Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision

Former EMCA Site

Mamaroneck (V), Westchester County, New York

Site Number 3-60-025

March 2005

New York State Department of Environmental Conservation

GEORGE E. PATAKI, *Governor* DENISE M. SHEEHAN, *Acting Commissioner*

DECLARATION STATEMENT - RECORD OF DECISION

Former EMCA Inactive Hazardous Waste Disposal Site
Mamaroneck (V), Westchester County, New York
Site No. 3-60-025

Statement of Purpose and Basis

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

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Former EMCA inactive hazardous waste disposal site, and the public's 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 have been addressed by implementing the interim remedial measure identified in this ROD. The treatment of contaminated groundwater via emulsified vegetable oil injections has significantly reduced the threat to public health and the environment. Therefore, a groundwater monitoring program will be implemented to monitor the effectiveness of previous remedial actions in preventing further contamination of the groundwater.

Description of Selected Remedy

Based on the results of the Remedial Investigation and Feasibility Study (RI/FS) for the Former EMCA site and the criteria identified for evaluation of alternatives, the NYSDEC has selected No Further Action other than continued groundwater monitoring, and additional emulsified vegetable oil injections as a contingency. In addition, the remedy includes the following:

1. Development of a site management plan to address groundwater use restrictions.
2. Imposition of an environmental easement.
3. Periodic certification of the institutional and engineering controls.
4. An investigation to determine the potential for vapor intrusion to occur in on-site buildings and to determine the need for vapor intrusion mitigation measures.

New York State Department of Health Acceptance

The New York State Department of Health (NYSDOH) concurs that the remedy selected for this site is 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.

_____ _____

Date

Dale A. Desnoyers, Director
Division of Environmental Remediation

TABLE OF CONTENTS

SECTION **PAGE**

RECORD OF DECISION

Former EMCA Site
Mamaroneck (V), Westchester County, New York
Site No. 3-60-025
March 2005

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 for the Former EMCA site As more fully described in Sections 3 and 5 of this document, operations at the site related to the manufacture of electronic conducting paste used in the electronics industry resulted in the disposal of hazardous wastes, including volatile organic compounds, primarily 1,1,2-trichloro-1,2,2-trifluoroethane (Freon 113). It is believed that hazardous waste disposal occurred through various surface spills, which released Freon 113 through the soil to the groundwater. These wastes contaminated the groundwater at the site, and resulted in:

- a significant threat to human health associated with potential exposure to contaminated groundwater, and contaminated vapors entering into structures.

- a significant environmental threat associated with the impacts of contaminants (VOCs) to groundwater.

During the course of the investigation certain actions, known as interim remedial measures (IRMs), were undertaken at the Former EMCA site in response to the threats identified above. An IRM is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the remedial investigation/feasibility study (RI/FS). The IRM undertaken at this site included emulsified vegetable oil injection to accelerate the natural microbial breakdown of Freon 113.

Based on the implementation of the above IRM, the findings of the investigation of this site indicate that the site no longer poses a significant threat to human health or the environment, therefore No Further Action with continued groundwater monitoring and additional emulsified vegetable oil injections, as necessary, was selected as the remedy for this site.
In addition, the remedy includes the following:

- Development of a site management plan to address groundwater use restrictions.
- Imposition of an environmental easement.
- Periodic certification of the institutional and engineering controls.
- An investigation to determine the potential for vapor intrusion to occur in on-site buildings and to determine the need for vapor intrusion mitigation measures.

The NYSDEC also will reclassify the site to a Class 4 site on the New York State Registry of Inactive Hazardous Waste Disposal Sites.

The selected remedy, discussed in detail in Section 6, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Former EMCA site is a 0.6-acre property located at 605-609 Center Avenue and 604-612 Fayette Avenue in the Village of Mamaroneck, Westchester County (Figure 1) which housed a facility used for the manufacture of thick-filmed precious metal electronic conducting paste. As shown on Figure 1-2, the site is bounded to the northeast by Ogden Avenue; to the northwest by Fayette Avenue; to southeast by Center Avenue; and to the southwest by Ceramic Company and Meta-Glo Furniture.

The setting is commercial/industrial with some residential homes nearby. It is noted that the Happiness Laundry facility is located southeast of the site (upgradient).

There is no domestic groundwater usage within one-half mile of the site.

The nearest surface water body is the Sheldrake River located approximately 300 feet to the west of the site.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

From 1968 to May 1988, EMCA, a subsidiary of Rohm & Haas, owned and operated a business at the site to manufacture electronic conducting paste used in circuits by the electronics industry. The manufacturing activities were contained on the first floor of the building. The vacant lot (604 Fayette Avenue) was used for waste storage and is a likely area where surficial spills of Freon may have occurred. Other potential areas of disposal or spills were the material storage room, the ball milling room and the powder room. Freon 113 was used in the ball milling operation.

Rohm & Haas transferred site ownership to UA-Columbia Cablevision who later merged with TCI Cablevision of Westchester and then with Cablevision of Westchester, the current site owner.

3.2: Remedial History

The site has been the subject of several environmental investigations which identified several environmental conditions of concern. As part of a real property transfer, United Artists (UA)

Columbia Cablevision of Westchester, Inc. commissioned two environmental investigations of the site by Goldberg Zoino Associates, Inc. (GZA) which included the installation of eighteen (18) borings on the 0.6-acre site, covering most of the accessible portions of the site and focusing on areas of potential contamination such as the waste storage area and a former buried gas tank. Nine (9) of these borings were completed as monitoring wells. Subsurface soil, groundwater and soil gas samples were collected from these locations and analyzed primarily for VOCs.

Based on these investigations, GZA produced a Preliminary Site Assessment report dated March 7, 1988, and an Assessment of Subsurface Conditions report dated June 30, 1988. A Risk Assessment report dated June 15, 1989 was also developed by Woodward-Clyde Consultants in connection with the site closure and sale of the property to the new owners, UA-Columbia Cablevision of Westchester. These reports clearly indicated that the groundwater was impacted by Freon 113 and six (6) other VOCs. Maximum groundwater contamination was as follows: Freon 113 (18,208 ppb), tetrachloroethene (380 ppb), 1,2-dichloroethene (320 ppb), trichloroethene (258 ppb), acetone (190 ppb), benzene (74 ppb) and chloroethene (55 ppb).

Metals data from the GZA report showed levels below standards for filtered groundwater samples. No unfiltered samples were collected at the time.

On site soils were only slightly impacted by three (3) VOCs. The soil sampling conducted by GZA in May 1988 found that the soil cleanup guidelines were not exceeded for VOC contaminants.

The soil vapor survey conducted in May 1988 detected the presence of an area of elevated photo-ionization detector (PID) response within the vacant lot north of the former waste storage area. A PID reading provides an indication of the presence of VOCs in an air or vapor sample.

In 1991, the NYSDEC listed the site as a Class 2 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York. A Class 2 site is a site where hazardous waste presents a significant threat to the public health or the environment and action is required.

SECTION 4: 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 Rohm & Haas entered into a Consent Order on March 29, 1999. The Order obligates the responsible parties to implement a RI and any IRM(s) deemed appropriate. After the remedy is selected, the NYSDEC will approach the PRPs to implement the selected remedy under an Order on Consent.

SECTION 5: SITE CONTAMINATION

A remedial investigation (RI) and engineering evaluation/cost analysis (EE/CA) has been conducted to evaluate the alternatives for addressing the significant threats to human health and the environment.

5.1: 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 two phases. The first phase was conducted in October 1999, and the second phase in July 2000. A supplemental field investigation was also conducted in July 2001 to provide additional data for the preparation of the Draft Final EE/CA Report. The field activities and findings of the investigation are described in the RI report.

The following activities were conducted during the RI:

- Research of historical information;
- Installation of two (2) temporary piezometers and five (5) geoprobe monitoring wells for analysis of groundwater as well as physical properties of soil and hydrogeologic conditions;
- Sampling of six (6) new and existing monitoring wells;
- Collection of one (1) discrete groundwater sample using a direct push technique;
- A survey of public and private water supply wells in the area around the site;
- Collection of four (4) soil vapor samples. Collection of three (3) indoor air samples. Collection of two (2) outdoor air samples.

To determine whether the soil, groundwater and indoor air contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on NYSDEC “Ambient Water Quality Standards and Guidance Values” and Part 5 of the New York State Sanitary Code.
- Soil SCGs are based on the NYSDEC “Technical and Administrative Guidance Memorandum (TAGM) 4046; Determination of Soil Cleanup Objectives and Cleanup Levels".
- Concentrations of VOCs in air were compared to the NYSDOH’s “Volatile Organic Compound Database” (NYSDOH Database).
- A background surface soil sample was taken from a single location. This location was upgradient of the site, and was unaffected by historic or current site operations. The sample was analyzed for barium, copper, lead, silver and zinc. The results of the analysis were compared to data from the RI (Table 1) to determine appropriate site remediation goals.

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 required remediation. These are summarized below. More complete information can be found in the RI report.

5.1.1: Site Geology and Hydrogeology

Geologic conditions at the site are characterized by unconsolidated deposits composed predominantly of stratified medium to fine sand with localized beds of coarse sand, gravel, silt, and clay. Bedrock is assumed at an approximate depth of 40 feet. Groundwater conditions consist of a water table aquifer encountered at a depth of approximately 6 feet below ground surface. Groundwater generally flows to the northwest towards the Sheldrake River.

5.1.2: Nature of Contamination

As described in the RI report, many soil, groundwater, soil vapor and indoor air samples were collected to characterize the nature and extent of contamination. As summarized in Table 1, the main categories of contaminants that exceed their SCGs are volatile organic compounds (VOCs).

The VOCs of concern are primarily Freon 113 and its breakdown by-products including 1,2-dichloro-1,1,2-trifluoroethane (Freon 123a) and chlorotrifluoroethene (Freon 1113). Other VOCs were also detected at elevated concentrations, however, the distribution of these contaminants suggested an off-site (upgradient) source.

5.1.3: Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

Chemical concentrations are reported in parts per billion (ppb) for water, parts per million (ppm) for waste, soil, and sediment, and micrograms per cubic meter ($\mu g/m^3$) for air samples. For comparison purposes, where applicable, SCGs are provided for each medium.

Table 1 summarizes the degree of contamination for the contaminants of concern in soil, groundwater, soil vapor, and indoor air 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.

Surface Soil

Direct contact was identified by the NYSDEC as a potential exposure pathway for metals based on previous investigations which showed that the groundwater contained concentrations of barium, copper, lead, silver and zinc, albeit at levels not exceeding groundwater standards. Therefore, as part of the RI, surface soil samples were collected from below the turf in grassed areas near Fayette Avenue and Ogden Avenue, and composited for laboratory analysis. See Figure 2 for location of the composited surface soil sample. This composite sample (SS-02) was

considered to be an off-site background sample, and was analyzed for barium (134 ppm), copper (56.8 ppm), lead (214 ppm), silver (1.1 ppm) and zinc (167 ppm).

Subsurface Soil

Prior to the RI, eighteen (18) borings were installed on the 0.6-acre site, covering most of the accessible portions of the site and focusing on areas of potential contamination such as the waste storage area and a former buried gas tank. Nine (9) of the borings were completed as monitoring wells. Subsurface soil samples were collected from these locations and analyzed for VOCs. This soil sampling found that the soil cleanup guidelines were not exceeded for VOC contaminants. Specifically, Freon 113 was detected at 1.2 parts per million (ppm) at a depth of 2-4 feet below grade, and tetrachloroethene at 0.58 ppm and trichloroethene at 0.27 ppm at a depth of 6-8 feet (below the water table). The SCGs for these compounds are 6 ppm, 1.4 ppm, and 0.7 ppm, respectively.

As part of the RI, an on-site soil sample (SS-01) was collected from 0 to 6 inches below the existing asphalt and sub-base layers near former groundwater monitoring well location GZ-02 from an area that was actively used during EMCA's former industrial activities. See Figure 2 for sample location. This sample was analyzed for select metals including barium, copper, lead, silver and zinc, and contained a lead concentration of 445 ppm which is within the concentration range for background soils, as defined in NYSDEC "Technical and Administrative Guidance Memorandum (TAGM) 4046. All other metals concentrations in this sample were less than or comparable to background metals concentrations in soils. It should be noted that the surface of the site is almost entirely paved or covered by existing structures, although minor grassy areas exist along median strips between sidewalks and roadways.

Groundwater

During the RI, four (4) geoprobe wells with a screen slot size of 0.010-inch were installed in October 1999 to replace former wells (that could no longer be found) and to expand the area of investigation. The location of these wells and two previously existing wells (GZ-03 and GZ-06) that were sampled as part of the RI are shown on Figure 3. The replacement wells were constructed in small-diameter boreholes advanced using a Geoprobe. Upon borehole completion, one-inch inside diameter Schedule 40 polyvinyl chloride monitoring wells were installed in the open borehole to the same approximate depth as the former site wells. Two temporary piezometers (used for monitoring groundwater elevation) were also installed in the locations shown on Figure 3. Both piezometers were pulled and abandoned in accordance with the RI Work Plan following the October 1999 sampling event. One deep sample (GRAB-01 from 29 to 31 feet below ground surface) was also collected adjacent to monitoring well MW-04 using a temporary Geoprobe screen point sampler. Groundwater conditions consist of a water table aquifer encountered at a depth of approximately 6 feet below ground surface. Groundwater generally flows to the northwest towards the Sheldrake River. Upgradient replacement well MW-01 was screened at 4 to 16 feet below grade. Replacement well MW-02 (installed near the source area) was screened at 3 to 16 feet below grade. Replacement wells MW-03 (installed in the contaminant source area) and MW-04 (installed along the downgradient edge of the site) were screened from 4.5 to 14.5 feet below grade. Monitoring well MW-05 was screened at 4 to

16 feet below grade, and was installed in July 2000 during the second phase of the RI to intercept any potential off-site plume. Monitoring well MW-06 was screened at 9 to 19 feet below grade, and MW-07 was screened at 10 to 20 feet below grade. Both of these monitoring wells were installed in June 2003 as part of the IRM Pilot Study.

As part of the RI, in October 1999, groundwater samples were collected from the two existing overburden monitoring wells (GZ-03 and GZ-06) and four newly-installed overburden monitoring wells (MW-01 through MW-04), and one Geoprobe sample was collected in the vicinity of monitoring well MW-04. The following VOCs were detected at concentrations exceeding Class GA groundwater standards: benzene (up to 20 ppb), 1,2-dichloroethene (total) (up to 1,600 ppb), tetrachloroethene (up to 240 ppb), trichloroethene (up to 130 ppb), Freon 113 (up to 17,000 ppb), and vinyl chloride (up to 49 ppb). The Class GA groundwater standard for these compounds is 5 ppb, with the exception of benzene and vinyl chloride whose groundwater standards are 1 ppb and 2 ppb, respectively. Except for Freon 113, the highest concentration of each of these compounds was detected in upgradient well MW-01. This suggests that the presence of Freon 113 in the underlying groundwater is related to EMCA operations, but the other VOCs appear to have migrated onto the Former EMCA site from an adjacent business or businesses. The highest concentration of Freon 113 was detected in monitoring well MW-03. Specifically, Freon 113 was detected as high as 17,000 ppb in monitoring well MW-03 during the October 1999 sampling event. When this well was re-sampled in July 2000 and July 2001, the Freon 113 concentration was relatively unchanged at 11,000 ppb and 13,000 ppb, respectively. Significantly lower concentrations of Freon 113 were detected at the downgradient monitoring wells MW-04 and MW-05, indicating that it is unlikely that the Freon 113 plume extends off-site (beyond Fayette Avenue).

Two wells (MW-01 and MW-04) were also analyzed for barium, copper, lead, silver and zinc during the October 1999 sampling event. Both filtered and unfiltered samples were collected. No metals concentrations exceeded Class GA groundwater standards. Total and dissolved iron and manganese analyses were performed on the July 2001 groundwater samples. Most of these samples exceeded the Class GA groundwater standards for iron and manganese.

Soil Gas

Based on the results of previous on-site sampling, it was suspected that Freon 113 could have migrated off-site, particularly through soil gas. Therefore, during the RI, six (6) soil gas screening and analytical samples were collected from a depth of 2 to 3 feet into the vadose soil zone from both on-site and off-site locations as shown on Figure 4. Soil gas concentrations were measured in the field at five (5) of these sampling locations using a calibrated flame ionization detector (FID). The FID was employed as a non-specific field screening tool which responds to a variety of organic compounds including Freon 113. FID readings for three out of five soil gas screening locations were significantly elevated (25,000 $\mu g/m^3$ or higher). In addition, soil gas samples were collected for laboratory analysis from sample locations SG-03 and SG-05 during the October 1999 sampling event, and from SG-06 and SG-07 during the July 2000 sampling event. Indoor air sampling conducted by NYSDOH at the residential properties located at 614 Center Avenue and 530 Fayette Avenue, indicate that soil vapor intrusion is not occurring. However, indoor air samples collected at the on-site building by NYSDOH showed

Freon 113 levels were slightly above typical background levels, indicating a potential for vapor intrusion. In addition to the soil gas samples, ambient air samples were collected for laboratory analysis near SG-04 during the October 1999 sampling event, and near SG-07 during the July 2000 sampling event. The ambient air samples exhibited only low levels of acetone (a common laboratory contaminant) and chloromethane.

Indoor Air

Due to the potential for off-site soil gas migration which could possibly affect indoor air quality in adjacent buildings, including residences, the NYSDOH collected indoor air samples from two homes near the Former EMCA site and within the Cablevision of Westchester facility located on the site. The concentrations of Freon 113 detected in the three buildings sampled by the NYSDOH in July 2000 were within or slightly above the typical background range for Freon 113 in indoor and outdoor air.

With regard to samples collected from the Cablevision of Westchester office, Freon 113 was detected at a concentration of 17 $\mu g/m^3$. This concentration is greater than is typically seen in indoor air. The concentrations of two similar compounds, Freon 12 (12 $\mu g/m^3$) and Freon 11 (17 $\mu g/m^3$), were also greater than those typically found in indoor air. The NYSDOH concluded that the detected Freon concentrations did not pose a health concern. Several other VOCs were detected within or slightly above the range of typical background levels in the on-site air sample. The NYSDOH concluded that the detected VOC concentrations did not pose a health concern.

The NYDOH also collected air samples from the basement, first floor and outdoor air at two nearby homes. Freon 113, the primary contaminant of concern, was detected in all of these air samples, but at a concentration similar to typical background levels. Several other VOCs were also detected within or slightly above the range of typical background levels in the basement, first floor and outdoor air samples at these two homes. With respect to these VOCs, the NYSDOH also concluded that the detected concentrations did not pose a heath concern.

5.2: 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.

An EE/CA was conducted to evaluate the alternatives for addressing the significant threats to human health and the environment. One of the alternatives evaluated involved the injection of organic substrates. This is an in-situ technology that offers a passive, low-cost approach to remediate groundwater contaminated with chlorinated hydrocarbons (including Freon 113). It consists of the introduction of soluble (lactate or molasses) or insoluble (soybean oil) substrates which degrade in the aquifer to produce hydrogen, which in turn promotes anaerobic biodegradation. During this process, chlorinated hydrocarbons and their derivatives will degrade in the presence of native dehalogenating micro-organisms. Bench scale testing results obtained from literature indicate that the pathway of reductive dechlorination is Freon 113 to Freon 123a to Freon 1113 to trifluoroethene to acetate, hydrogen fluoride and hydrogen chloride.

During May 2003 through July 2004, a combination Pilot Study/IRM was performed to evaluate the effectiveness of vegetable (soybean) oil injection as a method to stimulate anaerobic biodegradation resulting in reductive dechlorination of Freon 113 in site groundwater as follows:

1. In June 2003, approximately 220 gallons of edible oil substrate (EOS), or vegetable oil, and 205 gallons of sodium lactate were injected into the subsurface via 12 injection points as a method to stimulate anaerobic biodegradation resulting in reductive dechlorination of Freon 113 in site groundwater. Approximately 605 gallons of chase water was also added to distribute the EOS in the aquifer.

2. In November 2004, a second injection was performed as follows:

    - Approximately 170 gallons of sodium lactate were injected through 12 injection points centered on monitoring well MW-03.

    - Approximately 275 gallons of EOS and 30 gallons of sodium lactate were injected through 10 injection points that encompassed monitoring wells MW-02 and MW-06. In addition, 500 gallons of water were injected to distribute the EOS.

    - Approximately 70 gallons of sodium lactate were injected through 3 injection points between MW-03 and MW-07.

    - Approximately 28 gallons of sodium lactate were injected through 3 injection points around GZ-06.

Freon 113 concentrations in the source area groundwater monitoring well MW-03 declined dramatically immediately after the June 2003 vegetable oil/sodium lactate injection due to dilution and or sorption to the vegetable oil. Specifically, the Freon 113 in MW-03 dropped from a pre-injection concentration of 5,800 ppb in May 2003 to 68 ppb in July 2003. This represented an approximate 99 percent decrease during the period from May 2003 to July 2003. This rapid reduction of Freon 113 in MW-03 was attributed, in part, to sorption of the Freon 113 to the vegetable oil. By July 2004, however, Freon 113 had returned to a level (4,900 ppb) exceeding 80 percent of the pre-injection concentration. This rebound has been attributed to the desorption of the Freon 113 from the vegetable oil as the micro-organisms break down the vegetable oil in the formation. Increased biodegradation rates are expected as substrate limitations are overcome with the second injection of substrate.

The Freon 113 concentration in downgradient monitoring well MW-07 declined from 5,400 ppb in June 2003 to 110 ppb in July 2004. This shows that since the implementation of the IRM, Freon 113 concentrations in this well have declined by approximately 98 percent. If this trend continues, it is very unlikely that any Freon 113 contamination would ever migrate off-site. Furthermore, the relatively low concentration levels and the continued downward trend in Freon 113 concentrations observed in the other downgradient monitoring wells (MW-04 and MW-05) suggests that the Former EMCA site poses little or no impacts to off-site areas.

Other VOCs that do not appear to be related to site operations have also been detected in the groundwater including tetrachloroethene, acetone, benzene, ethylbenzene and methyl ethyl ketone. The concentration levels of these compounds are low to moderate in comparison to the Freon 113 concentrations. The source of this contamination will be investigated and addressed separately from the PRAP for the Former EMCA site.

The results of the dissolved oxygen (DO) readings indicate that biodegradation is occurring in the source area since the DO levels observed in MW-03 are much lower than those observed in the other, less impacted wells. The higher methane and lower sulfate concentration levels measured in the groundwater samples collected from MW-03 compared to the levels observed in the other wells also confirm that biodegradation is occurring in the vicinity of MW-03. Similar favorable biological conditions appear to exist in the vicinity of MW-07, but to a lesser extent.

Evaluation of other bio-parameters such as ferrous iron and oxidation reduction potential, however, seem to suggest that subsurface conditions conducive to biodegradation have diminished since the initial vegetable oil/sodium lactate injection in June 2003. Over time the trend in DO levels has been increasing, suggesting that anaerobic conditions are diminishing. In an effort to maintain conditions favorable for reductive dechlorination of Freon 113 and its by-products that were established during the pilot study, additional injections of emulsified vegetable oil and/or sodium lactate were undertaken as an IRM in November 2004. The collection of groundwater samples following the November 2004 injections has not been performed yet, since microbial activity takes several months to show decreases in groundwater concentrations.

Freon 113 concentrations in groundwater have decreased in most cases since the initial IRM (See Table 1 and Figure 5), and are expected to decrease further with the second injection of emulsified vegetable oil and sodium lactate which was performed in November 2004, as mentioned above. During the November 2004 injection, vegetable oil was not injected in the immediate vicinity of MW-03 in order to prevent the adsorption of the remaining Freon 113 contamination into the freshly injected oil.

5.3: 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 human exposure pathways can be found in Appendix F of the EE/CA report.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated

medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

The only completed exposure pathway identified at the site is inhalation of contaminated vapors in indoor air at the site by on-site workers. Freon 113 contaminated soil vapor was detected in the indoor air of the on-site buildings at levels that are slightly above background concentrations.

In the absence of site remediation, the following are potential exposure pathways related to possible use or development of the site:

- Inhalation of contaminated vapors, which may migrate into the indoor air of site structures and nearby buildings from the sub-surface. Indoor air samples collected in three buildings show that the concentration of Freon detected was similar or slightly above background levels.
- Ingestion of contaminated groundwater by on-site workers or future on-site residents. The area is served with public water and most homes and businesses are provided with public water. Therefore, exposure to contaminated groundwater is not expected to occur.

5.4: Summary of Environmental Impacts

This section summarizes the existing and potential future environmental impacts presented by the site prior to the IRM. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

Site contamination has impacted the groundwater resource in the upper glacial aquifer. However, the upper glacial aquifer is not used as a source of drinking water in the area. In addition, groundwater contamination does not appear to be migrating off-site.

The nearest surface water body (the Sheldrake River) which is located within 300 feet of the site is not threatened by surface run off from the site since contaminant concentration levels in on-site soils are not significant, and most of the site is paved with asphalt. Therefore, a viable exposure pathway to fish and wildlife receptors is not present.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS AND SELECTED REMEDY

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. 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.

Prior to the completion of the IRM described in Section 5.2, the remediation goals for this site were to eliminate or reduce to the extent practicable:

- off-site migration of groundwater that does not attain ambient groundwater standards; and

- the release of contaminants from subsurface soil into indoor air and ambient air through soil vapor.

The NYSDEC believes that the IRM would accomplish these remediation goals provided that it continues to be operated and maintained in a manner consistent with the design.

The main SCGs applicable to this project are as follows:

1. TOGS 1.1.1. - Ambient Water Quality Standards & Guidance Values and Groundwater Effluent Limitations.
   The No Further Action proposal is based on the success of the IRM and the NYSDEC's determination that its continued operation would achieve or closely approach the groundwater quality standards in TOGS 1.1.1.

2. TAGM 4046 - Determination of soil cleanup objectives and cleanup levels.
   The No Further Action proposal is based on the results of the soil samples at the Former EMCA site which meet the soil cleanup objectives listed in TAGM 4046.

The following elements of the IRM already completed have achieved the remediation goals and satisfy SCGs for the site:

1. During May 2003 through July 2004, a combination Pilot Study/IRM was performed to evaluate the effectiveness of vegetable (soybean) oil injection as a method to stimulate anaerobic biodegradation resulting in reductive dechlorination of Freon 113 in site groundwater. Sodium lactate was also injected based on evaluations that were conducted during the preparation of the Pilot Study Work Plan. The pilot study consisted of injecting a commercially prepared edible oil substrate and commercially prepared sodium lactate into the subsurface via 12 injection points.

2. Based in part on the March 2004 Pilot Study Report, an additional injection of emulsified vegetable oil and sodium lactate was recommended as an IRM which was performed in November 2004. The November 2004 IRM consisted of injecting commercially prepared sodium lactate only in the immediate vicinity, and downgradient of MW-03 combined with the injection of commercially prepared edible oil substrate and sodium lactate upgradient of MW-03.

Based on the results of the investigations at the site, the IRM that has been performed, and the evaluation presented here, the NYSDEC has selected No Further Action with continued groundwater monitoring and additional vegetable oil injections, as necessary, as the preferred alternative for the site. Once an operation, maintenance, and monitoring plan is in place, the NYSDEC will also reclassify the site from a Class 2 to a Class 4 on the New York Registry of Inactive Hazardous Waste Disposal Sites, which means the site is properly closed but requires continued management.

The basis for this selection is the NYSDEC's conclusion that No Further Action with continued groundwater monitoring and additional vegetable oil injections, as necessary, will be protective of human health and the environment and will satisfy all SCGs, as described above. Overall protectiveness is achieved through meeting the remediation goals listed above.

Therefore, the NYSDEC concludes that No Further Action is needed other than OM&M and the institutional and engineering controls listed below.

1. Development of a site management plan (SMP). The SMP will include the institutional controls and engineering controls to: (a) evaluate the potential for vapor intrusion to occur in any buildings developed on the site, including provision for mitigation of any impacts identified; (b) provide for the operation and maintenance of the components of the remedy; (c) monitor the groundwater and (e) identify any use restrictions on groundwater use.

2. The SMP will require the property owner to provide an Institutional Control/Engineering Control (IC/EC) certification, prepared and submitted by a professional engineer or such other expert acceptable to the NYSDEC, annually or for a period to be approved by the NYSDEC, until the NYSDEC notifies the property owner in writing that this certification is no longer needed, which will certify that the institutional controls and engineering controls put in place are unchanged from the previous certification and nothing has occurred that would impair the ability of the control to protect public health or the environment or constitute a violation or failure to comply with any operation and maintenance or soil management plan.

3. Imposition of an institutional control in the form of an environmental easement that will: (a) require compliance with the approved site management plan, (b) restrict use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the Westchester County Department of Health; and, (c) require the property owner to complete and submit to the NYSDEC periodic IC/EC certifications.

4. An investigation will be implemented to determine the potential for vapor intrusion to occur in on-site buildings and to determine the need for vapor intrusion mitigation measures. This will include, at a minimum, the collection of sub-slab soil vapor and indoor air samples in the buildings and an outdoor ambient air sample. The investigation will also include the investigation of off-site soil vapor migration and the need for vapor mitigation measures at off-site buildings. If mitigation systems are necessary in on-site or

off-site structures, the monitoring and maintenance of these systems will be included as a component of the SMP and thus be subject to the maintenance, monitoring and certification process required as part of the SMP.

SECTION 7: HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the remedial investigation process, a number of Citizen Participation activities were undertaken 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:

- Repositories for documents pertaining to the site were established.
- A public contact list, which included nearby property owners, elected officials, local media and other interested parties, was established.
- A Fact Sheet was sent to the site's contact list, advising the public of a 30-day public comment period and providing the time and date for a public meeting in their community.
- A public meeting was held on March 2, 2005 to present and receive comment on the PRAP.
- A responsiveness summary (Appendix A) was prepared to address the comments received during the public comment period for the PRAP.

TABLE 1
Nature and Extent of Contamination
May 1988-March 1989
Pre-RI

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Benzene	ND to 0.27	0.06	1 of 26
	Chloroethane	ND	1.9	0 of 26
	Chloroform	ND to 0.06	0.3	0 of 26
	1,1-Dichloroethene	ND	0.4	0 of 26
	1,2-Dichloroethene (total)	ND to 0.10	0.3	0 of 26
	Ethylbenzene	ND to 0.01	5.5	0 of 26
	Tetrachloroethene	ND to 0.58	1.4	0 of 26
	1,1,1-Trichloroethane	ND	0.76	0 of 26
	Trichloroethene	ND to 0.27	0.7	0 of 26
	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND to 1.2	6.0	0 of 26
	Vinyl Chloride	ND	0.12	0 of 26

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Acetone	ND to 190	50	1 of 18
	Benzene	ND to 74	1	6 of 18
	Chloroethane	ND to 55	5	4 of 18
	Chloroform	ND to 5	7	0 of 18
	1,1-Dichloroethane	ND to 5	5	0 of 18
	1,2-Dichloroethene (total)	ND to 320	5	3 of 18
	Ethylbenzene	ND to 6	5	1 of 18

TABLE 1 (Continued)
Nature and Extent of Contamination
October 1999-June 2003
Pre-IRM

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Tetrachloroethene	ND to 380	5	1 of 18
	1,1,1-Trichloroethane	ND to 15	5	3 of 18
	Trichloroethene	ND to 258	5	6 of 18
	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND to 18,208	5	14 of 18

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Inorganic Compounds	Barium	176	134[1]	1 of 1
	Copper	62.4	56.8[1]	1 of 1
	Lead	445	214[1]	1 of 1
	Silver	0.37	1.1[1]	0 of 1
	Zinc	158	167[1]	0 of 1

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Acetone	ND to 2,000	50	7 of 34
	Benzene	ND to 74	1	13 of 43
	Methyl ethyl ketone	ND to 46	50	0 of 27
	Chloroethane	ND to 55	5	4 of 43
	Chloroform	ND to 10	7	2 of 43
	1,1-Dichloroethene	ND to 33	5	1 of 26
	1,2-Dichloroethene (total)	ND to 1,600	5	6 of 30
	Ethylbenzene	ND to 6	5	1 of 43

TABLE 1 (Continued)
Nature and Extent of Contamination
October 1999-June 2003
Pre-IRM

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Tetrachloroethene	ND to 380	5	4 of 43
	1,1,1-Trichloroethane	ND to 15	5	2 of 43
	Trichoroethene	ND to 258	5	9 of 43
	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND to 18,208	5	30 of 43
	1,2-Dichloro-1,2,2-trifluoroethane	ND to 78	5	5 of 7
	Chlorotrifluoroethene	NA	5	0 of 0
	Vinyl Chloride	ND to 49	2	9 of 43
	Xylene (total)	ND	10	0 of 26
	Methyl tert-butyl ether	ND to 51	10	1 of 6
Inorganic Compounds	Iron	437 to 27,900	300	13 of 13
	Manganese	77.6 to 6,120	300	4 of 6

SOIL GAS	Contaminants of Concern	Concentration Range Detected (ppb_v)[a]	SCG[b] (ppb_v)[a]	Number of Samples
Volatile Organic Compounds (VOCs)	Acetone	ND to 420	n/a	6
	Benzene	ND to 660	n/a	6
	Methyl ethyl ketone	ND to 37	n/a	6
	Carbon Disulfide	ND to 28	n/a	6
	Chloroform	ND to 1.2	n/a	6
	1,1-Dichloroethane	ND to 0.97	n/a	6
	Ethylbenzene	ND to 12	n/a	6

TABLE 1 (Continued)
Nature and Extent of Contamination
October 1999-June 2003
Pre-IRM

SOIL GAS	Contaminants of Concern	Concentration Range Detected (ppb_v)[a]	SCG[b] (ppb_v)[a]	Number of Samples
Volatile OrgCompounds (VOCs)	Methylene Chloride	ND to 1	n/a	6
	Tetrachloroethene	ND to 2.2	n/a	6
	1,1,1-Trichloroethane	ND to 11	n/a	6
	Trichloroethene	ND to 0.92	n/a	6
	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND to 3,300	n/a	6
	Toluene	ND to 15	n/a	6
	Xylene (total)	ND to 92	n/a	6

INDOOR AIR	Contaminants of Concern	Concentration		NYSDOH Database[2]	
		Range Detected ($\mu g/m^3$)[a]		Indoor	Outdoor
		Indoor	Outdoor	25%-75%	25%-75%
Volatile Organic Compounds (VOCs)	Freon 12	1.6 - 12	2.2 - 2.6	<1.0 - <1.0	<1.0 - <1.0
	Chloromethane	1.0 [PL] - 1.6	1.2 - 1.3	<1.0 - 1.0	<1.0 - 1.3
	Freon 11	1.0 [PL] - 17	<1.0 - 1.0 [PL]	<1.0 - 3.3	<1.0 - <1.0
	Freon 113	1.0 [PL] - 17	1.0 [PL]	<1.0 - <1.0	<1.0 - <1.0

TABLE 1 (Continued)
Nature and Extent of Contamination
October 1999-June 2003
Pre-IRM

INDOOR AIR	Contaminants of Concern	Concentration		NYSDOH Database[2]	
		Range Detected (µg/m^3)[a]		Indoor	Outdoor
		Indoor	Outdoor	25%-75%	25%-75%
Volatile Organic Compounds (VOCs)	1,1-Dichloroethene	1.0 [PL] - 9.4	<1.0 - 1.0 [PL]	<1.0 - <1.0	<1.0 - <1.0
	Methylene Chloride	1.0 [PL] - 70	1.0 [PL] - 4.4	<3.0 - 5.6	<1.0 - 3.7
	Hexane	1.0 [PL] - 36	1.0 [PL]	<1.0 - 3.5	<1.0 - 1.8
	Chloroform	<1.0 - 1.5	<1.0	<1.0 - 4.4	<1.0 - <3.6
	1,1,1-Trichloroethane	<1.0 - 165	<1.0 - 1.0 [PL]	2.5 - 6.7	1.0 - 2.8
	Benzene	2.1 - 12	2.6 - 2.8	<3.2 - 5.0	<1.8 - 4.9
	Toluene	2.4 - 108	5.6 - 11	6.6 - 25	1.2 - 5.6
	Tetrachloroethene	<1.5 - 1.5 [PL]	<1.5	<1.6 - 5.0	<1.6 - 3.4
	Ethylbenzene	1.0 [PL] to 28	1.0 [PL] - 1.1	<3.2 - 4.8	<1.0 - 2.5
	m/p-Xylene	1.0 [PL] - 49	1.0 [PL] - 2.1	2.2 - 9.5	<1.6 - 5.0
	o-Xylene	1.0 [PL] - 33	1.0 [PL] - 1.3	1.9 - 5.0	<1.6 - 4.7
	Styrene	<1.0 - 3.4	<1.0	<1.0 - <1.0	<1.0 - <1.0
	1,3,5-Trimethylbenzene	<1.0 - 15	1.0 [PL]	<1.0 - 5.0	<1.0 - 5.0
	1,2,4-Trimethylbenzene	<1.0 - 56	1.0 [PL]	2.2 - 7.0	<1.0 - 5.0
	1,4-Dichlorobenzene	<1.5 - 6.2	<1.5	<1.5 - 5.0	<1.5 - 3.3

TABLE 1 (Continued)
Nature and Extent of Contamination
July 2003-July 2004
Post-IRM

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Acetone	ND to 120	50	3 of 25
	Benzene	ND to 14	1	3 of 26
	Methyl ethyl ketone	38 to 130	50	2 of 3
	Chloroethane	ND	5	0 of 26
	Chloroform	ND	7	0 of 26
	1,1-Dichloroethene	38 to 130	50	2 of 26
	1,2-Dichloroethene (total)	ND to 1.7	5	0 of 26
	Ethylbenzene	ND to 49	5	1 of 26
	Tetrachloroethene	ND to 4.6	5	0 of 26
	1,1,1-Trichloroethane	ND	5	0 of 26
	Trichloroethene	ND	5	0 of 26
	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND to 8,500	5	19 of 36
	1,2-Dichloro-1,2,2-trifluoroethane	ND to 3,900	5	17 of 36
	Chlorotrifluoroethene	ND to 210	5	5 of 10
	Vinyl Chloride	ND to 1.2	2	0 of 26
	Xylene (total)	ND to 11	10	1 of 26
	Methyl tert-butyl ether	NA	10	0 of 0
Inorganic Compounds	Iron	ND to 187,000	300	16 of 20
	Manganese	NA	300	0 of 0

[a] ppb = parts per billion, which is equivalent to micrograms per liter, ug/L, in water;
ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
ppb_v = parts per billion by volume
ug/m^3 = micrograms per cubic meter

[b] SCG = standards, criteria, and guidance values; developed from NYSDEC Technical and Administrative Guidance Memorandum (TAGM) No. 4046, Determination of Soil Cleanup Objectives and Cleanup Levels (1994) for surface and subsurface soil; NYSDEC Technical and Operation Guidance Series (TOGS) (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater

[1] Soil SCGs for inorganics are based on concentration levels from background sample SS-02

[2] The New York State Department of Health Database (NYSDOH Database) is a summary of indoor and outdoor air sample results from control homes. The samples were collected and analyzed by the NYSDOH from 1989 through 1996.
< = "less than." The number following a "less than" sign (<) is the lowest level the laboratory test can reliably measure (the detection limit). A "<" before any number means the chemical was NOT detected in that sample.

[PL] = Present, but less than the concentration indicated.

n/a = Not applicable.

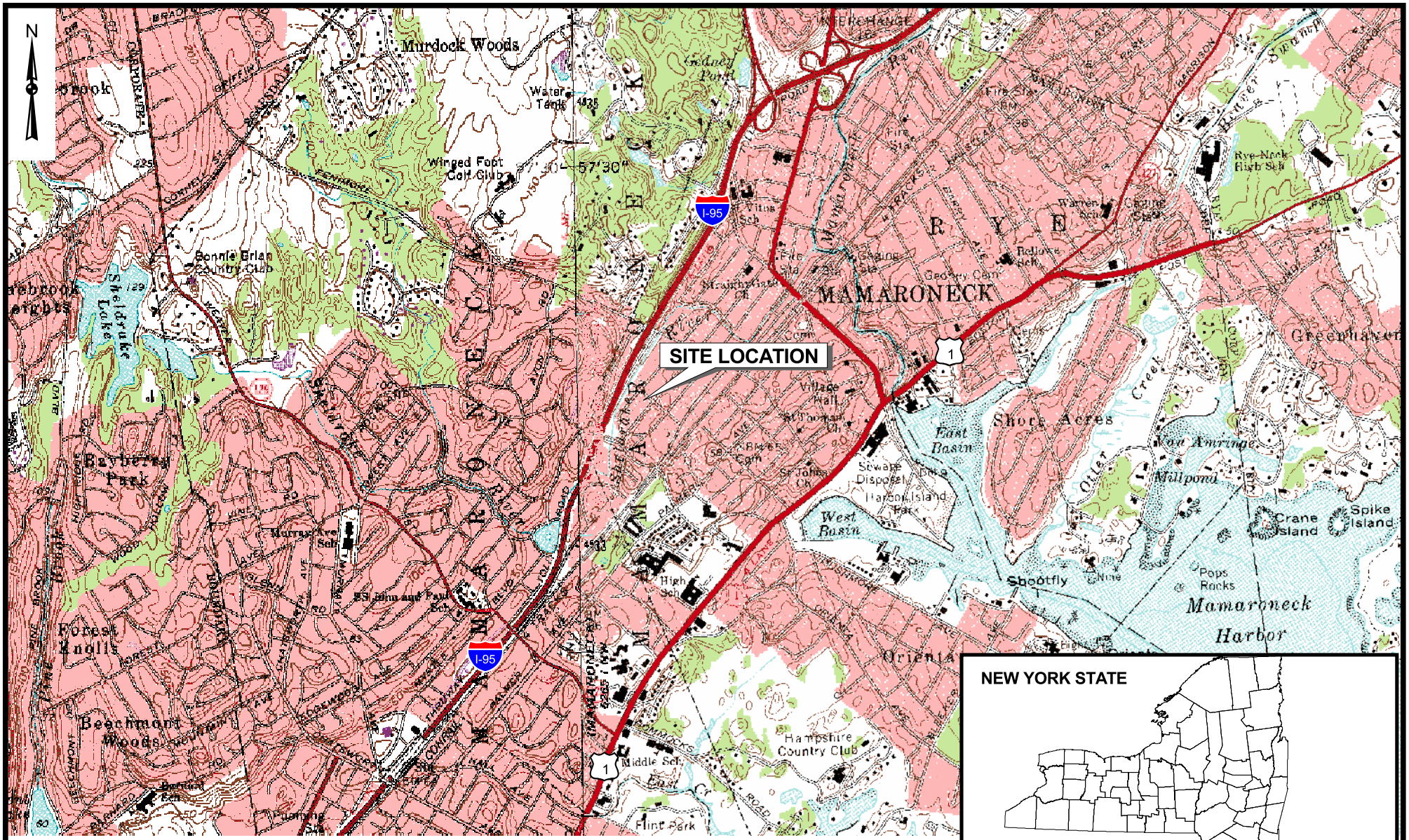
ND indicates that the compound was not detected at the method detection limit.

NA indicates that the compound was not analyzed.

Table 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual OM&M	Total Present Worth
No Further Action with Continued Groundwater Monitoring and Additional Vegetable Injections as a Contingency	$ 47,678	$ 9,895	$ 94,848

n:\11172730.00000\db\gis\2001\prap.apr SITE LOCATION
1/11/2005



SOURCE: USGS Topographical Quadrangle Mount Vernon, New York, 1979 and Mamaroneck, New York, 1985.

URS

FORMER EMCA SITE
LOCATION MAP

FIGURE 1

N:\11172730.00000\DB\GIS\2001\report00.apr SITE PLAN WITH WELLS
12/2/2004

N

SHELDRAKE RIVER

ETRE Associates (Truck Repair),
BMP Leasing, ELQ Industries

Container Testing

Container Testing

Orchids of Hawaii

Baumgold Industrial

J. Pocker (Art Framing)

Printing Company

FAYETTE AVENUE

MW-05

Residence

Residence

Auto Repair

GZ-08

GZ-04

MW-04

MW-07

MW-03

GZ-09

GZ-02

MW-02

MW-06

GZ-01

GZ-05

J. Pocker (Art Framing)

GZ-03

GZ-06

OGDEN AVENUE

Residence

Suburban Carting Corp.
(Welding and Inspection Facility)

Ceramic Company

Cablevision of Westchester (former EMCA Site)

Royal Environmental Services

New Way Air Conditioning and Heating

Meta Glo - Furniture Restoration, Repairs and Stripping

GZ-07

MW-01

Residence

Residence

Residence

Suburban Carting Corp. - Garbage hauling Facility, several USTs onsite

Westchester Squash

Tempranillo Wines

Star Auto Collision and Coating

CENTER AVENUE

Automotive Repair

Happiness Laundry - Dry Cleaning

Fischer Bearing Company

Culin & Cololla - Architectural Millwork

Happiness Laundry - Dry Cleaning

WAVERLY AVENUE

Mason Auto Repair

Residence

CONCORD AVENUE

Legend

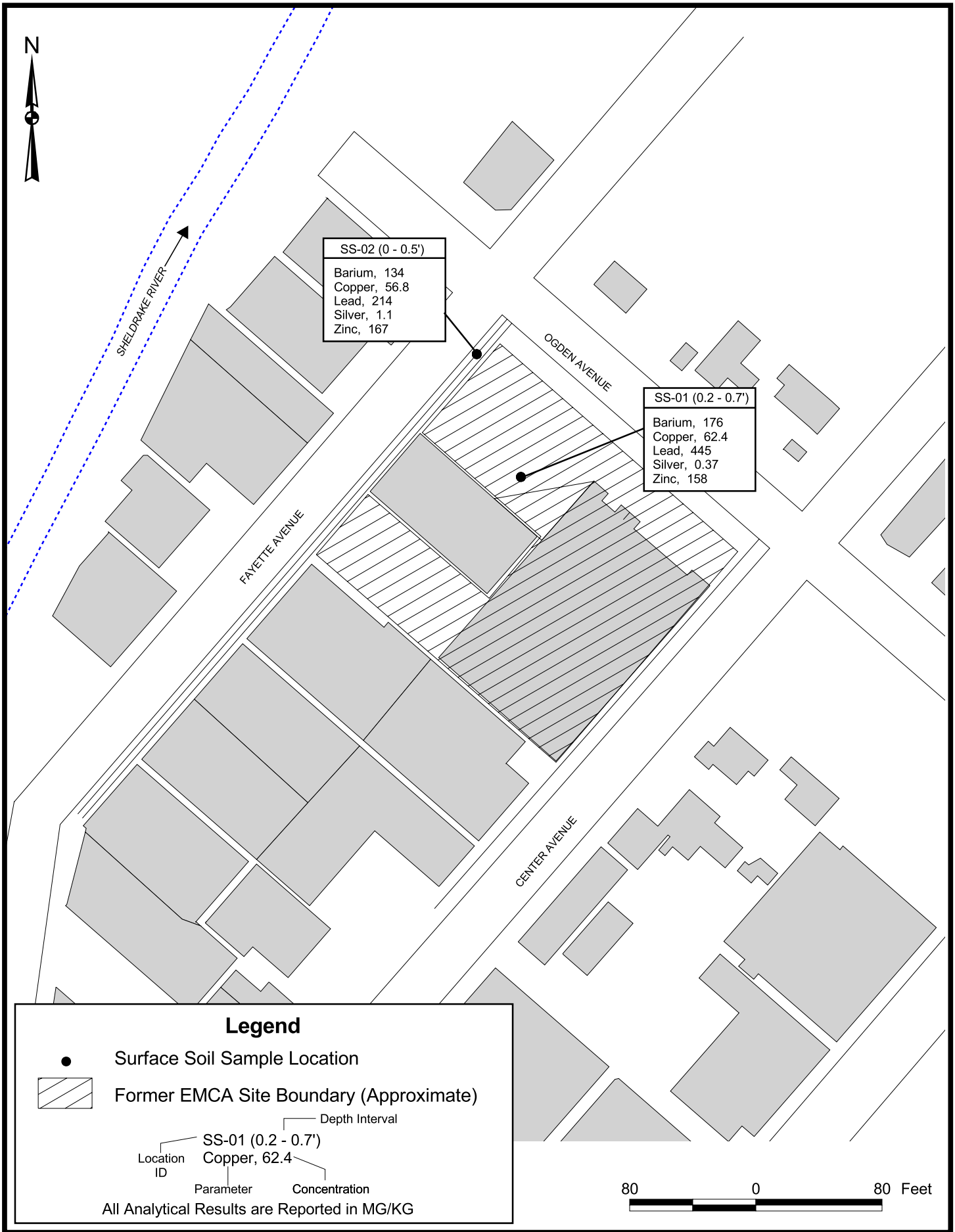
- Monitoring Well
- Former EMCA Site Boundary (Approximate)

100 0 100 Feet

URS

FORMER EMCA SITE
PLAN WITH WELLS

FIGURE 1-2

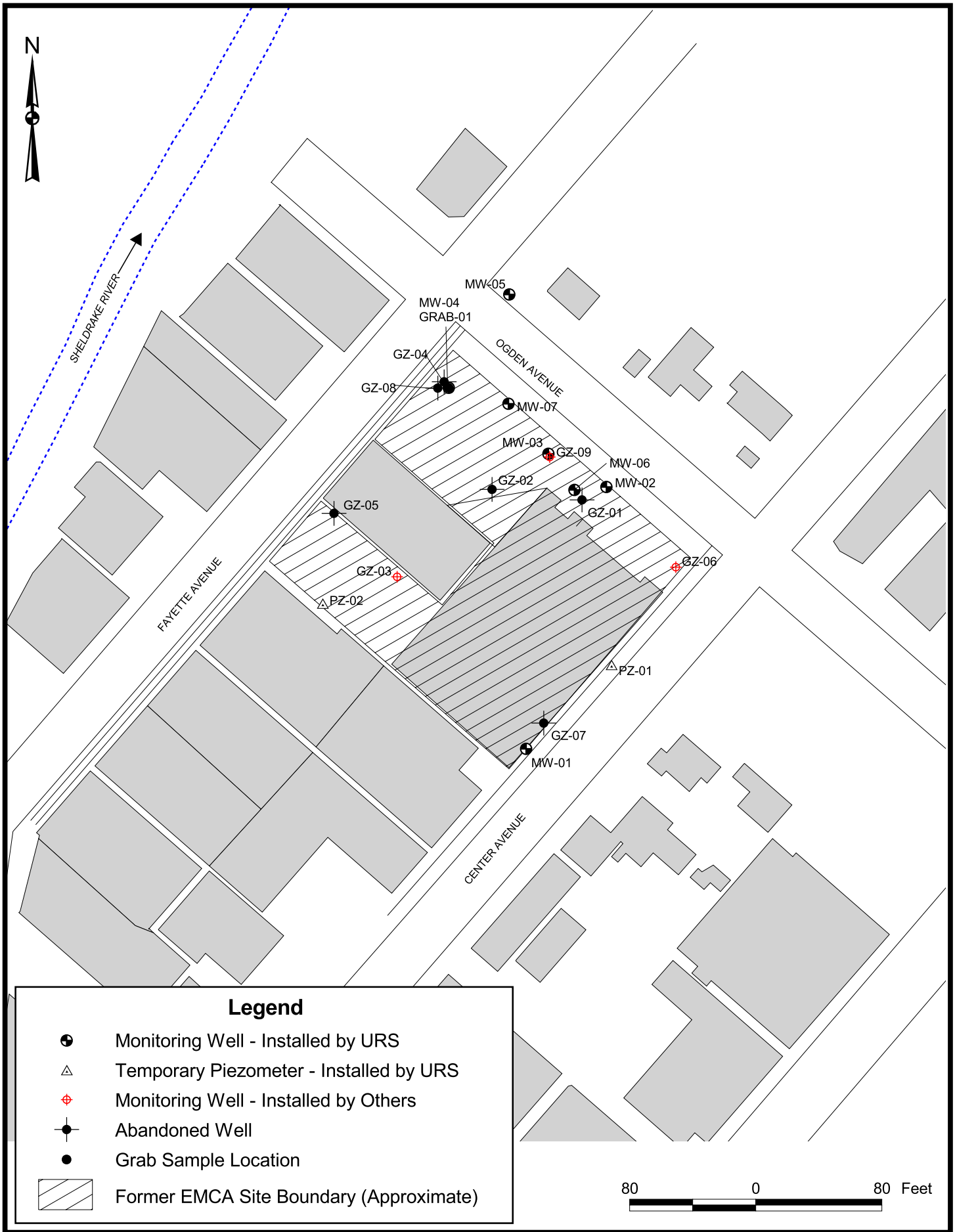


URS

FORMER EMCA SITE
RI SURFACE SOIL ANALYTICAL RESULTS
(OCTOBER 1999)

FIGURE 2

n:\11172730.00000\db\gis\2001\prap.apr SURFACE SOIL ANALYTICAL RESULTS
1/11/2005

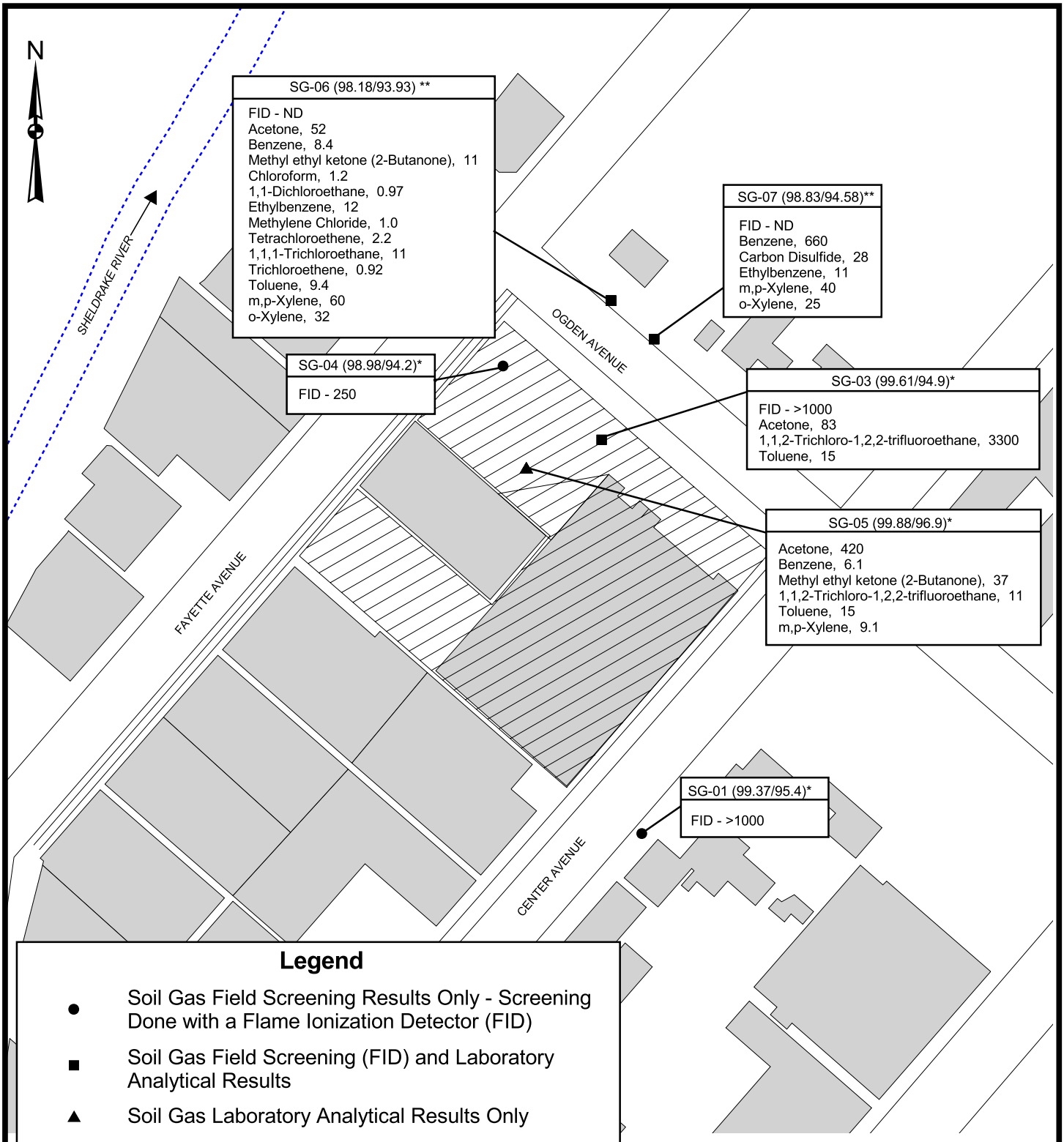


N:\11172730.00000\DB\GIS\2001\prap.apr MONITORING WELL LOCATIONS
1/12/2005

URS

FORMER EMCA SITE
MONITORING WELL/SAMPLING LOCATIONS

FIGURE 3



Legend

- ● Soil Gas Field Screening Results Only - Screening Done with a Flame Ionization Detector (FID)
- ■ Soil Gas Field Screening (FID) and Laboratory Analytical Results
- ▲ Soil Gas Laboratory Analytical Results Only
- Former EMCA Site Boundary (Approximate)

SG-05 (99.88/96.9)
Benzene, 6.1

Location ID — Ground Surface Elevation — Parameter — Concentration — Sample Elevation (Mid-point)

ND - Not Detected
* - October 1999 Results
** - July 2000 Results

All Laboratory Analytical Results are Reported in PPBV.

FID Field Screening Results (FID) are Reported in PPM.

80 0 80 Feet

URS

FORMER EMCA SITE
RI SOIL GAS FIELD SCREENING AND LABORATORY ANALYTICAL RESULTS (OCTOBER 1999 AND JULY 2000)

FIGURE 4

n:\11172730.00000\db\gis\2001\prap.apr SOIL GAS ANALYTICAL RESULTS
1/11/2005

N

GZ-04	05/88	03/89
1,1,2-Trichloro-1,2,2-trifluoroethane	5863	3300

GRAB-01	10/99
1,1,2-Trichloro-1,2,2-trifluoroethane	ND

MW-04	10/99	07/00	07/01	05/03	12/03	07/04
1,1,2-Trichloro-1,2,2-trifluoroethane	11	ND	ND	ND	ND	0.70

GZ-08	05/88
1,1,2-Trichloro-1,2,2-trifluoroethane	696

GZ-02	05/88	03/89
1,1,2-Trichloro-1,2,2-trifluoroethane	110	74

GZ-05	05/88	03/89
1,1,2-Trichloro-1,2,2-trifluoroethane	1	ND

GZ-03	05/88	03/89	10/99
1,1,2-Trichloro-1,2,2-trifluoroethane	340	470	ND

MW-05	07/00	07/01	05/03	12/03	07/04
1,1,2-Trichloro-1,2,2-trifluoroethane	7	ND	ND	ND	0.50

MW-07	06/03	07/03	09/03	12/03	07/04
1,1,2-Trichloro-1,2,2-trifluoroethane	5400	8500	6100	370	110

MW-03	10/99	07/00	07/01	05/03	07/03	09/03	12/03	07/04
1,1,2-Trichloro-1,2,2-trifluoroethane	17000	11000	13000	5800	68	26	150	4900

GZ-09	05/88	03/89
1,1,2-Trichloro-1,2,2-trifluoroethane	18208	1900

MW-02	10/99	07/00	07/01	05/03	07/03	09/03	12/03	07/04
1,1,2-Trichloro-1,2,2-trifluoroethane	740	1700	2400	880	1000	54	12	21

MW-06	06/03	07/03	09/03	12/03	07/04
1,1,2-Trichloro-1,2,2-trifluoroethane	220	180	97	250	140

GZ-06	05/88	03/89	10/99	07/00	07/01	05/03	07/03	09/03	12/03	07/04
1,1,2-Trichloro-1,2,2-trifluoroethane	1274	200	49	900	250	100	230	74	ND	100

GZ-01	05/88	03/89
1,1,2-Trichloro-1,2,2-trifluoroethane	8030	4100

GZ-07	05/88	03/89
1,1,2-Trichloro-1,2,2-trifluoroethane	32	4

MW-01	10/99	07/00	07/01
1,1,2-Trichloro-1,2,2-trifluoroethane	ND	ND	ND

OGDEN AVENUE

FAYETTE AVENUE

CENTER AVENUE

SHELDRAKE RIVER

Legend

- Existing Monitoring Well Location
- Previous Monitoring Well Location
- Concentration Exceeds NYSDEC TOGS (1.1.1) Class GA Standards
- Former EMCA Site Boundary (Approximate)
- Generalized Groundwater Flow Direction

GZ-03 05/88 (Sample Date)
1,1,2-Trichloro-1,2,2-trifluoroethane, 340
Location ID; Parameter; Concentration

ND - Not Detected

All Analytical Results are Reported in UG/L

60 0 60 Feet

FORMER EMCA SITE
SUMMARY OF FREON 113 DETECTIONS IN GROUNDWATER

URS

FIGURE 5

n:\11172730.00000\db\gis2001\prap.apr SUMMARY OF FREON 113 DETECTIONS (2)
1/11/2005

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

Former EMCA Site
Mamaroneck (V), Westchester County,} New York
Site No. 3-60-025

The Proposed Remedial Action Plan (PRAP) for the Former EMCA site, was prepared by the New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on February 14, 2005. The PRAP outlined the remedial measure proposed for the contaminated groundwater at the Former EMCA site.

The release of the PRAP was announced by sending a notice to the public contact list, informing the public of the opportunity to comment on the proposed remedy.

A public meeting was held on March 2, 2005, which included a presentation of the Remedial Investigation (RI) and the Engineering Evaluation/Cost Analysis (EE/CA) Report 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. The public comment period for the PRAP ended on March 17, 2005.

This responsiveness summary responds to all questions and comments raised during the public comment period. The following are the comments received, with the NYSDEC's responses:

COMMENT 1: What is the current use of the property?

RESPONSE 1: Cablevision of Westchester, the current site owner, currently uses the site as a cable television service center.

COMMENT 2: This remedy addresses the Freon 113 contamination. Will the remedy for Freon 113 in any way help to lower the concentration levels of dichloroethene, tetrachloroethene and other contaminants noted during the presentation? Did you test for these other contaminants during the RI, and did their concentration levels go down?

RESPONSE 2: Injection of organic substrates is an in-situ technology that offers a passive, low cost approach to remediate groundwater contaminated with chlorinated hydrocarbons. While this technology was used to address Freon 113, the technology is expected to reduce the concentration of several other chlorinated contaminants (which were not associated with on-site activities), including 1,2-dichloroethene (DCE), tetrachloroethene (PCE), and trichloroethene (TCE). Other contaminants, including benzene, ethylbenzene, and xylene, though not associated with on-site activities, were detected at much lower concentrations as compared to Freon 113, and would be expected to decrease over time via natural attenuation. Groundwater sampling

conducted during the course of the RI and the implementation of the IRM did include testing of these other compounds which showed a discernible downward trend.

COMMENT 3: Did you test all of the monitoring wells during this investigation? What about monitoring well MW-1. If it has not been tested, can it be tested now?

RESPONSE 3: At one time or another during the course of the investigation all of the wells were tested at least once. The upgradient monitoring well MW-1 was sampled three times (i.e. in October 1999, July 2000 and July 2001) during the course of the RI. There were no detections of Freon 113 during any of these sampling events.

COMMENT 4: Now that the November 2004 vegetable oil injections have taken place, when will you be testing the groundwater again to determine the effectiveness of the second injection?

RESPONSE 4: The frequency of post-injection sampling has yet to be finalized, but it is expected that the next round of groundwater samples will be collected later in 2005.

COMMENT 5: Whenever this testing is done, will the results be made public before the ROD is issued?

RESPONSE 5: NYSDEC will make them available to the public in the document repositories. The testing will not be completed before the ROD is issued.

COMMENT 6: You are proposing to re-classify the site to a Class 4. Will the proposed reclassification just apply to the Freon 113 contamination, or does the entire site get re-classified?

RESPONSE 6: The re-classification will apply to the entire site. The other contaminants are not site-related and do not affect the classification of this site.

COMMENT 7: Since other contaminants are involved besides Freon 113, will you transfer this project to the Petroleum Spills Program?

RESPONSE 7: Other non-site related compounds including benzene, as well as DCE, PCE, TCE and vinyl chloride have been detected primarily in upgradient wells suggesting an off-site source. The investigation and remediation of these potential off-site sources of contamination will be addressed by the NYSDEC separately from the PRAP for the Former EMCA site. There may be more than one source of the off-site contamination and the NYSDEC may have to address it with both the petroleum spills program monies and State Superfund monies.

COMMENT 8: The previous sampling conducted in 1988, contamination was indicated in an alleyway or bay area of this site. What is the status of that area, as it does not appear to have been further studied?

RESPONSE 8: This comment refers to low levels of VOCs detected in the on-site buildings' indoor air in 1988. The NYSDOH re-tested the indoor air of the on-site buildings in 2000 and

found low levels of VOCs but concluded that the detected concentrations did not pose a health concern. Additional indoor air and sub-slab testing will be implemented as part of the remedy to determine the potential for vapor intrusion to occur in on-site buildings and to determine the need for vapor intrusion mitigation measures.

Mr. Edward F. Tokarski of Rohm and Haas Company, Inc. (the Responsible Party) submitted a letter (dated March 16, 2005) which included the following comments:

COMMENT 9: Rohm and Haas generally agrees with the PRAP approach with one notable exception: Rohm and Haas does not agree with the requirement for a pre-remedial design investigation to determine if vapor intrusion is occurring in on-site buildings. Such an evaluation has already been performed, on several occasions, including once by the New York State Department of Health. These were performed before the pilot study and the Interim Remedial Measure (IRM) greatly reduced Freon concentrations in groundwater. All found that there was little to no potential for impact, even when the Freon concentration in groundwater were greater than now. Any potential vapor intrusion has greatly diminished because Freon concentrations have diminished. The requirement for the pre-remedial design investigation is unnecessary because it duplicates studies already performed and accepted by the NYSDEC, and is inconsistent with the findings and conclusions of previous studies.

Rohm and Haas requests that the requirement for a pre-remedial investigation of indoor air be removed from the final Remedial Action Plan.

RESPONSE 9: Indoor air sampling conducted at the Former EMCA facility detected Freon 113 at a level above the background concentration measured in homes in New York State, where no known source of said contaminant exists. Based on this information and due to high levels of Freon 113 detected in historic soil gas samples where Freon 113 was found at levels above 25,000 micrograms per cubic meter, it is necessary to further evaluate the levels of exposure in the on-site buildings and the potential for soil gas migration to nearby residential structures.

COMMENT 10: Page 1, Section 1, Paragraph 1 of the Proposed Remedial Action Plan (PRAP) states: "*...operations at the site related to the manufacture of electronic conducting paste used in the electronics industry resulted in the disposal of hazardous wastes, ...*" Rohm and Haas believes the phrase "*...in the disposal of hazardous wastes,*" creates the wrong image of site activities and the source of the released Freon. The phrase gives the image of intentional subsurface burial of waste materials, which is not the case at the EMCA site. Most members of the public do not understand that the legal definition of the term "disposal" includes unintentional spills and similar types of releases, the mechanism thought to have resulted in the Freon being found in groundwater. The conceptual model that surface spills released Freon to groundwater is important to understand that this situation is not large, nor will any waste materials remain after remediation is completed.

Rohm and Haas requests that the term disposal either not be used, or that the term be defined so that the public understands that the mechanism of release thought to have occurred at the EMCA site was unintentional surface spills from waste materials being temporarily stored.

RESPONSE 10: Comment noted. As a clarification, the language in the Record of Decision was modified accordingly.

COMMENT 11: Page 3, Section 3.1, First Paragraph. See our previous comment regarding the use of the term "disposal".

RESPONSE 11: See response to Comment 10.

COMMENT 12: Page 6, Section 5.1.3 Groundwater, Right Column, Line 15 states: "*The Class GA groundwater standard for these compounds is 5 ppb…"* Other regulatory agencies including the United States Environmental Protection Agency (USEPA) have published risk-based guidelines indicating that Freon is much less toxic than the other compounds listed in this section. These other compounds have been found in groundwater in the area and are attributed to other sources. For example, USEPA Region 2, which includes New York, uses guidelines prepared by USEPA Region 9. Those can be found at http://www.epa.gov/region09/waste/sfund/prg/files/04prgtable.pdf. This document indicates that Freon is much less toxic than the other listed compounds. For example, Freon in tap water is five orders of magnitude less toxic than tetrachloroethene.

Rohm and Haas requests that some mention be made that the Freon found in groundwater, although initially found at concentrations greater than the other compounds in area groundwater, is much less toxic than the other compounds. Without this clarification, the public is left with the impression that all the compounds have about the same toxicity, and the Freon is the major issue because it is present at higher concentrations. Mentioning relative toxicity allows the public to be better informed and able to make informed decisions regarding relative level of risk and importance.

RESPONSE 12: The application of the promulgated groundwater standard for Freon as a remedial goal at this site is a straightforward application of existing regulations (6 NYCRR 703.5), and there is no requirement that the NYSDEC invoke other criteria such as relative toxicity when establishing remedial goals for a site.

COMMENT 13: Page 7, Section 5.1.3 Soil Gas, Line 16 states: "*FID readings for three out of five soil gas screening locations were significantly elevated (25,000 $\mu g/m^3$ or higher).*" While correct, this statement without clarification does not inform the public about the occurrence of Freon, the contaminant of concern at the EMCA site. Figure 4 shows that there is little correlation between FID readings and the presence and relative concentrations of Freon. One sample of elevated FID readings was upgradient and off-site of the EMCA property, and could not be related to Freon. FID instruments respond to many forms of organic carbon, many of which are naturally occurring.

Freon was found in two soil gas samples, both located on site. These samples were taken before Freon concentrations in groundwater were reduced by the pilot study and IRM. The highest one was in the area of the suspected spills. The second, located closer to the building, had a Freon concentration that was two orders of magnitude less than the other sample. They indicate that there is little subsurface migration of Freon in soil gas except for where Freon concentration are highest in groundwater. Since Freon concentrations in groundwater have been reduced, the potential for Freon to be found in soil gas also is reduced.

Rohm and Haas requests that this section focus on Freon concentration, not FID readings, as described in the preceding paragraph.

RESPONSE 13: Clarification of the use of an FID as a field screening tool has been included in the ROD.

A soil vapor sample collected at location SG-03 was analyzed via EPA Method TO-14. Freon 113 was detected in sample SG-03 at 3,300 ppb_v,which is 25,000 micrograms per cubic meter. While it is correct to say that SG-03 was collected before the implementation of the IRM, post-IRM soil gas samples were not collected to determine if soil gas levels have decreased, hence the need to conduct an additional investigation to evaluate the potential for soil vapor intrusion.

COMMENT 14: Page 7, Section 5.1.3 Indoor Air, Right Column, Line 1 states: "*The trace concentrations in the indoor air did not differ from that detected in the outdoor air with the exception of the sample collected at the EMCA site, which were greater than those typically found in indoor air*." The comparison to indoor air and outdoor air are samples is not necessary and is confusing. The reader is uncertain whether indoor air or outdoor air samples were greater. The key concept is quoted in the same paragraph: "*The concentrations of Freon 113 detected in all three buildings sampled by the NYSDOH in July 2000 were within or slightly above typical background levels*."

Rohm and Haas requests that the statement comparing indoor air and outdoor air samples be deleted as confusing and unnecessary. Further, Rohm and Haas requests that a statement be added indicating that indoor air samples were collected before groundwater remediation reduced Freon concentrations. Finally, we request consistent language be used throughout the document to describe soil gas results as: "*...within or slightly above typical background levels*."

RESPONSE 14: An outdoor ambient air sample is routinely collected when evaluating indoor air issues potentially related to a site. The ambient air sample results are compared to indoor air sampled with that environment in order to assess whether the outdoor air is impacting indoor air quality. It is relevant and appropriate to make this comparison in order to identify possible sources of indoor air contamination.

In the absence of supporting indoor air sampling data, it is inappropriate to infer that the IRM has reduced the level of contamination in the indoor air.

COMMENT 15: Page 9, Section 5.3 Summary of Human Exposure Pathways, Left Column, Line 28, states: "*Freon 113 contaminated soil vapor was detected in the indoor air sample of the on-site building at levels that are above background concentrations*". As mentioned elsewhere in the PRAP, the concentrations of Freon 113 detected in indoor air at the site during the NYSDOH investigation were only slightly elevated above typical background levels. The levels found are described as being several orders of magnitude below a level known not to be a concern to human health. The NYSDOH correctly concluded that the detected Freon concentration did not pose a health concern.

Rohm and Haas requests that consistent terms be used throughout the document such that the relative concentrations of Freon found in an indoor air sample are described as "*...within or slightly above typical background levels*." This phrase provides a better description of the relative concentration of Freon, and is more easily understood. This comment applies to several other instances in this section where the phrasing is not consistent with and is directly contradicted by data provided in other sections of the PRAP.

RESPONSE 15: The language in the ROD has been revised accordingly.

COMMENT 16: Page 9, Section 5.3 Summary of Human Exposure Pathways, Left Column says that the only completed exposure pathway is inhalation of contaminated vapors in indoor air at the site by on-site workers. Rohm and Haas strongly disagrees with this conclusion. This conclusion is not supported by data collected at the site, is not consistent with data provided in the PRAP, and unnecessarily alarms the public and especially on-site workers.

The vapor intrusion pathway has been adequately investigated at the site, and the pathway does not pose a threat to human health. More specifically:

- Twenty-six subsurface soil samples were collected in 1988 from fourteen borings advanced at the site. Freon 113 was not detected at concentrations greater than the standards, criteria, and guidance value (SCG) provided in NYSDEC TAGM 4046 (NYSDEC 1994).

- In 1992, TCI Cable of Westchester, Inc. subcontracted ENVIRON Corporation to collect eight indoor and two outdoor ambient air samples at what is currently the Cablevision facility. ENVIRON concluded that the level of Freon identified at the site was not a health concern to site workers. Concentrations indoors ranged from 1.6 to 12 ppbv, with an average of 3.44 ppbv. Outdoor concentrations averaged 0.74 ppbv. The conclusion of the study states: *"The indoor air sampling results do not indicate any evidence of chemicals previously identified in the soil and ground water beneath the TCI Cable building migrating into the indoor air of the building." "A comparison of the indoor air sampling results to specific reference levels showed that all chemicals were well below the acceptable Ambient Air. Quality guidelines proposed by the State of New York, and are at least 300 times below the occupational OSHA permissible exposure limit (PEL) mandated by OSHA."*

- In July 2000, the New York State Department of Health collected three indoor air samples: two at local residences and one at what is currently the Cablevision facility. The concentrations of Freon 113 detected in the three buildings were within or only slightly above the typical background range for Freon 113.

- The soil gas survey conducted during the RI in 1999-2000 only indicated significant Freon 113 soil gas concentrations at one location (SG-03 at 3,300 ppbv) situated in the suspected spill area. A second location (SG-05) between the suspected source area and the building contained a very low level of Freon 113 (11 ppbv). This indicated that there was a rapid decrease in Freon concentrations with distance away

from the suspected spill area. Freon 113 was not detected at any other location. These data support a conclusion that lateral migration of soil gas is not occurring.

- Freon 113 has not been used at the site during or since the time of these various sampling events (1988-2000). One pilot study injection and one IRM injection have been completed. Maximum Freon 113 concentrations in groundwater have decreased since the time of these various sampling events (1988-2000) from 11,000 – 18,200 ppb to 4,900 ppb.

- The health risk assessment provided in the final EE/CA asserts that soil (surface and subsurface) and ambient air at the former EMCA Site are not media of concern under the current use scenario. Furthermore, the risk assessment calculation in the EE/CA resulted in a total hazard index from future inhalation of vapors (residents and workers) of 0.07. A level below 1 is generally considered to indicate no concern for non-cancer risk. Note that the calculation used a conservative model to assess long-term exposure from immediately above the most highly contaminated portion of the plume.

- During the March 2, 2005 public meeting, the concentrations of Freon 113 detected in indoor air at the site were described as several orders of magnitude below a level known not to be a concern to human health. The aforementioned USEPA Region 9 document also used by the USEPA region covering New York, indicates that Freon is orders of magnitude less toxic than other compounds such as tetrachloroethene, benzene and vinyl chloride that are found in area groundwater and are attributed to other sites.

For these reasons, Rohm and Haas requests that this section be modified to correctly describe that at this time, IRMs have reduced Freon concentrations, and that at this time there are no completed human exposure pathways. Further, Rohm and Haas requests that the first bullet at the bottom of Page 7 be reworded so that the public can easily understand that the only potential for inhalation of vapors by site workers would occur if Freon concentrations in groundwater increased, and only if there are changes to the site use from current conditions.

RESPONSE 16: The Former EMCA site is the source of the Freon 113 contamination at the site. Freon 113 was detected in soil vapor around the chemical storage area at 3,300 ppb_v (25,000 micrograms per cubic meter). Freon 113 was also detected in the indoor air on-site at levels above background concentrations. A complete exposure pathway consists at five elements: a source (Former EMCA site), contaminant release and transport mechanism (vaporization and movement of soil vapor), a point of exposure (Cablevision building), a route of exposure (inhalation) and receptor population (employees of Cablevision). In review of this information, the elements of a completed human exposure pathway were met.

The implementation of the IRM has reduced Freon 113 contaminated groundwater at the site. However, in the absence of sub-slab soil gas and indoor air sampling at the site, it is not possible to assess if the IRM was effective in reducing the level of Freon 113 in soil vapor. Therefore, in order to evaluate the effectiveness of the IRM and to determine if exposure to site-related

contaminants in indoor air are still occurring on-site and could potentially occur at off-site locations, the vapor intrusion pathway of exposure must be investigated.

COMMENT 17: Page 10, Section 6, Second Bullet states: "…*the release of contaminants from subsurface soil into indoor air and ambient air through soil vapor…*" was described as being a remediation goal for the site prior to the IRMs. For the reasons discussed in Comment 7 above, Rohm and Haas requests that this goal be described as the potential for release of contaminants from subsurface soil into indoor air and ambient air.

RESPONSE 17: The NYSDEC does not concur with the requested change. We believe the data demonstrates that Freon has migrated from soil and groundwater to indoor air.

COMMENT 18: Page 11, Right Column, Item 1 (a) states, *"…evaluate the potential for vapor intrusion to occur in any buildings developed on the site, including provision for mitigation of any impacts identifie*d". This requirement is needed only if groundwater concentrations are not reduced further and only if redevelopment occurs in such a manner as to place a building over or directly adjacent to elevated Freon concentrations.

Rohm and Haas requests that this item be reworded such that such an evaluation would be performed if plans for site redevelopment are proposed that include new building(s) over or adjacent to an area where elevated concentrations of Freon remain in groundwater.

RESPONSE 18: The NYSDOH does not concur with the requested change. A complete inhalation exposure pathway has already been identified. See Response #16.

COMMENT 19: Page 11, Right Column, Item 2 requires that the property owner provide a certification that site use and other institutional controls have not been changed. This certification is only needed for so long as Freon concentrations in groundwater remain elevated above levels of concern.

Rohm and Haas requests that this item be reworded such that any party that enters into an agreement with the NYSDEC can provide the certification, and that such a certification is necessary only as long as Freon concentrations in groundwater remain elevated above levels of concern.

RESPONSE 19: See Response #16.

COMMENT 20: Page 11, Right Column, Item 4 requires a pre-remedial investigation to determine if vapor intrusion is occurring in on-site and off-site buildings**.** This requirement is not supported by data collected at the site, is not consistent with data provided in the PRAP, is not consistent with the findings of various organization including the NYSDOH and the NYSDEC, and unnecessarily alarms the public and especially on-site workers. When studied by the NYSDOH five years ago before the IRMs reduced the Freon in groundwater, there was no concern for vapor intrusion as a pathway. The logical conclusion to be made by the public upon reading that there is a requirement to study indoor air now is that it is a concern now and has been for the last five years. There was no completed pathway five years ago, there

was no concern, and there is none today.

Our position has been explained fully in Comment 7. As long as site use remains as is and groundwater concentrations do not approach the levels found prior to the IRMs, then there is no scientific reason to be concerned with vapor intrusion from Freon. These scenarios are remote and are more than adequately addressed by other requirements. Groundwater monitoring and contingent remedies directly address Freon concentrations in groundwater and will prevent concentrations from approaching levels of concern. The institutional control regarding potential changes in site use and potential redevelopment addresses potential site use changes. The scenarios that might cause a concern for vapor intrusion are addressed adequately by other requirements.

RESPONSE 20: Refer to Responses #9 and #16.

APPENDIX B

Administrative Record

Administrative Record

Former EMCA Site
Site No. 3-60-025

1. Proposed Remedial Action Plan for the Former EMCA site, dated February 2005, prepared by the NYSDEC.

2. Order on Consent, Index No. A7-0384-9903, between NYSDEC and Rohm & Haas Co., executed on March 29, 1999.

3. "Remedial Investigation Field Investigation Plan", September 1999, prepared by URS Greiner Woodward Clyde.

4. "Remedial Investigation Report", December 2000, prepared by URS Greiner Woodward Clyde.

5. "Pilot Study Work Plan", March 2003, prepared by URS Corporation.

6. "Pilot Study Report", March 2004, prepared by URS Corporation.

7. "Groundwater Sampling and Analysis Report", September 2004, prepared by URS Corporation.

8. "Interim Remedial Action Work Plan", October 2004, prepared by URS Corporation.

9. "Engineering Evaluation/Cost Analysis Report", February 2005, prepared by URS Corporation.

10. "Citizen Participation Plan", August 2004, prepared by the New York State Department of Environmental Conservation (NYSDEC).

11. Fact Sheet, February 2005, prepared by the NYSDEC.

12. Letter dated March 16, 2005 from Mr. Edward F. Tokarski, Corporate Remediation Project Manager, Rohm and Haas.