.

- High concentration of BTEX are found in the shallow aquifer as high as 4,910 ug/L.

This IRM would be completed pursuant to NYSDEC Order on Consent, Index No. D6-0001-9210.

4.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks can be found in Section 8.0 of the RI report.

An exposure pathway is the manner by which an individual may come in contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Pathways which are known to or may exist at the site include:

- Ingestion - the ingestion of groundwater, surface soil, or subsurface soil (current and future construction workers, future site workers, current and future trespassers, and potential future recreators)

- Direct Contact - dermal contact with groundwater, surface soil, or subsurface soil (current and future construction workers, trespassers, and potential future recreators)

- Inhalation - the inhalation of vapors from groundwater, surface soil, or subsurface soil and the inhalation of dust from wind blown surface soil and sub-surface soil during excavation (current and future construction workers, future site workers, current and future trespassers, and potential future recreators)

4.4: Summary of Environmental Exposure Pathways

This section summarizes the types of environmental exposures and ecological risks which may be presented by the site. The following pathways for environmental exposure and/or ecological risks have been identified:

Complete exposure pathways for the contaminants present on the Monarch site exist for small mammals able to burrow under or traverse the fence surrounding the site, small mammals that burrow into the ground for shelter, and birdlife potentially frequenting the Harbor Point area.

There is no standing surface water at the Monarch Chemical site. In the shallow aquifer the ground water flows to the northeast towards the Utica Harbor. The groundwater of the intermediate aquifer flows in a more northerly direction eventually turning east, under the MVO site, toward the Harbor. The intermediate aquifer is hydraulically connected to the Harbor. Even though samples obtained from the Harbor sediment and water are non-detect or below SCGs for the contaminants of concern, there is a potential exposure pathway to the fish, waterfowl, and benthic organisms utilizing the Utica Harbor through direct contact and incidental ingestion.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The NYSDEC and JCI entered into a Consent Order on November 30, 1994. The Order obligates the responsible parties to implement a full remedial program.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. The overall remedial goal is to meet all Standards, Criteria and Guidance (SCGs) and be protective of human health and the environment. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this site are:

- Eliminate, to the extent practicable, the potential of future ingestion of groundwater affected by the site that does not attain NYSDEC Class GA Ambient Water Quality Criteria.

- Eliminate, to the extent practicable, the potential off-site migration of contaminated groundwater that does not attain NYSDEC Class GA Ambient Water Quality Criteria due to elevated levels of chlorinated VOCs such as PCE and TCE.

- Eliminate, to the extent practicable, exposures toVOCs and SVOCs.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost effective, comply with other statutory laws and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Monarch Chemicals site were identified, screened and evaluated in the report entitled "Feasibility Study Report for the Former Monarch Chemicals, Inc. Site".

A summary of the detailed analysis follows. As presented below, the time to implement reflects only the time required to implement the remedy, and does not include the time required to design the remedy, procure contracts for design and construction or to negotiate with responsible parties for implementation of the remedy.

7.1: Description of Remedial Alternatives

The potential remedies are intended to address the contaminated soils and groundwater at the site. Each alternative's cost estimate will be based on the standard 30 year period. Each alternative, with the exception of alternative No. 1 (No Action), will implement a natural attenuation program for the downgradient edge of the chlorinated plume in the intermediate aquifer that extends under the MVO site. This program will include monitoring and time based contingency plans.

Alternative No. 1 - No Action

Present Worth:	*$ 1,129,322*
Capital Cost:	*$ 0*
Annual O&M:	*$ 91,008*

The No Action alternative is evaluated as a procedural requirement and as a basis for comparison. It requires O&M and continued monitoring of the chlorinated plume in the groundwater, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment. Fieldwork, laboratory analysis, reports, fence maintenance, and regulatory support are the only annual O&M costs associated with this alternative.

Alternative No. 2 - Soil Cover, SVE of PCE-Affected Soil, Air Sparging, Monitored Natural Attenuation, and Institutional Controls

Present Worth:	*$ 4,265,561*
Capital Cost:	*$ 1,224,552*
Annual O&M:	*$ 245,064*
Time to Implement	*65 working days*

Under this alternative the contamination source, PCE and TCE affected sub-soil, would be remediated by soil vapor extraction (SVE). A 2 ft. thick soil cover will be used in areas where the surface soils are highly contaminated with carcinogenic PAHs, and the groundwater would be remediated by air sparging. The exhaust stream from the SVE and air sparging systems would be treated by vapor-phase carbon adsorption onto granulated activated carbon (GAC). In the hydraulically downgradient portions, monitored natural attenuation would be implemented. Institutional controls, including deed restrictions, would be established for the site to limit the future land use.

Alternative No. 3 - Soil Cover, SVE of PCE-Affected Soil, Permeable Reactive Barrier Wall, Monitored Natural Attenuation, and Institutional Controls

Present Worth:	*$ 6,955,117*
Capital Cost:	*$ 5,258,390*
Annual O&M:	*$ 545,148*
Time to Implement	*80 working days*

This alternative would involve SVE of PCE-affected soil, a 2 ft. thick soil cover will be used in areas where the surface soils are highly contaminated with carcinogenic PAHs, and treatment of the

affected groundwater by a permeable reactive barrier (PRB) wall and natural attenuation. The PRB wall, with zero-valent iron as the reactive media, would be installed along the northern perimeter of the Monarch Chemical site. The PRB wall would be installed to the top of the glacial till layer that is present at about 35 feet bgs. The affected soil from the trenching of the PRB wall would be characterized and disposed off site at a certified facility. In addition to treating affected groundwater via the PRB wall, monitored natural attenuation would also occur. Institutional controls, including deed restrictions, would be established for the site to limit the future land use.

Alternative No. 4 - Excavate PCE-Affected Soil, Slurry (Barrier) Wall, Monitored Natural attenuation, Hydraulic Control, Natural attenuation and Institutional Controls

Present Worth:	*$ 6,069,148*
Capital Cost:	*$ 4,097,600*
Annual O&M:	*$ 158,880*
Time to Implement	*100 working days*

This alternative would involve excavation of PCE-affected soil to approximately 8 feet bgs. The volume of excavated soil is estimated to be approximately 19,100 cubic yards. Excavated soil would be characterized and transported by a hazardous waste contractor to an off-site, certified disposal facility. Clean soil would be imported to replace the excavated material. In addition, a slurry (barrier) wall would be installed along the north-northeastern perimeter of the Monarch Chemical site. The barrier wall would be an extension of Niagara Mohawk's barrier wall, which is described in Section 4.2. The objective of the barrier wall would be to prevent off-site migration of affected groundwater. Affected groundwater inside the barrier wall would be hydraulically contained via pump-and-treat. The extracted water would be treated with an air stripper and polished using a GAC unit before it is discharged to a publicly owned treatment works (POTW). If required, the off gas from the air stripper would be treated using carbon adsorption. Affected groundwater in the hydraulically downgradient portions of the Monarch Chemical site would be addressed by monitored natural attenuation. Institutional controls, including deed restrictions, would be established for the site to limit the future land use.

Alternative No. 5 - Soil Cover, SVE of PCE-Affected Soil, Slurry (Barrier) Wall, Hydraulic Control, Monitored Natural attenuation, and Institutional Controls

Present Worth:	*$ 3,872,809*
Capital Cost:	*$ 1,619,220*
Annual O&M:	*$ 266,352*
Time to Implement	*90 working days*

Alternative 5 is the same as Alternative 4 with one exception: SVE would be used to treat PCE-affected sub-soil and a 2 ft. thick soil cover would be used in areas where the surface soils are highly contaminated with carcinogenic PAHs instead of excavation.

Alternative No. 6 - Soil Cover, SVE of PCE-Affected Soil, Hydraulic Control without Slurry (Barrier) Wall, Monitored Natural Attenuation, and Institutional Controls

Present Worth:	*$ 3,096,259*
Capital Cost:	*$ 745,880*
Annual O&M:	*$ 274,152*
Time to Implement	*75 working days*

Alternative 6 is similar to alternative 5; the only variation is that a slurry (barrier) wall would not be constructed. Affected groundwater at the Monarch Chemical site would be hydraulically controlled via pump-and-treat. Shallow and intermediate-depth extraction wells would be placed in the source area(s) and other strategic locations to extract the affected groundwater. The extracted water would be treated with an air stripper and polished using a GAC unit before it is discharged to a POTW. If required, the off gas from the air stripper would be treated using carbon adsorption. In addition to hydraulic control via pump-and-treat, treatment of affected groundwater would continue via monitored natural attenuation. Institutional controls, including deed restrictions, would be established for the site to limit the future land use.

Alternative No. 7 - Soil Cover, SVE of PCE-Affected Soil, Ethanol Injection, Monitored Natural Attenuation, and Institutional Controls

Present Worth:	*$ 5,018,894*
Capital Cost:	*$ 888,040*
Annual O&M:	*$ 417,634*
Time to Implement	*35 working days*

This alternative would include using SVE to remove the VOCs from the impacted soils and a 2 ft. thick soil cover will be used in areas where the surface soils are highly contaminated with carcinogenic PAHs. The contamination in the groundwater would be treated by ethanol injection. The appropriate concentration of ethanol, roughly 5%, will be injected into the subsurface soils using a direct push method. The ethanol acts as a food source for the anaerobic microrganisms and will enhance the degradiation of the PCE and TCE in the groundwater. The affected groundwater in the hydraulically downgradient portions of the Monarch Chemical site would be addressed by monitored natural attenuation. Institutional controls, including deed restrictions, would be established for the site to limit the future land use.

Alternative No. 8 - Soil Cover, SVE of PCE-Affected Soil, Hydraulic Control without Slurry (Barrier) Wall, Limited Ethanol Injection, Monitored Natural Attenuation, and Institutional Controls

Present Worth:	*$ 3,171,259*
Capital Cost:	*$ 745,880*
Annual O&M:	*$ 274,152*
Time to Implement	*80 working days*

Alternative 8 is similar to alternative 6; SVE would be used to treat PCE-affected sub-soil and a 2 ft. thick soil cover would be used in areas where the surface soils are highly contaminated with

carcinogenic PAHs. The only variations is that ethanol injection will be used, unless determined unnecessary, to treat the areas where the groundwater is contaminated with the highest concentrations of PCE and TCE. Affected groundwater at the Monarch Chemical site would be hydraulically controlled via pump-and-treat. Shallow and intermediate-depth extraction wells would be placed in the source areas and other strategic locations to extract the affected groundwater. Once hydraulic control is established the areas of the shallow aquifer consisting of the highest concentrations of chlorinated VOCs will be aggressively treated by ethanol anaerobic treatment. The appropriate concentration of ethanol, roughly 5%, will be injected into the subsurface soils using preselected monitoring wells. The extracted water would be treated with an air stripper and polished using a GAC unit before it is discharged to a POTW. The off gas from the air stripper would be treated using carbon adsorption. In addition to hydraulic control via pump-and-treat, treatment of affected groundwater would continue via monitored natural attenuation. Institutional controls, including deed restrictions would be placed to prevent the use of on-site groundwater, restrict residental use of the property, and control future excavation.

7.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is provided, followed by an evaluation of the alternatives against that criterion. A detailed discussion of the evaluation criteria and comparative analysis is included in the Feasibility Study.

The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance. The most significant SCG used for evaluating the sampling data for the Monarch site were the "Water Quality Regulations for Surface Waters and Groundwaters" and Technical and Administrative Guidance Memoranda HWR-94-4046.

The New York State soil clean up guidance for the VOCs; PCE and TCE are 1.4 and 0.7 ppm respectfully. The concentrations for the samples of these chemicals at the Monarch site range up to 57 ppm which is much higher than allowed by guidance. PAHs are the predominant SVOC contaminants in the soil. Benzo[a]anthrancene, Chrysene, and Benzo[b]fluoranthene are a few of the PAHs with high concentrations ranging from 0.05 to 20 ppm. The guidance for these chemicals in soil, which are 0.224, 1.1, and 0.014 respectfully, are greatly exceeded.

The groundwater at the site has been significantly impacted by VOCs. The concentrations for PCE and TCE in the groundwater range from 3 to 84,000 ppb, much higher then the standard value of 5 ppb.

Alternative 1 does not comply with the SCGs. Institutional controls should prevent human exposure to the site contaminants. Without any remedial plan, SCGs would not be achieved for many decades.

Alternatives 2, 3, 4, 5, 6, 7, and 8 would all comply with the chemical-specific SCGs for the contaminated sub-soil. Alternatives 3, 4, 5, 6, 7, and 8 would achieve groundwater preliminary remediation goals (PRGs) within the standard 30 year period for the contaminated on-site groundwater. Groundwater PRGs for off-site contaminated groundwater should be achieved within the standard 30 year period. Groundwater PRGs would be difficult to achieve with alternative 2 due to the presence of dense non-aqueous phase liquids in the soils and groundwater. Alternatives 4, 5, 6, and 8 would meet groundwater requirements, however they would possibly require the treatment of the exhausted air stream from the pump and treat system.

2. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

Alternative 1 would not be protective of human health and the environment. Alternatives 2, 3, 4, 5, 6, 7, and 8 would all be protective of human health and the environment. Institutional controls and deed restrictions would protect human health by preventing direct contact with contaminated soils.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

All of the alternatives would result in little worker and/or community exposure during the remedial action. Alternative 1 would not be effective in achieving clean up levels in the short term. Alternatives 2, 3, 4, 5, 6, 7 , and 8 would result in the required clean up levels being reached in a short term for the contaminated soil. However, the remediation of the contaminated groundwater would not be attainable on a short term basis.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternative after implementation. If wastes or treated residuals remain on site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

Alternative 1 would leave contaminants on site unremediated. The cleanup goals could take many years to meet the long term objectives. Alternative 2 can provide reliable long-term protection. However, because of the presence of DNAPLs and clay lenses the long term clean up goals may not be achieved for the groundwater. Alternatives 3, 4, 5, 6, 7, and 8 would all meet the long-term clean up goals for on-site groundwater within the standard 30 year period. However, the reactive barrier wall used for alternative 3 could possibly leak and require an extensive monitoring program.

Alternative 7 would possibly require a contingency plan for treating the accumulation of 1,2-DCE or vinyl chloride with an oxygen release compound (ORC).

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site. Alternative 1 would rely on natural attenuation to breakdown and destroy the VOCs and SVOCs in the soil and groundwater. Alternatives 2, 3, 4, 5, 6, 7, and 8 would significantly reduce the toxicity, mobility, and volume by effectively remediating the affected soil in the source areas. Alternative 2 may be effective in removing PCE in the sourcea area, however, due to the increase in dissolved oxygen levels it could have a negative effect on the bio-degradation of PCE and TCE downgradient. Alternative 7 could generate a greater volume of the breakdown products; 1,2-DCE and vinyl chloride, which could possibly require a contingency plan and alternative 5 could artifically raise the water table.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

Alternative 1 would be the easiest to implement as no construction work is required. Alternatives 2, 3, 4, 5, and 6 would easily be implemented as experienced contractors are readily available to construct each technology. Alternatives 2 and 3 would require a site-specific field test of the SVE component of the remedy. Alternatives 4, 5, and 6 would require compliance with the substantive permit requirements for handling and disposal of hazardous wastes. Alternative 7 would be administratively and technically difficult to implement. Numerous well points would be needed to inject the ethanol. Ethanol injection is a new technology that would require extensive field testing and permitting for ethanol through the Federal Bureau of Alcohol, Tobacco, and Firearms. Alternative 8 would be easily implemented, however, permits for the use of ethanol would be required. Pump and treat will be the primary method for groundwater treatment with the ethanol injection component used in conjunction to help accelarate the degradiation of high concentrations of PCE. Since the ethanol injection would be limited to a few hot spot areas extensive field testing would not be necessary.

7. Cost. Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in Table 2. The most expensive alternative was Alternative 3 ($6,955,117) the least expensive, excluding Alternative 1, was Alternative 6 ($3,096,259). Alternative 8 cost the same as alternative 6 ($3,096,259) plus $75,000 for theaddition of the ethanol injection component. Alternative 7 (Ethanol Injection) cost is $5,018,894.

8. Community Acceptance - This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan have been evaluated. The "Responsiveness Summary" included as Appendix A presents the public comments received and the manner in which the Department will address the concerns raised.

In general the public comments received were supportive of the selected remedy. Several comments were received, however, pertaining to redevelopment and ethanol injection.

Pertaining to redevelopment; Oneida County Department of Planning had concerns that Alternative 8 would not allow a more timely reuse of the property or better opportunity for future development and that the remedy would not be aesthetics pleasing.

Pertaining to ethanol injection; JCI Jones has proposed that the use of ethanol be evaluated after the SVE system has remediated the source of the contamination in the soil and the pump and treat system has been treating the groundwater for several years.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based on the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC is selecting Alternative 8 as the remedy for this site which consists of: Soil vapor extraction and limited soil cover of PCE-affected soil, hydraulic control without barrier wall, natural attenuation, and ethanol anaerobic treatment technologies for PCE-affected groundwater, and institutional controls

This selection is based on the evaluation in Section 7 of the eight alternatives developed for the site. With the exception of the No Action alternative, each of the alternatives would comply with the threshold criteria and would meet the soil and groundwater clean up goals.

The SVE system in Alternative 8 is preferred to be used to remediate PCE-affected soil rather than excavation because of the cost disparity (approximately $3 million) between the two remedies. The cost differential is associated with the cost to excavate, transport and landfill contaminated soil.

Capping of carcinogenic PAH contaminated soils as recommended in Alternative 8 is preferred. PAH contamination is not only located in the surface soils, it extends vertically through the unsaturated soil to the water table. It would not be practical to excavate because wherever the vertical extent of the excavation stops, clean cover material (i.e. cap) would still have to be placed. This would be much more costly because excavated soils would have to be landfilled, and clean soils still brought in for backfill and cover.

The pump and treat system for contaminated groundwater in Alternative 8 is preferred to the air sparging system in Alternative 2 because the DNAPL is confined by clay lenses, and air sparging would not be as efficient or as effective a method of treatment. The permeable reactive barrier wall, as proposed in Alternative 3, was not chosen as the method to remediate the groundwater due to the high costs associated with the installation, maintenance, and extensive monitoring program. Alternative 7 would be technically and administratively difficult to implement as the primary groundwater remedy for a large contaminated area such as this since it is a new technology which would require extensive field testing. The slurry (barrier) wall proposed in Alternative 4 was not chosen due to its potential long term impacts. Those being that, once the pump and treat component of the remedy had been completed and the groundwater no longer being pumped, the water table would continue to rise behind the slurry wall. This could cause ponding of surface water during rainfall and also affect overall site drainage.

Alternative 8 was selected because:

- It will aggressively eliminate or significantly reduce the sources of contamination, located in the sub-surface soil and groundwater resulting in attainment of SCGs for the soil which should enable attainment of SCGs for the groundwater in the future.

- It is the most cost effective alternative that meets the remediation goals for the site.

- It will reduce the toxicity, mobility, and volume of contamination at the site.

- It has short term effectiveness by significantly reducing the contaminated surface and sub-surface soil and long term effectiveness for reducing the affected groundwater.

The estimated present worth cost to implement the remedy is $3,171,259. The cost to construct the remedy is estimated to be $745,880 and the estimated average annual operation and maintenance cost is $274,152.

The elements of the selected remedy are as follows:

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Any uncertainties identified during the RI/FS would be resolved.

2. Remediation of the surface soils (0-2 ft. bgs) contaminated with the seven most carcinogenic SVOCs; benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluorantene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene with a total concentration greater than 10 ppm, will be addressed by placement of a 2 foot thick clean soil cover. The placement of the clean soil cover may require grading and/or excavation, with off-site disposal, of some areas due to topographic conditions.

3. Remediation of the PCE and TCE hot spot areas, that extend from the surface soils to the sub-soils above the shallow aquifer as deep as 6 ft. bgs ***(Figure 2)***, will be remediated in situ by a SVE system. The off-gas would be treated using a granular activated carbon unit. The effectiveness of this system will be evaluated with a field pilot test. The affected sub-soils are proposed to be cleaned up to meet the guidance values, for the contaminants of concern, in TAGM HWR-94-4046.

4. The PCE and TCE contaminated groundwater would be treated by using a pump-and-treat system consisting of multiple depth extraction wells placed in strategic locations, including source areas, to capture and treat the groundwater and prevent the plume from migrating. Once hydraulic control is established and the SVE system has effectively treated the source of contamination in the soil, the areas of the shallow aquifer consisting of the highest concentrations of chlorinated VOCs will be aggressively treated by ethanol anaerobic treatment unless determined unnecessary based upon monitoring data. The appropriate concentration of ethanol, roughly 5%, will be injected into the groundwater of the shallow and intermediate aquifers using preselected monitoring wells located at source areas. This system is proposed to remediate contaminated groundwater to the standards contained in 6NYCRR part 703.5 (Class GA).

5. The groundwater contaminated with PCE and related breakdown products such as vinyl chloride, at the leading edge of the plume, located at and downgradient of the Monarch Chemical site will be addressed by monitored natural attenuation (MNA). A groundwater monitoring program will be used to monitor the effectiveness of the MNA component of the remedy. This MNA remedy will include a contingency plan that will require the leading edge of the plume to be treated if data from the O&M plan concludes that the monitored natural attenuation will not meet its time based remedial goal of 23 to 29 years.

6. The SVOCs remaining in the sub surface soils would be addressed by deed restrictions. SVOCs in the sub-surface soils are all below the clean up goal of 500 ppm for total SVOCs. There is not a direct pathway to adversely affect human health or the environment.

7. Deed restrictions will be placed to prevent the use of on-site groundwater, restrict residental use of the property, and control any future excavation onsite that would disturb contaminated soil addressed by the clean soil cover.

8. The O&M plan will include a long term monitoring program. Groundwater samples will be collected semiannually to evaluate the effectiveness of the remedy for a 30 year period with 5 year evaluations. This program will determine the effectiveness of the soil vapor extraction, pump and treat, ethanol anaerobic treatment or chemical oxidation, and natural attenuation systems to be monitored.

SECTION 9: HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the remedial investigation process, a number of Citizen Participation activities were undertaken in an effort to inform and educate the public about conditions at the site and the potential remedial alternatives. The following public participation activities were conducted for the site:

- A repository for documents pertaining to the site was established.
- A site mailing list was established which included nearby property owners, local political officials, local media and other interested parties.
- Factsheet #1 was mailed to the nearby property owners announcing the availability of the Remedial Investigation report.
- Factsheet #2 was mailed to nearby property owners announcing the availability of the PRAP and the public meeting.
- A public meeting was held on February 7, 2001 in the Utica State Office Building to provide an opportunity for the public to ask questions and provide their concerns on the proposed remedy.
- A public comment period for the PRAP was established, beginning on January 15, 2001 and ending on February 16, 2001.
- A Responsiveness Summary was prepared and included as part of this document, to address the comments received during the public comment period for the PRAP.

JONES/3445SITE\WDW\10-27-99

Source USGS National Mapping Program.
New York State.

SCALE 1:50000

Site Location Map
Former Monarch Chemicals, Inc. Site
37 Meadow Street
Utica, New York

LFR
LEVINE • FRICKE

P No. 34 .99

Figure 1

MOHAWK VALLEY OIL
LEE STREET TERMINAL

MCI ALTERNATIVE 8:
- SVE of PCE-Affected Soil
- Hydraulic Control
- Ethanol Injection
- PAH Surface Soil Excavation
- Remediation by Natural Attenuation
- Institutional Controls

PAD
WS-14 **GROUNDWATER TREATMENT SYSTEM COMPOUND AREA**

NIMO'S PROPOSED REMEDIAL ALTERNATIVES
- Barrier Wall
- Surface Capping
- Hydraulic Control
- Removal of Surficial NAPL & Purifer Debris

LEGEND

PAD	Concrete Pad for Bulk Storage Tank
HYD.	Fire Hydrant
MH	Manhole
MWS-1	Natural Attenuation Monitoring Well
	Hydraulic Control Piping Location and Extraction Wells
	Proposed Soil Vapor Extraction Well Location
	Proposed Soil Vapor Extraction Piping Location
	Aproximate Location of Proposed Barrier Wall Alignment
	Aproximate Location of Proposed Working Platform
	Proposed Surface Soil Excavation Area For Polynuclear Aromatic Hydrocarbons
PAH	Polynuclear Aromatic Hydrocarbons

0 100 FEET
SCALE 1"=100'

Proposed Remedial Alternative
Former Monarch Chemicals, Inc. Site
37 Meadow Street, Utica, New York

LFR LEVINE•FRICKE
Project No. 3445.99

Figure 2

Isoconcentration Map of Tetrachloroethene

28" BOX
ELDER

FORMER
WATER GAS PLANT

8\WDW\03-3-99

CADARC\JONES\UTICA\34450

LEGEND

	Concrete Pad for Bulk Storage Tank	TCE	Trichloroethene	BDL	Below Detection Limits
	Fire Hydrant	(12)	Contaminant Concentration (µg/l)	NS	Not Sampled
	Manhole	20,000	Contaminant Isoconcentration Contour, Dashed Denotes Inferred (µg/l)		
MWS-14	Shallow Monitoring Well Location				
PCE	Tetrachloroethene	µg/l	Micrograms per liter		

0 130 FEET
SCALE 1"=130'

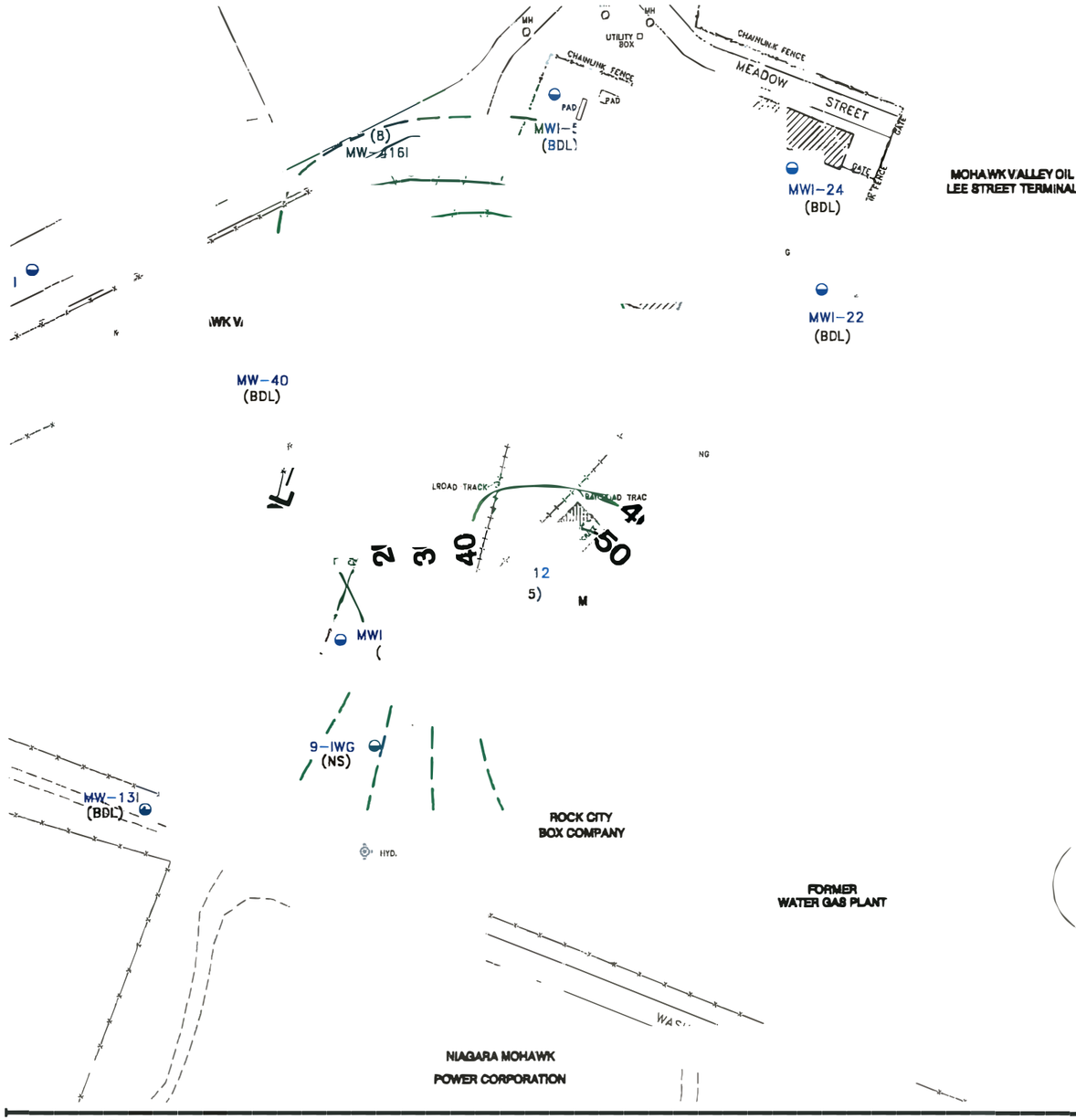
Isoconcentration Maps of Tetrachloroethene and Trichloroethene
Shallow Monitoring Wells, October 1998
Monarch Chemicals, Inc.
37 Meadow Street
Utica, New York

LFR LEVINE·FRICKE

Figure 3

Project No. 3445.99

Isoconcentration Map of Tetrachloroethene



Isoconcentration Map of Trichloroethene

LEGEND

PAD	Concrete Pad for Bulk Storage Tank	TCE	Trichloroethene	BDL	Below Detection Limits
HYD.	Fire Hydrant	(12)	Contaminant Concentration (µg/l)	NS	Not Sampled
MH	Manhole	20	Contaminant Isoconcentration Contour, Dashed Denotes Inferred (µg/l)		
MWI-1	Intermediate Monitoring Well Location				
PCE	Tetrachloroethene	µg/l	Micrograms per liter		

0 130 FEET
SCALE 1"=130'

Isoconcentration Maps of Tetrachloroethene and Trichloroethene
Intermediate Monitoring Wells, October 1998
Monarch Chemicals, Inc.
37 Meadow Street
Utica, New York

LFR LEVINE-FRICKE
Project No. 3445.99

Figure 4

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Table 1
Nature and Extent of Contamination

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	SHALLOW AQUIFER (ppb)	INTERMEDIATE AQUIFER (ppb)	FREQUENCY of EXCEEDING SCGs/Background *Shallow/Intermediate*		SCG/ Bkgd. (ppb)
Groundwater	Volatile Organic Compounds (VOCs)	Tetrachloroethene (PCE)	8-84,000	21-77	20/20	17/17	5
		Trichloroethene (TCE)	3-5,600	5-620	17/20	16/17	5
		1,2-Dichloroethene (1,2-DCE)	3-7,300	3-7,000	12/20	16/17	5
		1,1-Dichloroethene (1,1-DCE)	1-67	3-120	14/20	15/17	5
		Vinyl Chloride	12-650	5-370	19/20	17/17	5
		1,1,1-Trichloroethane (TCA)	30-1,100	12-280	20/20	16/17	5
		1,1-Dichloroethane (DCA)	15-99	6-1,100	17/20	15/17	5
		Benzene	4-100	4-48	20/20	17/17	1
		Toluene	3-65	<1	14/20	14/17	5
		Ethylbenzene	2-93	2-24	17/20	16/17	5
		Total Xylenes	2-80	2-13	13/20	14/17	5

Table 1
Continued

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	SHALLOW AQUIFER (ppb)	INTERMEDIATE AQUIFER (ppb)	FREQUENCY of EXCEEDING SCGs/Background *Shallow/Intermediate*		SCG/ Bkgd. (ppb)
Groundwater	Semivolatile Organic Compounds (SVOCs)	Acenaphthene	9-110		1/15		20
		Benzo[a]anthracene	BDL-11	<10	14/15	9/9	0.002
		Benzo[b]fluoranthene	<11	<10	15/15	9/9	0.002
		Benzo[k]fluoranthene	BDL-11	<10	15/15	9/9	0.002
		Chrysene	BDL-11	<10	14/15	9/9	0.002
		Indeno[1,2,3-cd]pyrene	<11	<10	15/15	9/9	0.002
		Napthalene	2-250		5/15		10
		3,3-Dichlorobenzidine	<11	<10	15/15	9/9	5

Table 1
Continued

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	SURFACE SOIL (ppm)	SUB-SURFACE SOIL (ppm)	FREQUENCY of EXCEEDING SCGs/Background *Surface/Sub-surface*		SCG/ Bkgd. (ppm)
Soil	Volatile Organic Compounds (VOCs)	Tetrachloroethene (PCE)		0.002-57		6/19	1.4
		Trichloroethene (TCE)	BDL-14	0.002-29	1/8	6/19	0.7
		1,2-Dichloroethene (1,2-DCE)		0.002-17		9/19	0.3
		Vinyl Chloride		0.007-0.27		1/19	0.2
		1,1-Dichloroethane (DCA)		0.009-0.400		1/19	0.2
		Benzene		0.002-0.110		1/19	0.06
		Chloroform	29				0.3
		Acetone		0.49		2/19	0.2
	Semivolatile Organic Compounds (SVOCs)	Benzo[a]anthracene	0.063-12	0.150-20	6/8	13/19	0.224
		Benzo[a]pyrene	0.065-9.4	0.110-13	8/8	19/19	0.061
		Benzo[b]fluoranthene	0.013-13	0.095-15	6/8	7/19	1.1
		Benzo[k]fluoranthene	0.11-5.6	0.040-7.7	6/8	7/19	1.1
		Chrysene	0.12-13	0.050-20	7/8	15/19	0.4
		Dibenzo[a,h]anthracene	0.36-2.4	<2.1	8/8	19/19	0.014
		Indeno[1,2,3-cd]pyrene	0.075-4.2	0.062-7.1	2/8	2/19	3.2
		4-methylphenol	0.36-2.4	<2.1	6/8	6/19	0.9

Table 1
Continued

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	SURFACE SOIL (ppm)	SUB-SURFACE SOIL (ppm)	FREQUENCY of EXCEEDING SCGs/Background *Surface/Sub-surface*		SCG/ Bkgd. (ppm)
Soil	Semivolatile Organic Compounds (SVOCs)	Phenol	0.36-2.4	<2.1	8/8	19/19	0.03
		Napthalene		0.098-35		1/19	13
		Phenanthrene		0.041-52		1/19	50
		2,4,6-trichlorophenol	0.34-2.4	<2.1	8/8	19/19	0.1

Table 2
Remedial Alternatives Costs

Remedial Alternatives	Capital Cost	Annual O&M	Total Present Worth
Alternative 1 - No Action	$0	$91,008	$1,129,322
Alternative 2	$1,224,552	$245,064	$4,265,561
Alternative 3	$5,258,390	$545,148	$6,955,117
Alternative 4	$4,097,600	$158,880	$6,069,148
Alternative 5	$1,619,220	$266,352	$3,872,809
Alternative 6	$745,880	$274,152	$3,096,259
Alternative 7	$888,040	$417,634	$5,018,894

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

Monarch Chemicals
Proposed Remedial Action Plan
City of Utica, Oneida County
Site No. 6-33-030

The Proposed Remedial Action Plan (PRAP) for the Monarch Chemicals Site, was prepared by the New York State Department of Environmental Conservation (NYSDEC) and issued to the local document repository on January 11, 2001. This Plan outlined the preferred remedial measure proposed for the remediation of the contaminated soil at the Monarch Chemicals Site. The preferred remedy consists of soil vapor extraction of PCE-affected soil, hydraulic control without slurry (barrier) wall, natural attenuation, ethanol anaerobic treatment technologies, limited soil cover, long term groundwater monitoring, and deed restrictions to prevent the use of on-site groundwater, restrict residential use of the property, and control any future excavation.

The release of the PRAP was announced via a notice to the mailing list, informing the public of the PRAP's availability.

A public meeting was held on February 7, 2001 which included a presentation of the Remedial Investigation (RI) and the Feasibility Study (FS) as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. Written comments were received from JCI Jones, Niagara Mohawk, and the Oneida County Department of Planning. The public comment period for the PRAP ended on February 16, 2001.

This Responsiveness Summary responds to all questions and comments raised at the February 7, 2001 public meeting and to the written comments received.

The following are the comments received at the public meeting, with the NYSDEC's responses:

1. *Question:* Has ethanol injection been used successfully to treat tetrachloroethene (PCE) at any other hazardous waste sites?

   Answer: Yes, it was used on an EPA project at a dry cleaner site in Florida where there was PCE contamination in the soil. At this site, the PCE was in the ground for about 30 years and was not degrading. The site remedy consisted of two phases. First, hydraulic control was established to contain the plume and then the soil was flushed with a high concentration of ethanol, which served as a solvent, to wash out the PCE. Most of the PCE and ethanol were recovered by a pump and treat system. The remaining PCE was degraded by the

residual trace amounts of ethanol which acts as a food source for naturally occuring microbes which degrade the remaining PCE. This was successful as the PCE degraded to its breakdown products resulting in the final end products (carbon dioxide, ethene, and ethane) which do not represent a threat to human health or the environment at low concentrations.

2. *Question:* How much ethanol will have to be injected into the ground?

Answer: The quantity of ethanol to be injected will have to be calculated based on the concentration of PCE in the groundwater. Approximately 12,000 gallons at a 5% concentration was used at the Site in Florida.

3. *Question:* Can ORC be used instead of ethanol to remediate the PCE in the groundwater?

Answer: No, the microbes which break down PCE are anaerobic while ORC technology is used to enhance an aerobic environment to stimulate aerobic microbes. However, ORC will be considered as a possible contingency measure, for addressing the downgradient edge of the plume, to treat the PCE breakdown product, vinyl chloride, which degrades in an aerobic environment.

4. *Question:* At what depth will the ethanol be injected into the aquifer?

Answer: The ethanol will be injected into the shallow aquifer at depths less than 15 feet.

5. *Question:* How deep will the slurry (barrier) wall extend into the ground?

Answer: The slurry (barrier) wall proposed by Niagara Mohawk ***(See Section 4.2)*** will be tied into the till layer which is approximately 20 -56 feet below the ground surface.

6. *Question:* Will ORC definitely be used as a contingency plan?

Answer: No, these are examples of what may have to be done to contend with the downgradient edge of the plume. A contingency plan is part of the proposed remedy. If it is necessary to implement the contingency plan it would be acceptable for JCI Jones to consider additional alternatives to those described in the ROD.

7. *Question:* If ethanol migrates offsite, what are the potential effects to the downgradient facilities? How will off-site impacts be prevented?

Answer: Ethanol will be injected in low concentrations at limited source areas only after hydraulic control has been established. This should ensure that the ethanol will not migrate off site. Further information will have to be gathered to determine the effects of ethanol on the barrier wall proposed by Niagara Mohawk, in the unlikely event that it were to migrate. If a small quantity of ethanol at a low concentration were to migrate downgradient to the Mohawk Valley Oil site it should not effect the BTEX in the groundwater since BTEX is degraded aerobically.

8. *Question:* How long will it take the remedy to work? Under Alternative 4, How long would it take to excavate the contaminated soil?

Answer: The groundwater treatment aspect of the proposed remedy will require at least 30 years to remediate the groundwater to meet NYS standards. As part of Alternative 4, Excavation of the contaminated soil would take approximately 8 weeks.

9. *Question:* Where will the treated water from the pump and treat system be discharged?

Answer: The treated water will be discharged to the Oneida County Water Pollution Control Plant.

10. *Question:* Pertaining to alternative 8 what types and description of the equipment will be onsite to implement the remedy?

Answer: To remediate the contaminated soil, a SVE system will be used. This will consist of a skid mounted blower system enclosed in a winterized structure for year round operation and two granular activated carbon units. To treat the contaminated groundwater, a pump and treat system will be used. This will consist of a skid mounted treatment system housed in a winterized structure for year round operation and a low profile air stripper. The air stripper is about 25 - 30 feet tall depending on the design requirements. Drilling equipment, and earth moving equipment will be on site while the remedy is being installed.

11. *Question:* Will there be any on-site excavation?

Answer: The proposed remedy requires covering surface soil contaminated with PAHs. Parts of the area where the cover will be placed may have to be excavated due to surface grading restrictions. However, excavation is not part of the proposed remedy.

12. *Question:* Will the existing buildings be demolished?

Answer: No, this is not part of the proposed remedy. If the buildings were to be demolished in the future, an asbestos and lead paint survey would be required and the rubble would have to be disposed of in accordance with Department regulations. If the concrete foundation were to be removed, the deed restrictions included in remedy would have to be followed.

13. *Question:* Will the railroad tracks be removed?

Answer: No, This is not part of the proposed remedy.

A letter dated February 2, 2001 was received from County of Oneida, Office of the County Executive which included the following comments:

14. *Comment* - All of the remedial alternatives presented in the PRAP (pages 12 through 15) propose "institutional controls" including "deed restrictions to limit future land use". While this wording is somewhat vague, it is our understanding (based on telephone conversations with you) that the land use restrictions for Alternatives 2 through 7 are similar to those described in more detail for the selected Alternative No. 8.

Response - Yes, this is correct. The deed restrictions to limit the future land use for Alternatives 2 through 7 are identical to those described in more detail for the selected Alternative 8.

15. *Comment* - Alternative No. 8 specifically mentions "limiting future land use to industrial only" (p.15). A summary of Alternative No. 8 (p.20) also suggests "deed restrictions to prevent the use of on-site groundwater, to restrict residential use of the property, and to limit future excavation and access". While residential use is specifically excluded for Alternative No. 8, how would recreational, commercial, or light industrial uses be treated? If "future access is limited" doesn't that effectively prohibit ALL future development?
Response - The text in Alternative 8 "limiting future land use to industrial only" has been revised in the ROD to be consistent with the text in Section 8, Summary of the Proposed Remedy. To clarify the confusion, "Alternative 8" and "Section 8" will be revised to state that; deed restrictions would be placed to prevent the use of on-site groundwater, restrict residential use of the property, and control future excavation and access. The intent of these

deed restrictions is to prevent residential use, control exposure during future excavation into contaminated soil, and limit exposure to contaminants during construction by acknowledging their presence in the health and safety plan which would be a component of any future construction project at the site. This deed restriction would allow the site to be developed for commercial, light industrial, and recreational use on a case-by-case basis depending on the potential exposure to contaminants.

16. *Comment* - Given the interest of the City of Utica, Niagara Mohawk, Oneida County, Canal Corporation, and others in the potential redevelopment of the Harbor Point area, we would like to reiterate and stress that remediation alternatives must take into account the plans for redevelopment in the area.

Again, based on telephone conversation with you, it is our understanding that some type of industrial, commercial, and/or business uses are possible on the site once it is remediated. This only land use restrictions proposed for residential types of uses such as apartments, nursing homes, and single- family homes.

Please take note that, working in conjunction with Niagara Mohawk and local agencies, the LA Group has developed a draft redevelopment plan for this area that proposes the Monarch Chemical site be used for commercial or light industrial business with parking provided on the adjoining Water Gas Plant property. The plan also suggests a business/office complex on the City owned property to the south of the Monarch site. It is important that the Monarch Chemical site be remediated in such a way as to lend support to these surrounding and proposed uses.

Aesthetics are also an important consideration given the interest in redevelopment of the surrounding area. Given the high visibility of this site and its location as a primary entranceway into the harbor area from Genesee Street, we are concerned about: the removal of vegetation; the random placement and design of monitoring and extraction wells; the long. term presence of treatment equipment, injection well, etc; the proposed use of the site as a storage and equipment decontamination area for Niagara Mohawk; the future use and condition of the warehouse building; and the visual impacts of chainlink fencing. Regardless of which alternative is selected, the PRAP and remedial design phase must address aesthetic considerations for this area.

Response - The remediation of this site in accordance with this ROD is a key step towards making this site suitable for redevelopment. As discussed in the response to comment 15, this remedy allows for site reuse. Issues pertaining solely to aesthetics or how the site owner chooses to reuse the site within the terms of the the deed restrictions do not fall under the purview of the NYSDEC.

17. *Comment* - Alternatives No. 8 proposes the in-situ treatment of soils and long-term monitoring of groundwater. It is our understanding that the soil vapor extraction wells will be present for approximately 3-5 years during treatment. However, once treatment is completed, these wells may be removed to allow for future development. The groundwater wells, however, will be present onsite for approximately 30 years or more. We encourage the placement of these wells in a location that will not limit future development potential.

Given the concerns raised above, we must question whether alternative No. 4 (that includes soil excavation and replacement rather than in-situ treatment) might be a more desirable alternative if remedial efforts were better coordinated with the efforts of Niagara Mohawk. For example, could the random placement of monitoring wells, extraction wells and treatment equipment be eliminated (or at least consolidated) if soil excavation were to take place? Could soil excavation, treatment and required fill material be coordinated with Niagara Mohawk's treatment process and materials handling and disposal? For example, could treated soil from the Niagara Mohawk site be used as fill for excavated areas? Would Alternative No. 4 provide a better opportunity for future development on the site by allowing unrestricted future excavation in clean-fill soils?

Response - JCI Jones and Niagara Mohawk have been coordinating their efforts while preparing the Feasibility Study for the Monarch Chemical Site and the IRM for the Water Gas Plant Site. At this time there is not a proposed remedy for the Niagara Mohawk - Harbor Point Site. The predominant contaminants of concern at the Monarch Chemical Site consist of chlorinated VOCs while the predominant contaminants of concern at Niagara Mohawk's site consist of BTEX and coal tar related products. The technology Niagara Mohawk proposes to use to address the waste on their site may not be suitable to remediate the chlorinated solvents present at the Monarch Chemical Site.

If soil excavation were to be used in place of the SVE system all of the wells associated with the SVE system could be eliminated. However, this would not eliminate the groundwater treatment wells or the long term monitoring wells. Under Alternative 4 the area of excavation corresponds to the area proposed for SVE included as part of Alternative 8. Therefore, contaminated soils will remain on site for both Alternatives. Alternative 4 would carry the same deed restrictions as Alternative 8 and would not provide a better opportunity for future development or allow unrestricted future excavation.

Regarding the specific location of groundwater wells or other similar design considerations, JCI Jones, the site owner will be responsible, in the first instance, for preparing an approvable, detailed remedy design. NYSDEC will work with JCI Jones in order to accommodate to the extent practicable specific site redevelopment needs.

18. *Comment* - Would alternative No. 4 provide for more timely reuse of the site rather than a delay of 3 to 5 years while the in-situ treatment process takes place?

Response - Excavation and disposal (proposed as part of Alternative 4) of contaminated soils at an off-site disposal facility would return the Monarch Chemical site to a reusable condition sooner than the SVE technology (3 to 4 months verses 3-5 years). However, in the selection of Alternative 8, other factors were also considered:

- SVE, in contrast to excavation/landfilling, will actually treat the VOC contamination, thus reducing the toxicity, mobility, and volume of the waste.
- The Monarch Chemical Site is on a remediation schedule ahead of "Niagara Mohawk's" and "New York Tar Emulsions Products'" proposed remedial plans for the Harbor Point peninsula, therefore the selected alternative should not negatively impact the timely redevelopment of the Harbor Point peninsula area.
- The in-situ treatment process, if necessary, can be designed to allow for concurrent/partial site redevelopment.
- Excavation and landfilling would cost $2,820,120 and SVE would cost $ 290,940 making SVE a much more cost effective alternative.

19. *Comment* - The presence of a slurry (barrier) wall in Alternative No. 4 seems to provide for a better long term guarantee for containment of contaminants. Could the construction of a slurry wall be coordinated or cost shared with Niagara Mohawk's barrier wall for the Water Gas Plant? Could the presence of a slurry wall reduce the number of monitoring wells or consolidate them to the down gradient edge of the property? Additionally, long term operation and maintenance requirements appear to be less for Alternative No. 4 than for any other alternative (excluding the No Action alternative).

We recognize that cost is a consideration in selecting remedial alternatives. However, as stated within the PRAP, "Cost is the last balancing criterion evaluated". It appears that from the "Evaluation of Remedial Alternatives", Alternative No. 4 also meets all the evaluation criteria and remediation goals.

Response - One of the elements of Alternative 4 is to remediate the contaminated groundwater by implementing a pump and treat system. The slurry (barrier) wall is not intended to act as a containment system to prevent the contaminated groundwater from leaving the Monarch Chemical site. Rather, the slurry wall proposed in Alternative 4 would be used to divert the natural flow of the contaminated groundwater, enabling the elimination

of one set of groundwater extraction wells located at the downgradient edge of the property. However, by using the pump and treat system in conjunction with the slurry wall, it would be necessary to relocate one set of extraction wells away from the slurry wall (down gradient edge of the property) as seen in Figure 14 of the Feasibility Study. This would be necessary so that the integrity of the slurry wall is not compromised as a result of pumping close to the wall and the conical area of influence, of the pumps, is optimized. This slurry wall, described under Alternative 4, for the Monarch Site would be an extension to the slurry wall planned by Niagara Mohawk for its site. Niagara Mohawk would have to construct its slurry wall before the slurry wall as part of Alternative 4 could be added.

Each PRP will pay to implement the remedy selected for their site unless it has been agreed upon otherwise by each party.

It is true that "Cost" is the last balancing criteria evaluated when selecting an alternative. This criteria comes into consideration where there are dramatic cost differences between feasible alternatives. With respect to the Monarch Chemicals site, Alternatives 4 and 8 both meet the other seven evaluating criteria equally. However, with respect to the soil alone, excavation and landfilling would not reduce the toxicity nor volume of waste. Also, it is very costly to landfill contaminated soil because landfill space is becoming limited. The NYSDEC recognizes this problem which is another reason why using remedial technologies for treating contamination whenever it is technically feasible and cost effective is preferred.

In addition to the cost disparity between Alternatives 4 & 8 and the disadvantages of soil excavation described above, Alternative 4 also elicits concerns in relation to potential long term impacts. The slurry wall of Alternative 4 could act as a barrier causing the groundwater level to rise behind the wall. After the pump and treat component of the remedy had been implemented and the groundwater no longer being pumped, the water table would continue to rise behind the slurry wall. This could cause ponding of surface water during rainfall and also affect overall site drainage. Taking into consideration all the above pros and cons of the alternatives, Alternative 8 is still considered the preferred remedy.

A letter dated February 14, 2001 was received from Niagara Mohawk which included the following comments:

20. *Comment* - The use of ethanol injection in the vicinity of the NMPC's proposed soil-bentonite slurry (barrier) wall may be incompatible with the soil-bentonite mix used to backfill the proposed slurry wall on the WGP site. It has been documented that ethanol in contact with clay minerals such as used in soil-bentonite mixes may be incompatible (see Dragun, 1988)(1). The effect of ethanol on smectite clay minerals for example, is to cause an increase in the hydraulic conductivity of the clay by a factor of 100 times the prior conductivity value. If this effect were to be realized on the proposed wall at Harbor Point it would significantly reduce the effectiveness of the remedy of NMPC's site by reducing the

hydraulic conductivity of the barrier. Some consideration should be given to where and how close the ethanol injections would be made to the WGP's proposed wall location and the potential impact to the proposed IRM at the WGP site.

Response - Ethanol injection will only be implemented after hydraulic control is established and if it is determined that the pump and treat system is not significantly reducing the concentrations of PCE and TCE. The ethanol is proposed to be injected into the shallow aquifer in a low concentration approximately 5% to act as a food source for anaerobic microbes. The injection(s) would be in a localized area (MWS-10) where the highest concentrations are located. The unfavorable impacts that ethanol would have on the soil-bentonite slurry (barrier) wall has been considered in the proposed remedy and will be further evaluated during the design phase to prevent any adverse impacts on the effectiveness of the soil-bentonite slurry wall proposed by Niagara Mohawk.

21. *Comment* - The PRAP for the Monarch site should be evaluated in terms of the design for the layout of the soil vapor extraction system. As you know, the proposed layout for the slurry (barrier) wall at the WGP site will require that the wall be extended onto the Monarch Chemicals site in order for the wall to fully encompass the PAHs found in the soil that exceed the 1000 ppm level. The two remedies should be considered together so as to not overlap and/or to avoid interference and/or cost inefficiencies that could potentially result.

Response- JCI Jones' consultant, LFR, has considered the design for the barrier (slurry) wall interm remedial measure (IRM) proposed by Niagara Mohawk. Once the Niagara Mohawk IRM conceptual design is accepted by the DEC, the design details for the remedy for the Monarch Chemicals Site will be reviewed to ensure that these two remedial actions are compatible and not unduly redundant.

A letter dated February 16, 2001 was received from JCI Jones which included the following comments:

22. *Comment* - Ethanol is proposed as a reductive dechlorination catalyst for aggressively treating localized tetrachloroethene (PCE) source areas. Under the proposed remedy, food-grade ethanol would be injected after the implementation of soil vapor extraction (SVE) and hydraulic control pump -and treat is to control systems at the site. The rationale behind injecting ethanol after the implementation of pump and treat is to control inadvertent migration of ethanol via hydraulic control of the groundwater. JCI recommends that injection of ethanol to treat the source(s) be considered only if warranted, and then only after the initial treatment by SVE and pump and treat has begun. Specifically, we request that analytical data from at least four (4) periodic monitoring events be evaluated prior to making a determination as to weather or not ethanol injection is warranted. If concentrations show

a decreasing trend or PCE levels have been reduced to below ten (10) percent of its pure phase solubility, then further treatment via the SVE and pump and treat systems should be continued. On the other hand, if PCE levels are still elevated (consistently greater than ten (10) percent of its pure phase solubility), then additional treatment of the source(s) should be considered via ethanol injection.

Response - Ethanol injection will only be implemented after the source areas in the soil are treated with the soil vapor extraction (SVE) system. This should allow at least 3 years of data to be collected. When the SVE component of the remedy is complete, the groundwater will be analyzed to determine how effective the pump and treat and SVE systems have been in reducing the concentrations of PCE and TCE in the shallow groundwater. Based on the review of this data, NYSDEC will determine if ethanol injection should proceed.

23. *Comment* - Under the proposed remedy, breakdown products of PCE such as vinyl chloride at the leading edge of the groundwater plume would be addressed by monitored natural attenuation (MNA). The proposed contingency plan is to either expand the pump and treat system or inject Oxygen Releasing Compounds (ORCs) in the event groundwater goals have not been met in estimated time of 23 to 29 years by MNA. JCI requests that it be allowed to consider other innovative cost effective chemical oxidation technologies, besides pump and treat or ORCs, to address the PCE breakdown products at the leading edge of the groundwater plume if groundwater remedial goals are not met by MNA in the estimated time.

Response - ORC and/or expanding the groundwater pump and treat system were presented as examples of what may have to be implemented to address the leading edge of the groundwater plume if necessary. If it is determined that MNA component of the remedy for addressing the leading edge of the plume is not meeting it's time based goals then JCI will be required to develop a contingency plan to address the contamination. It would be acceptable for JCI Jones to consider additional alternatives to those described in the ROD which would need to be approved by NYSDEC.

APPENDIX B

Administrative Record

Administrative Record
Monarch Chemicals
Site No. 6-33-030

1. Record of Decision, Monarch Chemicals - March 2001
2. Factsheet #3 - Monarch Chemicals- January 2001
3. Proposed Remedial Action Plan, Monarch Chemicals - January 2001
4. Factsheet #2 - Monarch Chemicals- January 2001
5. Final Feasibility Study (FS) Report, Monarch Chemicals - May 26, 2000
6. Remedial Investigation (RI) Report, Monarch Chemicals - March 16, 1999
7. Addendum to the Work Plans - Monarch Chemicals - June 7, 1996
8. Health And Safety Plan - Monarch Chemicals - February 9, 1996
9. Sampling and Analysis Plan Volume 1 - Monarch Chemicals - February 9, 1996
10. Sampling and Analysis Plan Volume 1 - Monarch Chemicals - February 9, 1996
11. Citizen Participation Plan - Monarch Chemicals - February 9, 1996
12. Word Plan - Monarch Chemicals - February 9, 1996
13. Gore-Sorber Screening Survey - Final Report - Monarch Chemicals - December 13, 1995
14. Order on Consent - Index No. A6-0314-94-02- November 8, 1994
15. Capabilities and Services, Levine Fricke, Inc.
16. Phase II Investigation - Monarch Chemicals - March, 1992
17. Phase I Investigation - Monarch Chemicals - March, 1990
18. Phase I Investigation - Monarch Chemicals - December, 1987
19. Appendix A-2 - Proposed Activated Carbon Filtration System - April 1985
20. Appendix A-1 - Proposed Remedial Plan - April 1985