Department of Environmental Conservation

Division of Environmental Remediation

Record of Decision

AVM-Gowanda Site

Persia (T), Cattaraugus County, New York

Site No. 9-05-025

March, 2001

New York State Department of Environmental Conservation

GEORGE E. PATAKI, *Governor* ERIN M. CROTTY, *Commissioner*

DECLARATION STATEMENT - RECORD OF DECISION

AVM-Gowanda Inactive Hazardous Waste Site
Persia (T), Cattaraugus County, New York
Site No. 9-05-025

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the AVM-Gowanda 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 **AVM-Gowanda** 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 AVM-Gowanda site and the criteria identified for evaluation of alternatives, the NYSDEC has selected **Alternative 5: Groundwater Extraction in Combination with Permeable Passive/Reactive Iron Wall**. The components of the 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.

2. Continued operation of the extraction well and air stripper currently in place on the Gowanda Electronics property.

3. Installation of a groundwater extraction system consisting of pumping wells beneath Torrance Place and a collection trench midway between Torrance Place and Chestnut Street.

4. Construction of a treatment system housed in a separate sound dampened building constructed on the Gowanda Electronics property.

5. Installation of a reactive iron wall north of Chestnut Street, extending approximately 250 feet in length to intercept the leading edge of the contaminant plume.

6. Implementation of a monitoring system to ensure the effectiveness of the remedy, including groundwater flow conditions, groundwater chemistry, and indoor air quality.

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

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Persia (T), Cattaraugus County, New York
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SECTION 1: SUMMARY AND PURPOSE OF THE SELECTED REMEDY

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 and off- site migration of hazardous waste at the AVM-Gowanda site, a class 2 inactive hazardous waste disposal site. As more fully described in Sections 3 and 4 of this document, disposal of various metal shavings, cutting oils, and degreasing solvents occured at the site, including hazardous wastes consisting of trichloroethene (TCE), 1,1-dichloroethane (1,1-DCA), and 1,1,1-trichloroethane (1,1,1-TCA), much of which have migrated from the site northward beneath a residential area. These disposal activities have resulted in the following significant threats to the public health and/or the environment.

- a significant threat of human exposure to contaminated groundwater.
- a significant threat to the groundwater resource, due to excedence of NYSDEC groundwater standards.
- a significant threat to human health associated with high level groundwater contamination migrating beneath residential dwellings, resulting in the release of contaminants into basements in vapor form.
- a significant environmental threat associated with the potential for impacts of contaminants to Cattaraugus Creek.

In order to eliminate or mitigate the significant threats to the public health and/or the environment that the hazardous wastes disposed at the AVM-Gowanda site have caused, the following remedy was selected:

- Groundwater extraction by pumping wells along Torrance Place combined with a groundwater collection trench through the back yards between Torrance Place and Chestnut Street, with treatment of the collected groundwater.
- A reactive iron wall north of Chestnut Street providing in-situ treatment of contaminated groundwater beyond the extent of the extraction system

The selected remedy, 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 AVM-Gowanda site is located at One Industrial Place in the Town of Persia, Cattaraugus County, New York. The property is approximately 1.75 acres in area and includes two manufacturing buildings and two small storage sheds. The site is currently owned and occupied by the Gowanda Electronics Corporation, a small manufacturer of electrical components such as inductors. The site property is flat and largely covered with either paved parking areas or buildings. Surface drainage is provided via storm drains that ultimately empty into Cattaraugus Creek. The site is bordered by residential property to the north and east, a railroad yard to the south, and commercial facilities to the west (see Figure 1).

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

Situated in a mixed industrial/residential area the facility has been used for commercial operations since the early 1930's. From World War II until 1979 the facility was used as a metal stamping/machine shop. Gowanda Electronics purchased the facility in 1979 from Automatic Voting Machine Corporation (AVM) and has since used the facility for the manufacture of electronics components.

3.2: Remedial History

A Phase I and Phase II site investigation were completed in the spring of 1994 for Gowanda Electronics by Malcolm Pirnie, Inc. Analysis of surface soil samples showed elevated levels of various metals, total petroleum hydrocarbons (TPHs) and trace levels of volatile organic compounds (VOCs) at the east end of the main building, along the northern property boundary. The company chose to excavate the surface soils for off-site disposal. The initial surface soil excavation program continued to a depth of approximately seven feet based on visual identification of stained soil and waste metal shavings, removing 568 tons of soil and wastes. This lead to the discovery of high levels of VOCs which increased in concentration as the depth of the excavation increased. VOCs from this area apparently had migrated to the groundwater table, resulting in significant groundwater contamination. At this point the excavation was backfilled and the company installed a groundwater extraction well, with an air stripper for treatment. This system became operational in June 1996 and continues to operate under a Voluntary Cleanup Agreement, (Index No. B9-0507-96-05) (VCA) between the NYSDEC and the Gowanda Electronics Corp.

To further investigate existing subsurface and groundwater conditions near the source area and to identify any potential migration pathways from this source area, a NYSDEC Immediate Investigation Work Assignment (IIWA) was undertaken in 1995. Field activities associated with the IIWA were conducted during late 1995 with the summary report issued by NYSDEC in January 1996. A significant groundwater contaminant plume was identified, migrating from the source area northward to Torrance Place. The data further suggested that the plume likely extended beyond Torrance Place.

The IIWA provided the basis for the site to be listed on the New York State Registry of Inactive Hazardous Waste Disposal Sites as a Class 2 Site. A Remedial Investigation/Feasibility Study (RI/FS) was then conducted to fully define the nature and extent of contamination, determine if any exposure pathways exist that pose a threat to human health or the environment, and if so, evaluate remedial alternatives to effectively address the contamination.

SECTION 4: SITE CONTAMINATION

To evaluate the contamination present at the site and to evaluate alternatives to address the significant threat to human health and the environment posed by the presence of hazardous waste, the NYSDEC has recently conducted a Remedial Investigation/ 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 3 phases. The first phase was conducted between April - June, 1997, the second phase during December, 1997, and the third, in October 1998. A report entitled Remedial Investigation Report, AVM-Gowanda Site, July 1998 has been prepared which describes the field activities and findings of the RI in detail.

The RI included the following activities:

- Geoprobe™ Sampling - groundwater samples were collected at 69 locations (soil gas samples also collected at 27 of those locations) and immediately analyzed in a mobile laboratory to determine extent of the groundwater contaminant plume.

- Monitoring Well Installation - 12 monitoring wells were installed within the contaminant plume based on the information developed during the Geoprobe™ sampling to serve as long term sampling locations and to measure the physical properties of the aquifer, including groundwater flow rates and direction.

- Aquifer Testing - Slug tests were performed on the monitoring wells to estimate hydraulic conductivity of the aquifer material at each location. Hydraulic conductivity is used in the calculation of groundwater flow volume and velocity.

- Groundwater Sampling - Groundwater samples were collected from all monitoring wells for analysis during the first and second phases of the RI.

- Indoor Air Sampling - Indoor air samples were collected from 8 homes located along Torrance Place during the first and second phases of the RI to monitor for potential volatilization of the contaminants from the groundwater into the basement in vapor phase.

- A 3 Dimension High Resolution seismic survey and fracture trace analysis were performed to determine the surface of glacial till and bedrock, orientation of fractures within the till and bedrock, and identify preferential pathways to predict contaminant migration.

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 AVM-Gowanda site are based on NYSDEC Ambient Water Quality Standards and Guidance Values and Part 5 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

The site, and resulting area of impacted groundwater, is underlain by moderately to highly permeable alluvium (alluvium is a general term referring to soil and sediment deposited by a river or stream) comprised of a varying mix of sand and gravel. Within this alluvium are buried stream channels filled with coarser sand and gravel that serve as preferential flow paths and, in part, control groundwater flow. The thickness of the alluvium ranges from 4 to 15 feet. Groundwater occurs within the alluvium under unconfined, or water table, conditions. Below the alluvium, is a dense glacial till that may serve as a barrier to further downward migration of contaminants. The surface of this till was eroded during post glacial stream flow, resulting in an uneven surface with the deepest area beneath Torrance Place. The water bearing alluvium is covered with up to 8 feet of flood plain silt and clay, that serves to retard upward migration of contaminant vapors from the water table. Groundwater flow within the alluvium is to the north/northwest under a moderate gradient, at an estimated rate of 2 to 4 feet per day.

4.1.2: Nature of Contamination

As described in the RI report, many groundwater, soil, soil gas, and indoor air samples were collected at the site to characterize the nature and extent of contamination. The main category of contaminants which exceed their SCGs are volatile organic compounds (VOCs). The VOC contaminants of concern are TCE, 1,2-dichloroethene (1,2-DCE), 1,1-DCA, 1,1,1-TCA, and 1,1-dichloroethene (1,1-DCE).

4.1.3: Extent of Contamination

Table 1 summarizes the extent of contamination for the contaminants of concern in 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

Gowanda Electronics reported that contaminated soils had been removed as part of their initial work. Three subsurface soil samples were collected between the source area and residential property during the RI to confirm contaminated soils had been effectively removed by Gowanda Electronics. Two samples collected from above the water table exhibited very low concentrations of VOCs below TAGM levels. The one soil sample from below the water table contained approximately 1 ppm of total VOCs. It was concluded that this was likely due to the contact with highly contaminated groundwater and the soil removal had been effective.

Groundwater

Results from 102 groundwater samples show significant VOC contamination exists within the alluvial aquifer, consisting primarily of TCE and 1,2-DCE. Figure 1 shows the extent of the groundwater contaminant plume at concentrations exceeding 1,000 ppb (1 ppm), based on Geoprobe™ sampling and groundwater flow gradients and direction. Figure 2 shows analytical data from the second phase RI monitoring well sampling and the extent of the groundwater contaminant plume at concentrations exceeding 1 ppm total VOCs. The groundwater contaminant plume extends from the source area at One Industrial Place, approximately 1150 feet north, to beyond Chestnut Street. The plume is approximately 450 feet across at its widest point, which is located along Chestnut Street. The plume covers an area of approximately 7.5 acres. Virtually all of the contamination remaining at the site is within the groundwater, which continues to migrate northward. Groundwater elevations were observed to be 6 to 8 feet below ground surface during the RI, below potential influences of buried utility trenches along Torrance Place. Basements in homes along Torrance Place were observed to be dry during indoor air sampling in the summer and winter months.

Significant concentrations of VOCs exist within the plume, with exceptionally high levels, up to 224 ppm total VOCs (170 ppm TCE) identified at MW-4 which is located in Torrance Place. These concentrations strongly suggest the TCE also exists as a separate, heavier than water, phase (undissolved product) known as dense non-aqueous phase liquid (DNAPL). The DNAPL is suspected to exist as small pools accumulated in low points on the surface of the till and/or within the pore spaces of the soil. If present, the DNAPL acts as a continuing source of contamination, slowly dissolving into the passing groundwater.

Waste Materials

Based on soil sampling at the suspected source area waste material, in solid form such as contaminated soil and metal shavings has been excavated and disposed of off-site by the current site owner (see Section 3.2). It is suspected that DNAPL continued to migrate downward to the water table, where it then migrated off-site to the north.

Soil Gas

Soil gas samples (air samples collected from the unsaturated soil) collected off-site over the groundwater plume at the beginning stages of the RI show the same VOC compounds as found in the groundwater. This indicates the VOC contamination is volatilizing (evaporating) into the soil above the water table.

Indoor Air

Due to volatilization of contaminants from the water table identified with the soil gas sampling, indoor air samples were collected from homes located over the areas of the highest levels of groundwater contamination. VOCs consistent with those in the groundwater were found in 5 of the 8 homes sampled. The United States Environmental Protection Agency (EPA) and the NYSDOH maintain a database of average concentrations of specific chemical compounds that could be expected in homes resulting from paints, cleaning solutions, insecticides, etc. When compared to these databases, the concentrations found in the 5 homes exceeded the average for contaminants associated with the site, indicating a human exposure pathway exists. Concentrations were not at levels that were considered a health concern, however due to the potential threat for concentrations to increase, periodic monitoring will be performed. Table 2 shows the indoor air data from houses located over the contaminant plume, compared to the EPA and NYSDOH median concentrations.

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.

Prior to the State's involvement with the site, the current owner, Gowanda Electronics, identified significant soil contamination on the property at the east end of the main production building. The company chose to excavate the surface soils for off-site disposal. This surface soil excavation program continued to a depth of approximately seven feet, removing 568 tons of soil, and lead to the discovery of high levels of VOCs which increased in concentration as the depth of the excavation increased. VOCs from this area have migrated to the groundwater table, resulting in the significant groundwater contaminant plume. At this point the excavation was backfilled and the company installed a groundwater extraction well, with an air stripper for treatment, that became operational in June 1996. The purpose of the extraction well is to contain and treat groundwater on-site only. This system continues to operate under the VCA between the NYSDEC and the Gowanda Electronics Corp.

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 5 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.

The potential for human contact with contamination is through direct contact with groundwater and soil below the water table during activities such as utility maintenance, both on site and throughout the area of the plume. All residents in the area are served by municipal water, however, use of groundwater from sources such as private well points for gardening would provide direct exposure to contaminants, through both dermal contact and inhalation of vapors. Volatilization of contaminants associated with the groundwater plume into basements of homes along Torrance Place has been identified as a completed exposure pathway (see section 4.1.3), and will continue to be monitored.

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 Fish and Wildlife Impact Assessment included in the RI presents a more detailed discussion of the potential impacts from the site to fish and wildlife resources.

Field observations at the source area and throughout the residential area did not find any waste material or contamination at the surface. As shown in the analytical data, significant impacts to the groundwater resources have occurred as a result of contaminants migrating from the site. No stressed vegetation on site or along the plume was found to exist. Contamination identified at the site is subsurface and is not impacted by surface runoff during storm events. Analytical results combined with hydrogeologic observations indicate that any migration of contaminants is northward, however it has not reached surface water bodies or resurfaced in the form of springs. Groundwater discharge is to Cattaraugus Creek, however the extent of the contamination plume currently terminates before it reaches Cattaraugus Creek. After consideration of the above potential impacts, along with the current conditions defined for the site, it was determined that there were no present impacts to wildlife as a result of contamination from the site. However, left untreated, continued migration of the plume could impact Cattaraugus Creek in the future.

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 Potential Responsible Parties (PRP) for the site, documented to date, include, but are not limited to, Gowanda Electronics and past site owners and operators, such as Automated Voting Machine (AVM).

The PRPs declined to implement the RI/FS at the site when requested by the NYSDEC. After the remedy is selected, the PRPs will again be contacted to assume responsibility for the remedial program. If an agreement cannot be reached with the PRPs, the NYSDEC will evaluate the site for further action under the State Superfund. The PRPs are subject to legal actions by the State for recovery of all response costs the State has incurred.

The Voluntary Cleanup Agreement, Index Number B9-0507-96-05, effective January 13, 1998, VCA between the NYSDEC and the Gowanda Electronics Corp., remains in effect for the operation of the on-site groundwater recovery and treatment system.

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:

- Reduce, control, or eliminate to the extent practicable, the continued migration of contaminated groundwater and suspected DNAPL throughout the residential area north of the site.

- Eliminate potential for direct exposure through the inhalation of contaminant vapors migrating into the homes located over the groundwater contaminant plume or dermal contact with contaminated groundwater or soil.

- Achieve NYSDEC groundwater quality standards to the extent practical.

- Prevent migration of the contaminant plume to Cattaraugus Creek.

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 AVM-Gowanda site were identified, screened and evaluated in the report entitled Feasibility Study Report, AVM-Gowanda Site, February 2000.

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 groundwater at the site. All alternatives described below would include the continued operation of the groundwater extraction system currently operated on-site under the VCA.

Alternative 1: No Further Action/Continued Monitoring

Present Worth	$355,000
Capital Cost	$ 0
Annual O&M	$ 30,000 (years 0-3)
	$ 16,000 (years 4-30)
Time to Implement	NA

The no further action alternative is evaluated as a procedural requirement and as a basis for comparison. It would require continued monitoring of groundwater and indoor air only, allowing the site to remain in its current state. The VCP groundwater extraction and treatment system would continue to operate, preventing further migration of contaminants from the source area. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Alternative 2: In-Well Air Stripping

Present Worth	$3,223,000
Capital Cost	$2,343,000
Annual O&M	(years 0-3)$121,000
	(years 4-10)$95,000
Time to Implement	6-9 Months
Estimated Time to Completion	10 years

This alternative would involve the installation of in-situ air stripping wells throughout the contaminant plume area, where VOCs would be stripped from the groundwater within the well and transferred in vapor phase via a pipeline to a central treatment area. The vapors would then be treated with options such as granular activated carbon or UV/Oxidation. Activated carbon treatment has been assumed for cost estimates. Actual treatment options would be further evaluated during remedial design. This technology draws groundwater from the aquifer, air strips the contaminants from the water within the well, and discharges the water into the unsaturated zone through an upper screen in the well. Due to the relatively low permeability of the unsaturated upper soil unit (flood plain silt and clay), infiltration basins would need to be created at each well location. This would consist of an excavation to approximately 8 feet and backfill with select gravel, with the well subsequently installed through the infiltration basin. Continued monitoring of the groundwater and indoor air would be performed as a measure of the effectiveness of the remedial system.

Alternative 3: Groundwater Extraction and Treatment via Air Stripping

Present Worth	$2,582,000
Capital Cost	$485,000
Annual O&M	(1st 3 years) $124,000
	(years 4 through 30) $104,000
Time to Implement	6 - 9 months
Estimated Time to Completion	30 years

This alternative would involve the installation groundwater pumping wells throughout the extent of the contaminant plume, installed to the top of glacial till. Alternatively, groundwater collection trenches excavated to the top of the glacial till could be installed in areas where implementation could easily be accomplished, i.e. areas without buried utilities such as gas, water, and sewer. Due to the channelized nature of the alluvium, collection trenches would be more effective for intercepting preferential flow zones (sand and gravel channel deposits), ensuring capture of contaminated groundwater flowing through the alluvial aquifer. It is estimated that the system would operate at an average withdrawal rate of approximately 5 gallons per minute per well (based on current pumping rates for the on-site VCA well) or 20 to 50 gallons per minute within a collection trench extending up to 500 feet across the aquifer, for an estimated period of 30 years. Extraction wells and/or collection trenches would be installed at locations over the entire plume, to separate the plume into smaller sections thereby significantly reducing the time frame required to remediate the aquifer. Once removed, the groundwater would be pumped to the Gowanda Electronics property, treated, and discharged to either surface water or the sanitary sewers, as necessary and appropriate. For cost estimating purposes, it has been assumed treatment will consist of air stripping with chemical oxidation to treat the air discharge from the stripper. Alternative treatment options, such as advanced oxidation process or granular activated carbon could be considered during the remedial design. Continued routine monitoring of groundwater and indoor air would be performed as a measure of the effectiveness of the remedial system.

Since DNAPL is strongly suspected in the area between the source and Torrance Place, actions would be expanded to address this continuing source of contamination to groundwater. Such actions would be taken only if the first year of operating data show consistent contaminant concentrations in the collected groundwater, indicating a continuing source of contamination, and after pumping wells along Torrance Place had established a strong zone of influence to ensure recovery of any remobilized DNAPL. A proposed method to collect/control migration of DNAPL would be to enhance the groundwater extraction with the injection of either cosolvents or surfactants at the source area, which would dissolve or break loose the DNAPL from the pore space and remobilize it within the aquifer. The treatment system would be equipped with a DNAPL "knockout" stage, where DNAPL would be separated from the groundwater.

Alternative 4: Permeable Passive/Reactive Iron Wall

Present Worth	$ 3,937,000
Capital Cost	$3,709,000
Annual O&M	(years 0-3)$ 46,000
	(years 4-30) $20,000
Time to Implement	6 - 9 months
Estimated Time to Completion	30 years

This alternative would involve the installation of reactive media (reactive iron is the most appropriate for the site specific contaminants) in the form of a wall across a vertical section of the groundwater contaminant plume. This would be accomplished by excavating a trench east to west, perpendicular to the flow of groundwater to the top of the lodgement till. The trench would be backfilled with the reactive media to above the water table, then clean fill to ground surface and seeded. As groundwater passes through the wall, oxidation of the iron provides electrons for the dechlorination of the contaminants in the groundwater, treating the groundwater as it naturally flow to the north. Due to the relatively high groundwater velocities and high contaminant concentrations within the southern and central sections of the plume, significant horizontal thickness of reactive iron media would be required to adequately reduce the compounds of concern and associated breakdown products that are expected during the dechlorination process that occurs within the reactive wall. Three walls would be installed across the plume so that the plume would be broken into three segments to stop continued migration of contaminated groundwater. Eventually, the treated water emerging beyond the first reactive iron wall would reach the next reactive iron wall under natural flow gradients, to the point that groundwater between the reaction walls would be completely treated. This would not be expected to occur as a sharply defined line between contaminated and clean groundwater, due to mixing and adsorption of contaminants to soil particles, but rather as a gradual decrease in concentration until contaminants have either been flushed through the aquifer to the reactive wall or degraded under natural biologic processes. Chemical and hydraulic groundwater monitoring on each side of each wall would be performed to ensure the walls were breaking down the contamination and not restricting natural flow patterns. Additionally, periodic monitoring of groundwater and indoor air would be performed as a measure of effectiveness of the remedial system.

With this alternative, no groundwater would be removed or diverted and there would be no need for further treatment.

Alternative 5: Groundwater Extraction in Combination with Permeable Passive/Reactive Iron Wall

Present Worth	$ 2,685,000
Capital Cost	$688,000
Annual O&M	(years 0-3) $124,000
	(years 4-30) $98,000
Time to implement	6 - 9 months
Estimated Time to Completion	30 years

This alternative would involve the installation of groundwater extraction wells along Torrance Place, the installation of a groundwater collection trench across the plume located between Torrance Place and Chestnut Street, (approximately along the back property lines) and the installation of a reactive iron wall at the leading edge of the contaminant plume between Chestnut Street and Walnut Street. The installation of the extraction wells would be within the street right-of-way, flush with the ground surface, with all associated piping and electrical conduit below grade. The collection trench would be backfilled to pre-existing grade, seeded, and restored back to lawn. A collection sump would exist at one end of the trench with the only visible evidence of the system being a manhole flush with the ground surface. The reactive iron wall would be backfilled to pre-existing grade and seeded like the collection trench. There would be no visible evidence of the reactive iron wall other than several flush mounted monitoring wells, as there is no active process such as pumping associated with it. With this alternative, groundwater with the highest degree of contamination, generally in the vicinity of Torrance Place, would be extracted through the pumping wells and the collection trench, and then treated in a plant located on the Gowanda Electronics property as discussed in Alternative 3 above. Also as discussed for Alternative 3, enhancement using either surfactants or cosolvents may be implemented if operational data indicate a DNAPL is present. Pumping from beneath Torrance Place is expected to create a zone of influence that would extend northward to approximately beneath the homes on the north side of the street, and southward to meet and compliment the current zone of influence resulting from the on-site pumping well. Contaminated groundwater beyond the influence of the pumping wells that would be beneath Torrance Place would continue to migrate north to be intercepted by the collection trench. The hydraulic zone of influence of the collection trench would be controlled to work with the pumping wells to efficiently remove contaminants and to ensure contaminants are not drawn northward beneath the residences on the north side of Torrance Place. For cost estimation purposes, the extraction system, including the wells and collection trench, has been conservatively estimated to generate 100 gallons per minute of groundwater. Contaminated groundwater beyond the northern influence of the collection trench would continue to migrate northward and be intercepted by the reactive iron wall, where the reaction described in Alternative 4 would occur and allow treated groundwater to emerge out of the north side of the wall.

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 primary SCGs for the AVM-Gowanda site relate to groundwater, specifically 6NYCRR Part 700-705, Water Quality Regulations for Surface Water and Groundwater and NYSDEC Division of Water TOGS 1.1.1. The no further action alternative would not meet SCGs since significant concentrations of contaminants would remain in the groundwater. SCGs for groundwater would be met with varying time frames under the remaining alternatives. Since they would be injected into the aquifer, selection of specific cosolvents or surfactants would be based on compliance with SCGs for groundwater. Engineering controls would be employed to ensure SCGs for emissions and soils were met during construction of all alternatives.

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.

The no further action alternative would not be protective of human health or the environment within an acceptable time frame. The remaining alternatives would actively address the contamination and would be protective of human health and the environment through either removal and/or destruction of contaminants. For in-well air stripping, published data suggest remediation could be expected within 7 to 10 years, pump and treat historical data suggest up to 30 years or more may be necessary. If DNAPL remains in the subsurface as a continuing source of contamination, as suspected, the cosolvent or surfactant enhancement would be necessary to meet or possibly shorten these time expectations. Reactive iron wall remediation time would be dependent on the natural velocity of groundwater flow, which varies throughout the plume, the degree of the saturated soil's ability to adsorb contaminants, and the number and spacing of walls installed. The combined groundwater extraction and reactive iron wall alternative would still provide for the DNAPL enhanced recovery if necessary.

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.

The no further action alternative would cause no increased short-term impacts since no intrusive work would take place.

All the alternatives except the no further action alternative would involve the handling of contaminated media. These actions could potentially impact worker health and safety, the environment, and the local community. Groundwater extraction would have limited potential for worker exposure, since the only intrusive activity into contaminated media would be the installation of wells. In-situ air stripping would have slightly greater potential for worker exposure due to the need to excavate the infiltration basins at each well location. Subsurface work for either of these alternatives associated with power supply and plumbing are not expected to have any significant impact due to the relatively shallow depth and distance from the water table, however continuous monitoring would be performed during construction. Reactive iron walls would involve more extensive soil handling, since contaminated soil would be excavated and hauled off-site during installation. However, the use of engineering controls would minimize and/or eliminate any possible impact during excavation. These controls would include air monitoring, personal protective equipment, and dust suppression measures. Off-site disposal could pose a short-term risk due to possible spilling of contaminated media off site. This could be mitigated by properly covering contaminated media and by establishing proper emergency spill response measures.

The no further action alternative would require access to private property, rights of way, and public streets for continued monitoring of groundwater and indoor air. The remaining alternatives would also require access to these properties not only for monitoring, but for construction activities involving heavy equipment.

The length of time over which short-term impacts would occur would be approximately six to nine months during construction of these alternatives. Again, it should be possible to control these impacts through the use of engineering controls.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation.

The no further action alternative would allow the continued migration of contaminants through groundwater and from the groundwater into basements in vapor form. The remaining alternatives would be effective by immediately reducing contaminant concentrations through removal and/or destruction of the chemical compounds. Because the DNAPL, if present, would be addressed and the groundwater treated, the enhanced groundwater extraction system would provide the highest degree of effectiveness and permanence. The combined groundwater extraction and reactive iron wall alternative would utilize enhanced groundwater extraction in the area of highest contamination where it is needed most.

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. With the no further action alternative, there would be no active reduction in the toxicity, mobility, or volume of waste. In-situ air stripping, groundwater extraction, and reactive iron walls all would reduce toxicity

through the reduction in contaminant concentration; would reduce mobility through either recovery or the interception of contaminated groundwater; and would reduce volume through the actual removal or destruction of contamination from the aquifer. However, the ability of in-situ air stripping wells or groundwater extraction wells to reduce mobility are dependent on the spacing of the wells to ensure an overlapping of the zones of influence, whereas the reactive iron wall or collection trench would be more effective since it would be installed over the entire cross section of the contaminated portion of the aquifer. The goal of the groundwater extraction enhancement with cosolvent and surfactant would be to increase mobility of contaminants only once the groundwater extraction system demonstrates a zone of influence sufficient to capture the contaminated groundwater. Since DNAPL is a separate phase chemical product, enhanced groundwater extraction would provide a higher efficiency rate of reduction in toxicity and volume.

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.

The no further action alternative would be the easiest to implement, since no construction would be necessary. The remaining alternatives require substantial construction in a residential area, including private property, and therefore require additional considerations for implementation. Groundwater extraction systems are readily available from numerous contractors and are relatively easy to construct using standard well and associated utility installation procedures, but would require routine maintenance which would require continued long term access to private property. Additionally, once installed, each well would have a subsurface vault and manhole cover, which would not be expected to cause concern if constructed within a street. Wells can be located and installed in public rights of way to easily fit among buried utilities. Groundwater collection trenches are commercially available from several vendors and are relatively easy to install,involving either conventional excavation of a trench or the use of "one pass" system. The "one pass" system excavates and simultaneously places piping and select material to the desired depth.

Implementation of the groundwater extraction enhancements would be straightforward, involving the injection of a cosolvent or surfactant into the aquifer at the head of the plume utilizing wells already installed on the Gowanda Electronics property.

In-situ air stripping systems require construction techniques similar to groundwater extraction systems (wells), however their commercially availability is very limited. This limitation has resulted in actual costs reflected in bids on similar sites to be ten times more expensive than an engineer's estimate, and several times more expensive than comparable pump and treat systems. Due to the limited availability of the technologies, the State's procurement process has yet to generate competitive bids for a project and therefore has not been able to secure a contractor to implement a system.

Reactive iron walls are commercially available from several vendors and are relatively easy to install, involving either conventional excavation of a trench or the use of a "one pass" system, depending on site conditions. The "one pass" system excavates and simultaneously places select material to the desired depth. Once in place, reactive iron walls do not require any routine maintenance, only monitoring of groundwater to verify effective treatment of groundwater. Over time, it may be necessary to replace the iron media if it becomes depleted before restoration of the aquifer. Since installation requires a continuous trench from the ground surface, construction would be significantly complicated with buried utilities in public right-of-ways, such as the streets. Reactive walls do not require active handling of groundwater, therefore there are no buried pipes for the transfer of water or electrical conduits for power to pumps.

Due to the limitations cited above, the combined groundwater extraction and reactive iron wall alternative remains the most implementable alternative, with groundwater extraction component in the area that would prove most difficult for reactive iron walls.

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 3.

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.

8. **Community Acceptance** - 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 the placement and construction of the groundwater collection trench. As described below in Section 8, alternative means of accomplishing the function of the collection trench have been explored and will be further evaluated during the remedial design.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based upon the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC is selecting **Alternative 5: Groundwater Extraction in Combination with Permeable Passive/Reactive Iron Wall**.

This selection is based on the evaluation of the five alternatives developed for this site. Each of the alternatives evaluated, except no further action, comply with the threshold criteria. With the exception of the no further action alternative, a comparison of the remaining alternatives resulted in the selection of a combination system consisting of groundwater extraction in the area of highest contamination in the vicinity of Torrance Place and the installation of a reactive iron wall further to the north. This alternative is preferred largely based on implementability and it would have lower impacts to private residential property than any of the other alternatives. The only component of this remedy that would be visible to the public is the treatment building, which would be located on the Gowanda Electronics property. All remaining components of the remedy would be located at or below the ground surface. The remedy will be designed and constructed to split the overall contaminant plume into three smaller sections in order to accelerate the required cleanup time and prevent further migration of contamination.

The first section is comprised of the area between the houses on the north side of Torrance Place and the source area on Gowanda Electronics property. This area currently holds the highest levels of contamination and will be addressed with the extraction wells recovering contaminants from beneath the houses on both sides of the street.

The second section extends from approximately the houses on the north side of Torrance Place to Chestnut Street. Within this section, especially in the back yard area, groundwater contaminant levels drop off significantly from a high of 224 ppm beneath the street down to less than 10 ppm total VOCs along the back property lines. The groundwater collection trench will prevent migration of the high level contamination through this area, to beneath the houses along Chestnut Street. The collection trench will provide the most effective means of terminating any further northward migration of the contaminant plume due to the fact that it will cut across the entire plume, intercepting all preferential flow pathways. The collection trench, especially the proposed location, is the most critical component of the remedy, selected to completely prevent the highest concentration of contaminants from spreading any further and thereby protecting the Chestnut Street area from more significant future impacts. An alternative utilizing vertical extraction wells, instead of the collection trench, would not provide the same degree of certainty for total capture, since it would be unlikely to intercept all preferential flow paths (i.e. the channelized deposits discussed in Section 4.1.1) with a few wells. The collection trench will be expected to reverse the natural northward groundwater and recover contaminated groundwater from the back yard area of the houses on the south side of Chestnut Street. Figure 4 shows the conceptual layout of the remedial system relative to the distribution of groundwater contamination, illustrating the importance of the proposed location for the collection trench.

Since the issuance of the PRAP, as discussed at the public informational meeting, alternative means of accomplishing the groundwater cutoff function of the collection trench have been explored. It must be demonstrated that an alternative method will be capable of achieving the complete hydraulic control and prevention of contaminant migration that is expected from the collection trench before it will be considered as a viable option. Based on preliminary evaluation, it is apparent that horizontal wells can be used in place of the trench. Benefits of using horizontal wells all relate to the installation procedure, requiring less property access and much less disruption at the ground surface. Horizontal wells are drilled into the ground at a shallow angle initially, then controlled horizontally for the desired distance, and re-surface at the opposite end, essentially tunneling beneath surface features such as trees, shrubs, and fences. This eliminates the need for an open excavation such as would be necessary for the collection trench, and also eliminates the need to clear the area of trees and roots, fences, etc. As with the collection trench, manholes would be located at each end, one for maintenance, the other as a pumping station to extract the groundwater from the horizontal wells and transfer it to the treatment facility. In order to achieve hydraulic control, it may be necessary to install two horizontal wells along the same alignment, one along the base of the aquifer with the second located higher in the saturated zone. Horizontal well technology will be further evaluated during the remedial design to ensure it will be as effective as the collection trench originally proposed.

The third and final section extends from Chestnut Street northward to the end of the plume, as shown on Figures 1 and 2. The remaining groundwater containing lower levels of contamination will be allowed to continue northward from Chestnut Street where it will be intercepted and treated as it passes through the reactive iron wall, completing remediation of the contaminant plume.

The natural and induced (from groundwater extraction) hydraulic gradients at the site will play a key role in the efficient achievement of the remedial goals for this project.

While each component of the proposed remedy will provide a high degree of effectiveness, for their respective sections of the plume, selection was largely based on the ability to implement each component with the least amount of disruption to the community. Groundwater extraction wells will be easier to install along Torrance Avenue among the buried utilities and the close proximity to the site will make it easier to transfer the contaminated water to the treatment area on the Gowanda Electronics property via underground piping. The collection trench between Torrance Place and Chestnut Street will be relatively narrow compared to the width of a trench for reactive iron and therefore more implementable, and is located close enough to the site that the transfer of contaminated groundwater can easily be incorporated with the extraction well system. The reactive iron wall will be easy to install north of Chestnut Street. There are no associated buried utilities or active operation of the reactive iron wall, once installed. Enhanced DNAPL removal utilizing surfactants or cosolvents will be employed, if necessary, at the appropriate time. Alternative 5 also provides the highest degree of effectiveness compared to all the alternatives evaluated.

A conceptual design of Alternative 5 is shown on Figure 3.

The estimated present worth cost to implement the remedy is $2,685,000. The cost to construct the remedy is estimated to be $688,000 and the estimated annual operation and maintenance cost for 30 years is $1,997,000.

The elements of the proposed 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 will be resolved.

2. The volunteer will continue operation of the extraction well and air stripper currently in place on the Gowanda Electronics property.

3. Installation of a groundwater extraction system consisting of pumping wells beneath Torrance Place and a collection trench midway between Torrance Place and Chestnut Street. Groundwater will be conveyed back to the Gowanda Electronics property via buried pipe for treatment.

4. Construction of a treatment system consisting of an air stripping unit, air treatment, and DNAPL separator, all housed in a separate sound dampened building constructed on the Gowanda Electronics property.

5. Installation of a reactive iron wall north of Chestnut Street, extending approximately 250 feet in length to intercept the leading edge of the contaminant plume.

6. Implementation of a monitoring system to ensure the effectiveness of the remedy, including groundwater flow conditions, groundwater chemistry, and indoor air quality.

TABLE 1

COMPOUNDS OF CONCERN

Media	Class	Contaminant of Concern	Concentration Range (ppb)	Frequency of Exceeding SCGs	SCG (ppb)
Groundwater	Volatile Organic Compounds (VOCs)	Trichloroethene	ND - 170,000	75/102	5
		1,2-Dichloroethene (T)	ND- 45,000	71/102	5
		1,1,1-Trichloroethane	ND - 1800	30/102	5
		1,1-Dichloroethane	ND - 8100	48/102	5
		1,1-dichloroethene	ND - 1600	11/102	5

TABLE 2

AVM GOWANDA INDOOR AIR SAMPLE RESULTS
Results in parts per billion (ppb)

Media	Class	Contaminant of Concern	Concentration Range	EPA Median Indoor	NYSDOH Median Basement/ 1st Floor	
Indoor Air	Volatile Organic Compounds (VOCs)	1,1,1-trichloroethane trichloroethene cis-1,2-dichloroethene	ND - 11 ND - 25 ND - 6.0	1.8 1.4 NA	0.9 <0.2 <0.25	O.6 <1.0 <0.25

Table 3
Remedial Alternative Costs

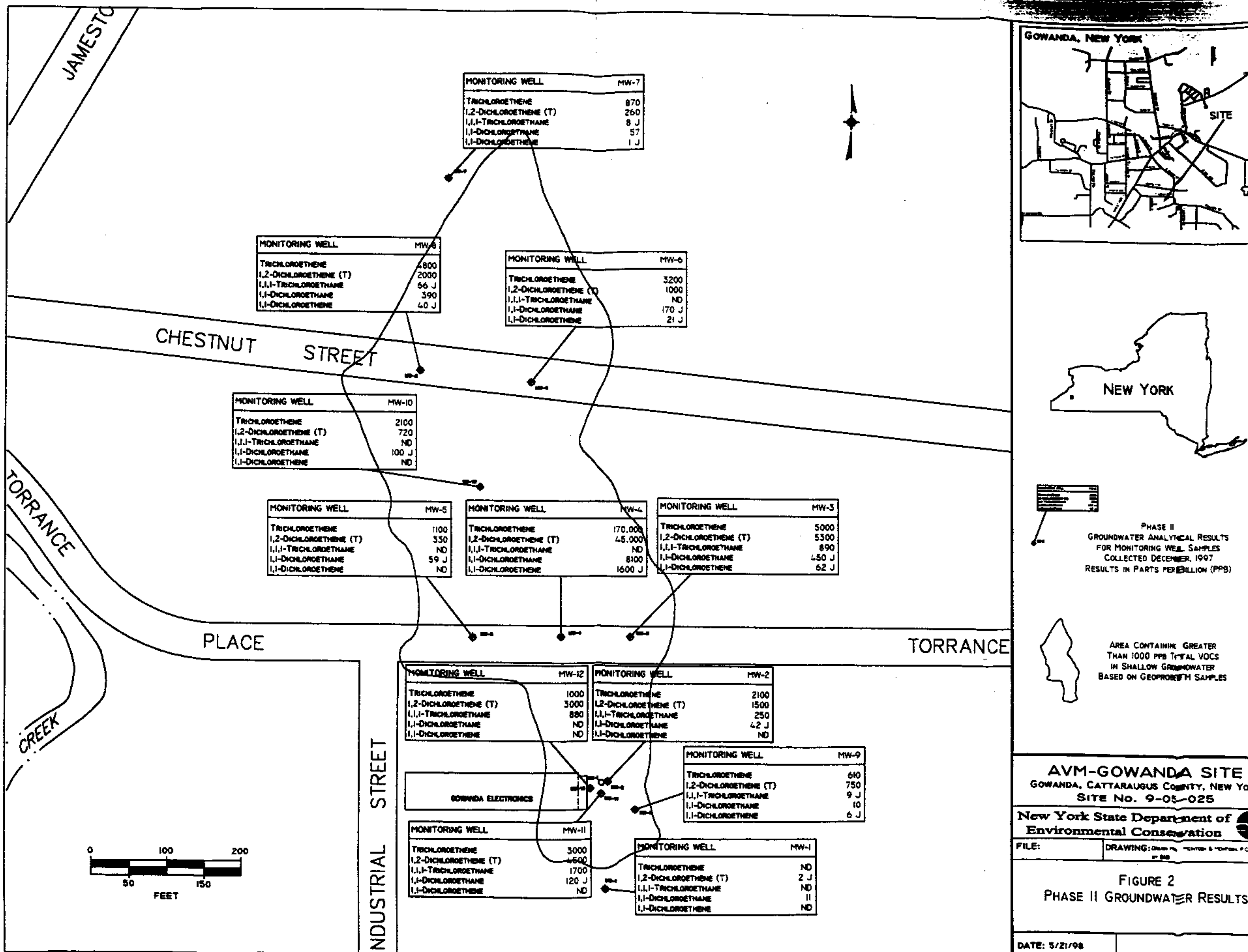
Remedial Alternative	Capital Cost	Annual O&M	Total Present Worth
1 - No Further Action	$0	$30,000 (years 0 - 3) $16,000 (years 4 - 30)	$355,000
2 - In-Well Air Stripping	$2,343,000	$121,000 (years 0 - 3) $95,000 (years 4 - 10)	$3,223,000
3 - Groundwater Extraction w/Air Stripping	$485,000	$124,000 (years 0 - 3) $104,000 (years 4 - 30)	$2,582,000
4 - Permeable Passive/ Reactive Iron Walls	$3,709,000	$46,000 (years 0 - 3) $20,000 (years 4 - 30)	$3,937,000
5 - Groundwater Extraction in Combination with Permeable Passive/Reactive Iron Walls	$688,000	$124,000 (years 0 - 3) $98,000 (years 4 - 30)	$2,685,000

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.
- Fact Sheet was sent to the mailing list in April 1997 announcing the start of the Remedial Investigation and a Public Information Meeting scheduled for April 28, 1997 to discuss the RI process.
- Fact Sheet was sent to the mailing list in April 1997 announcing the postponement of the April 28, 1997 Public Information Meeting.
- Fact Sheet was sent to the mailing list in May 1997 announcing the rescheduling of the Public Information Meeting to be held on May 21, 1997.
- Public Information Meeting held in the Village Hall on May 21, 1997 to explain RI activities planned for the site.
- Fact Sheet was sent to the mailing list in August 1998 containing a summary of the RI and a Public Information Meeting scheduled for August 19, 1998 to discuss the results.
- In addition to the CP correspondence and events listed above, the NYSDEC and NYSDOH have sent letters to residents informing them of monitoring data generated from samples collected on their property as it became available. If their property had been impacted by contaminants from the site, they were advised accordingly with regard to appropriate precautions.
- Fact Sheet was sent to the mailing list in October 1998 announcing additional field activities for later that month, consisting of the 3D Seismic Reflection Survey.
- Fact Sheet was sent to the mailing list in June 2000 announcing the availability of the PRAP.
- Meeting Notice was sent to the mailing list in June 2000 announcing a Public Information Meeting scheduled for June 28, 2000 for a presentation of the PRAP.
- Public meeting held on June 28, 2000 for presentation of the PRAP.
- In February 2001 a Responsiveness Summary was prepared and made available to the public, to address the comments received during the public comment period for the PRAP.


JAMESTO
CHESTNUT STREET
TORRANCE
PLACE
TORRANCE
CREEK
INDUSTRIAL STREET
GOWANDA ELECTRONICS
767.0
768.0
769.0
770.0
771.0
772.0
0 50 100 150 200
FEET
SITE
NEW YORK
AREA CONTAINING GREATER THAN 1 PPM TOTAL VOCs IN GROUNDWATER BASED ON GEOPROBETM SAMPLES
GROUNDWATER ELEVATION CONTOUR LINE MEASURED DURING PUMPING CONDITIONS JANUARY 23, 1998
GROUNDWATER FLOW DIRECTION
AVM-GOWANDA SITE
GOWANDA, CATTARAUGUS COUNTY, NEW YORK
SITE No. 9-05-025
New York State Department of Environmental Conservation
FILE:
DRAWING:
FIGURE 1
EXTENT OF GROUNDWATER PLUME AND GROUNDWATER FLOW PATTERN
DATE: 5/21/98



AVM-GOWANDA SITE
GOWANDA, CATTARAUGUS COUNTY, NEW YORK
SITE No. 9-05-025

New York State Department of Environmental Conservation

FILE:
DRAWING:

FIGURE 2
PHASE II GROUNDWATER RESULTS

DATE: 5/21/98

AVM-GOWANDA SITE
GOWANDA, CATTARAUGUS COUNTY, NEW YORK
SITE NO. 9-05-025

New York State Department of Environmental Conservation

FILE:
DRAWING:

FIGURE 3
CONCEPTUAL LAYOUT OF REMEDIAL SYSTEM

DATE: 5/21/98

AVM-GOWANDA SITE
GOWANDA, CATTARAUGUS COUNTY, NEW YORK
SITE No. 9-05-025

New York State Department of Environmental Conservation

FILE: | DRAWING:

FIGURE 4
CONCEPTUAL LAYOUT OF REMEDIAL SYSTEM RELATIVE TO CONTAMINANT DISTRIBUTION

DATE: 5/21/98

Appendix A

RESPONSIVENESS SUMMARY

AVM-Gowanda Site
Proposed Remedial Action Plan
Persia (T), Cattaraugus County
Site No. 9-05-025

The Proposed Remedial Action Plan (PRAP) for the AVM-Gowanda Site, was prepared by the New York State Department of Environmental Conservation (NYSDEC) and issued to the local document repository on June 7, 2000. This Plan outlined the preferred remedial measure proposed for the remediation of the contaminated groundwater at the AVM-Gowanda Site. The preferred remedy is **Groundwater Extraction in Combination with a Permeable Passive/Reactive Iron Wall.**

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 June 28, 2000 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 Mr. Musacchio, Village Attorney for Gowanda, Ms. Sheibley, Village Board member and resident of Gowanda, Mr. Rabideau, PhD, P.E., University at Buffalo, and Mr. Schaack, Gowanda Electronics with comments prepared by their consultant, Benchmark Environmental Engineering and Science (Benchmark). The public comment period for the PRAP ended on July 12, 2000.

This Responsiveness Summary responds to all questions and comments raised at the June 28, 2000 public meeting and to the written comments received.

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

Question 1: How long will it take to build?

Response 1: Once the remedial design (RD) is complete, the actual construction of the remedy is expected to require six to nine months to complete.

Question 2: How long will it have to operate?

Response 2: Pump and treat systems, of which there are many across the State, are typically designed to operate for 30 years according to USEPA recommendations based on computer modeling and operational histories of pump and treat systems currently in place. Site characteristics vary widely and directly affect the efficiency and operation period of pump and treat systems. It is expected the AVM-Gowanda site can be remediated in significantly less time with the multiple component approach utilizing extraction wells, collection trenches and reactive iron wall. The effectiveness of the remedial system will be closely monitored. The remedy will be designed so that if the data show the remedial goals have been accomplished in a specific area, operation of the remedial component addressing that area could be terminated.

Question 3: Wouldn't it be cheaper to buy a couple houses, knock them down, drill one big well and just pump that one well hard?

Response 3: No. Acquisition and demolition of houses in the neighborhood is not necessary and would not have any benefit towards enhancement of the remediation of the groundwater contaminant plume.

Recovery of contaminated groundwater from an unconfined aquifer such as the one beneath the site relies in large part on the natural flow of groundwater. A single pumping well in hydrogeologic settings such as those found at the site reach a state of equilibrium relatively quickly with a limited zone of influence or recovery area. As such, a single pumping well would be incapable of recovering groundwater from the entire width of the plume, regardless of the size or pumping rates. The conceptual layout of the remedial system was based on dividing the contaminant plume into three sections in order to take advantage of the natural groundwater flow and accelerate cleanup.

Question 4: So that other well isn't doing any good?

Response 4: This question is in reference the recovery well currently operating on Gowanda Electronics property. The well has been achieving its primary goal of containing and/or removing contaminants from the Gowanda Electronics property source area and continues to be effective. This well has been pumped at its maximum rate for over two years, establishing a steady zone of influence approximately half way to Torrance Place. As stated in the previous response and as evidenced with the observations at this recovery well, a single well in this hydrogeologic setting can only achieve a limited area of influence. It was never intended to address the entire groundwater plume nor would it ever be capable of doing so.

Question 5: Will we ever get a clean bill of health?

Response 5: The Human Exposure Pathway Analysis completed as part of the Remedial Investigation did not identify any current routes of exposure to contaminants at levels that warrant a health concern. Once the remedial system is constructed and operating, contaminant levels within the subsurface will begin to drop, reducing the potential for exposures.

Question 6: Who in their right mind would want to buy a house here?

Response 6: In the recent years since this project has been active, several real estate transactions have taken place along Torrance Place. It is recognized that the decision to move into the neighborhood could be impacted by the presence of contamination resulting from a listed inactive hazardous waste site. The facts that the area is served by a municipal water supply, the contamination is at depth within the aquifer, and that there are no olfactory or visual signs of contamination, all contribute to the home buying activity in recent years. Active remediation of the contaminant plume should further support property values.

Question 7: Wouldn't it be faster to construct the system if you bought the houses?

Response 7: No, the procedure for the State to acquire property is a time consuming and complicated process. If there were a compelling reason to acquire property for the implementation of the remedy, which there is not (see response 3 above), the overall time frame to design and construct the remedy could potentially double.

Question 8: Is it possible for the State to buy the houses and build a plant there or something?

Response 8: There are mechanisms for the State to acquire private property in rare cases where it is necessary to do so. However, since there are no benefits to the remedial system through acquiring property, the State will not seek to purchase homes in the area.

Question 9: How extensive is the aquifer and how much of it is contaminated?

Response 9: The shallow (water table) aquifer studied during this RI is thought to extend over most of the Cattaraugus Creek valley from the site northward throughout most of the Village of Gowanda. Core samples collected confirmed the presence of the aquifer over the entire study area as depicted in the RI report. The contaminated portion of the aquifer extends from the source area located on the Gowanda Electronics property, northward approximately 1150 feet, spreading to its widest point along Chestnut Street, where it is about 450 feet wide (east to west). Due to the physical characteristics of TCE, contaminant concentrations are higher at the base of the aquifer, however, contamination is present throughout the full thickness of the saturated zone.

Question 10: How comfortable are you that you have clearly defined the contamination plume?

Response 10: The approach of using a small, mobile, geoprobe rig for groundwater sampling and on-site analysis provided for a high degree of confidence in delineating the nature and extent of contamination. The immediate analysis of the sample allowed the project manager to determine the next appropriate sampling location and have the results for that location within minutes. Sampling started in the area of known contamination (source area), working outward. As contaminants were identified at a given location, the next location was selected further from the source, until a clean sample location was found. The next sampling location was then selected between the clean location and the last one known to contain contamination. This process was repeated as necessary until the entire groundwater contamination plume was mapped in detail.

Question 11: If you grow a garden, is there a concern?

Response 11: No, contamination is found in the groundwater at depths of approximately 8 feet, below the reach of vegetable root systems.

Question 12: If you watered the garden from a well, is there a concern?

Response 12: From the standpoint of TCE uptake by the plants, there is no concern. However, due to the potential for TCE to volatilize from the water during spraying and due to the potential for direct contact of contaminants to the skin, recommendation have been made to use the public water supply rather than shallow well points for applications such as garden irrigation, car washing, etc.

Question 13: The water is moving faster by Chestnut Street?

Response 13: The aquifer thickness decreases in the area of Chestnut Street, therefore in theory groundwater would be moving at a higher velocity through this area, all other parameters being equal. Hydraulic conductivity and hydraulic gradient, two components used to calculate groundwater flow velocity, were determined from measurements at 10 monitoring well locations across the study area, resulting in an average value for flow velocity over a relatively large area.

Question 14: Is this plume going to show shrinkage in area or concentration?

Response 14: Once the system is operational, it is expected that concentrations will decrease significantly at first, which will result in a decrease in the overall size of the plume.

Question 15: Is it safe to have fruit trees?

Response 15: Some types of trees, such as the poplar, can absorb contaminants like TCE from water in their root zone. We do not know if fruit trees absorb groundwater contaminants. If you have fruit trees on your property, you may wish to avoid eating the fruit until the groundwater treatment system returns groundwater contamination to acceptable levels.

Question 16: What are the chances of the ground settling as you draw the water out?

Response 16: Based on the physical geologic properties of the aquifer, the relatively small (thin) zone of saturation, and the operational histories of pump and treat systems in similar geologic settings, there are no concerns with subsidence resulting from the extraction of groundwater.

Question 17: You were going to put indoor testing; my house has a dirt basement, will you be testing my house?

Response 17: Houses to be monitored and the frequency of sampling will be determined during the Remedial Design phase of the project.

Question 18: With it taking 2 years to implement the remediation, will the plume get wider by then?

Response 18: The contaminant plume boundary is thought to be in a state of equilibrium due to chemical and hydrogeologic properties. The plume has been studied for a relatively short time period compared to the overall span since contaminants are reported to have been disposed to the ground surface. Therefore, it is difficult to say with certainty that it is not expanding. However, immediately prior to the design of the remedy, a confirmatory round of sampling (pre-design sampling) will be conducted to ensure conditions have not changed since the last sampling event during the RI. If the plume is determined to have widened or migrated further northward, the remedy design would be modified to address this.

Question 19: The trench, wouldn't it cut a lot of tree roots?

Response 19: Conventional trench excavation would cut or damage the root systems of nearby vegetation including trees. Alternative construction techniques are being explored, including horizontal well installation, that would accomplish the same goals as a conventional trench with much less disruption property in general, including tree roots.

Question 20: Those two wells along Torrence Street, are you going to hook them together? What about the utilities?

Response 20: The two proposed extraction wells along Torrance Place will be connected for discharge to the main influent line to the treatment facility. Piping necessary to accomplish this can be installed to avoid the various underground utilities located along Torrance Place.

Question 21: How long has the contamination been in the ground?

Response 21: Records show the property has been used for various commercial operations since the 1930s, with use as a machine shop from World War II through 1979. It is not known exactly when the deposition of wastes to the ground surface began, however past employees recall such practices occurring in the 1940s.

Comment 21: I worked there in the 40's, it has got to be 50 years at least.

Question 22: How can you say it is not getting wider?

Response 22: It cannot be said with certainty that the plume is not getting wider. The plume has been studied over a relatively short period of time compared to the duration of the plume's existence. As discussed above, it is thought that the plume boundary is currently in equilibrium, and this will be confirmed at the beginning of the remedial design.

Question 23: What is TCE? Why is it dangerous?

Response 23: TCE (trichloroethylene) is a common chlorinated solvent that was widely used in industry as a degreasing agent. It is a clear colorless liquid that will only marginally dissolve in water. TCE is about 1½ times heavier than water, and will sink through an aquifer until it reaches an impermeable barrier such as the glacial till found at the site. Over time, is slowly dissolves in the groundwater and migrates as a dissolved contaminant plume. The dangers of TCE in the environment are primarily health related (see response to the following question).

Question 24: What are the health effects of TCE?

Response 24: TCE causes cancer in laboratory animals exposed to high levels over their lifetimes. Chemicals that cause cancer in laboratory animals may also increase the risk of cancer in humans who are exposed to lower levels over long periods of time. Some limited data from studies of people who ingested this and other chemicals in drinking water suggests, although inconclusive, that exposure to TCE in drinking water may increase the risk of cancer in humans.

TCE also produces noncarcinogenic toxic effects, primarily to the liver, kidneys and nervous system. Chemicals that cause effects in humans and/or animals at high levels of exposure may also pose a risk to humans who are exposed to lower levels over long periods of time. Although the risks of noncarcinogenic effects from past and present exposures are not completely understood, the existing data suggest that they would be minimal for exposure to TCE.

Question 25: Is there an easy, cheap way for someone to monitor their homes themselves?

Response 25: The State is not aware of any testing device to monitor for TCE available to the homeowner, such as those available for radon testing for example. The testing performed during the RI and planned during the operation of the remedy requires specialized equipment and laboratory analysis for accurate measurement, and therefore can be quite expensive. The houses selected during the RI were based on their proximity to the highest concentrations of groundwater contamination, the rationale being that if they did not exhibit significant impacts, then houses over much lower concentrations would not be adversely effected.

Question 26: Is there any way for people to reduce their exposure?

Response 26: The two primary means by which a resident could be exposed to the contaminants are through inhalation of vapors in indoor air (concentrations detected to date are below health guidance levels) and direct contact or inhalation of vapors during use of the groundwater. Recommendations have been made to use only the municipal water supply for all uses, rather than using a private well. Additionally, if there are concerns with indoor air quality, leaving some basement windows open slightly to provide cross ventilation would prevent any accumulation of vapors. Houses were tested during the winter to represent a time that it could be expected to find the highest concentrations of contaminants in indoor air due to the likelihood that most windows would be closed, and even then, the houses located over the highest groundwater contaminant concentrations did not exhibit levels that constituted a health concern.

Question 27: When will you put forward the air sampling plan?

Response 27: The air sampling will be a component of the operation and maintenance plan (O&M) to be developed as part of the overall remedial design.

Question 28: The reactive wall, will the air monitoring pay special attention to the wall and the breakdown products from the TCE?

Response 28: The reactive iron wall is to be located at the leading edge of the contaminant plume, beyond the area where air monitoring is warranted as conditions currently exist. The reactive iron wall will be designed to address the calculated breakdown products as well as the compounds found in the plume. The intent of the reactive iron wall is to prevent any further migration of contaminants, including breakdown products, beyond the location of the wall.

Question 29: In the seismic study it states that they think the fissures may come all the way to the surface. Are you paying attention to them?

Response 29: The fractures within the soil structure identified during the seismic study are believed to affect groundwater and contaminant flow direction, and therefore are playing a key role in the selection of groundwater extraction wells.

Question 30: Do you anticipate having to replace the piping in the next 20 or 30 years?

Response 30: All components of the remedy will be designed for an operational life of at least 30 years to minimize the need for replacement.

Question 31: Will the iron wall last the length of the remediation?

Response 31: A number of natural conditions that vary from site to site effect the duration of the reactive iron walls. Additional data will be collected during the remedial design to assess the conditions and calculate the expected useful life of the iron. Monitoring will also be included in the O&M plan to ensure the reactive wall continues to be effective. If monitoring data indicate the wall needs replacement, it will be performed at that time.

Question 32: How do you remove the iron after it is used up?

Response 32: Conventional excavation would be the most likely method to remove the expired iron material.

Question 33: What about flooding, will it have an effect?

Response 33: Flooding would not be expected to have an adverse effect on any of the remedial components as selected. Groundwater extraction rates and resulting discharge volume from the treatment system would be insignificant relative to the flow volumes in the creeks during normal flow, not to mention during flood conditions. The pump and treat system will be designed so that it can be temporarily shut down for O&M or emergency situations, should they occur.

Question 34: Where will the treatment plant be located?

Response 34: It is currently proposed to construct the treatment plant somewhere on the Gowanda Electronics property. Final selection of the treatment plant location will depend on negotiations between the State, Gowanda Electronics, and other potentially responsible parties.

Question 35: Will the discharge go into the storm sewer?

Response 35: It is currently planned that the treated groundwater, which will be required to meet State discharge limits, will be directly discharged to Thatcher Creek via a buried pipeline to be constructed as part of the treatment system. It is possible to utilize storm sewers for such discharge, however it would likely impact the capacity of a sewer pipe to the point that it would need replacement with a larger pipe to accommodate both the treatment plant effluent and still be able to carry storm runoff.

Question 36: How big will the pumping station be on the end of the trench and what will it look like?

Response 36: The actual size of the pumping station will be determined during the remedial design phase of the project. It will be designed to be completely under ground with an access hatch similar to a sewer manhole to allow for maintenance.

Question 37: Can the residents do anything to minimize the current health hazards?

Response 37: As discussed above, avoiding contact with groundwater by using the municipal water supply will essentially eliminate all health hazards associated with the contamination found at depth. With regard to concerns over indoor air, there have not been any impacts identified to date at concentrations that constitute a health concern. Minimal cross ventilation in a basement would reduce any impacts to indoor air.

Question 38: Some of the residents have been here 30 years; is there a past problem?

Response 38: Unfortunately there is no way of determining with certainty the magnitude or extent of contamination at some point in the past. The techniques employed for remedial investigations allow for a determination of current conditions and depending on those conditions, a prediction of what can be expected in the future.

Question 39: Why are you doing anything?

Response 39: Left in place, the high concentrations of contamination associated with the site will provide the potential for exposure and risk to human health and the environment for an indefinite period of time. The remedy, as selected, is intended to remove and prevent further migration of contaminants thus eliminating those potential risks.

Question 40: Have you actually looked for springs?

Response 40: Yes, as the RI progressed and the plume became defined, the area was examined in an attempt to locate groundwater seeps or springs. None were noted during the field activities.

Question 41: In what time frame will the RI of the deep aquifer be done?

Response 41: The deep aquifer will be investigated during the remedial construction phase.

Question 42: There were puddles of water from the rain, could they be contaminated?

Response 42: All contamination identified during the RI was found below the ground surface, primarily below the water table. As such, it is highly unlikely any puddles could be contaminated with the compounds associated with the site.

Question 43: What will happen once Gowanda Electronics sells the property?

Response 43: The requirements of the current on-site remedial efforts as well as those associated with the selected remedy to address the off-site contamination would not be affected by a change in property ownership.

Question 44: Once this is started, you will continue right through until the remediation is complete?

Response 44: Once it has been determined whether the State or the responsible parties will be implementing the remedy, the project is expected to progress from remedial design directly to remedial construction, with operation and maintenance to continue for as long as necessary.

Question 45: Are there any plans that could clean it up quicker?

Response 45: The selected remedy includes provisions to enhance the pump and treat efficiency, based on analytical data from the first year of operation. If contaminant concentrations in the extracted groundwater remain elevated and constant, suggesting a DNAPL source, then an enhancement technology such as surfactants or cosolvents may be used to expedite extraction of the DNAPL. This would not be performed until it could be demonstrated that complete hydraulic control had been established by the recovery wells.

A copy of the letter dated June 9, 2000 from Mr. Musacchio, Village Attorney for Gowanda, is included in Appendix A of this Responsiveness Summary. The letter raised concerns over the discharge of treated groundwater to Thatcher Brook and the implications this could have during a flood event. The issues stated in the letter are addressed in the response below.

Thatcher Brook was selected as the point of discharge for the treated groundwater based on its close proximity to the proposed location of the treatment plant and its capacity to carry the insignificant volume of treated water relative to normal flow conditions. Based on preliminary estimates, the discharge from the treatment plant will be in the range of 30 to 70 gallons per minute, or .07 to .16 cubic feet per second (cfs), while Thatcher Brook could be estimated at 20 cfs under normal flow conditions. These values indicate the contribution from the treatment plant would be less than 1% of the normal flow of Thatcher Brook. In the unlikely event that the discharge is adversely impacting a flood condition, the system can be temporarily shut down until water levels recede. The groundwater must be treated in compliance with Standards, Criteria, and Guidance (SCGs) prior to discharge to surface water, therefore any concerns with contaminants being introduced to Thatcher Brook are addressed.

A copy of the letter dated July 11, 2000 from Ms. Sheibley, Village Board member and resident of Gowanda, is included in Appendix A of this Responsiveness Summary. The letter expressed a preference for a remedial system that would be the least disruptive and still be protective for the community. The letter also includes opposition to the discharge of treated groundwater to Thatcher Brook. The issues stated in the letter are addressed in the response below.

The primary challenge in selecting an effective remedy for the site has always been trying to develop a system that could be constructed in the residential setting of Torrance Place and Chestnut Street with minimal disruption or impacts to the residents. This applies to both the actual construction activities as well as the presence of the resulting structures and associated operational activities. As the process of implementing the remedy progresses from the conceptual design of the remedial system as described in the PRAP to the remedial design, through the actual construction, efforts will continue to minimize inconvenience to the residents. As an example, at the time the PRAP was issued, it was planned to excavate a trench along the back property lines between Torrance Place and Chestnut Street for the construction of the groundwater collection system. However, as explained at the Public Meeting, alternative methods of construction for the groundwater collection system in that location are being considered. Specifically, horizontal drilling is believed to be capable of accomplishing comparable effectiveness with much less impact to private property. This option will continue to be explored as an alternative method.

Please refer to the response to Mr. Musacchio's letter above with regard to the opposition to treated groundwater discharge to Thatcher Brook.

A copy of the letter dated July 11, 2000 from Mr. Rabideau, PhD, P.E., University at Buffalo, is included in Appendix A of this Responsiveness Summary. The letter contained several comments, each followed by questions for clarification. The questions are restated below, with the State's response immediately following each.

Question 1: What is the area characterized by TCE concentrations above the drinking water standard of 5 ppb?

Response 1: The isoconcentration contour lines on the figures throughout the RI and FS, as well as the PRAP, represent total VOCs including the sum of TCE and the associated breakdown products identified in the groundwater. As such, it was never intended to illustrate an area that could be defined as either above or below the groundwater standard for a specific compound such as TCE. That is, the work focused on delineating the total contaminant plume rather than individual compounds. The data used to delineate the plume was generated using an onsite mobile laboratory providing for immediate analysis of the groundwater from a given location. This allowed work to progress outward from the source area until contaminants were no longer detected. This was a labor intensive effort with sample location selection limitations imposed by buildings, utilities, or other access problem. Nonetheless, sufficient data was collected to define the plume with a high degree of precision. For instance, a sample may have yielded results of 250 ppb total VOCs with the next sample only tens of feet outward from the source area showing less than 5 ppb total VOCs or even non-detect. At that point, for the purposes of the RI, it was determined that boundary of the plume lied somewhere between those two close sampling locations. The isoconcentration contour values were selected as a "best fit" to the data.

Question 2: What is the current understanding of the potential long-term health effects associated with breathing air containing elevated levels of TCE?

Response 2: TCE causes cancer in laboratory animals exposed to high levels over their lifetimes. We do not know if TCE causes cancer in humans. Noncarcinogenic health effects from inhalation of TCE include damage to the liver, kidney and nervous system. Most reports of noncarcinogenic health effects in people inhaling TCE involve workers and others exposed to TCE in high concentrations. TCE concentrations in the indoor air of homes sampled in connection with investigations of the AVM-Gowanda site were sometimes above background levels, but well below levels that resulted in health effects in workers or experimental animals exposed to TCE in air. Exposure to TCE in air in these homes poses a minimal risk of adverse health effects.

Question 3: Please delineate the process used to determine what constitutes a "health concern".

Response 3: The State utilizes a qualitative exposure assessment to identify potential health concerns and subsequently establishes the remedial goals for a site. A qualitative exposure assessment consists of characterizing the exposure setting (including the physical environment and potentially exposed human populations), identifying exposure pathways, and evaluating contaminant fate and transport. It 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.

Question 4: Was a baseline risk assessment performed for the site? If not, why?

Response 4: A baseline risk assessment was not performed at this site. A baseline risk assessment is not necessary for the qualitative risk assessments used by the State to evaluate exposure pathways. Rather than perform quantitative risk assessments, which rely on a number of assumptions that may or may not represent actual conditions and therefore has the potential for misleading results, the State utilizes a qualitative exposure assessment to establish the remedial goals for a site. A qualitative exposure assessment consists of characterizing the exposure setting (including the physical environment and potentially exposed human populations), identifying exposure pathways, and evaluating contaminant fate and transport. It 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.

Question 5: What level of reduction in the groundwater concentrations would be considered sufficient to adequately reduce future health risks from the vapor pathway?

Response 6: A specific value for groundwater contamination concentrations cannot be assigned or predicted as protective to the vapor exposure pathway due to the high degree of variability in geology (soil types) at each basement location and the depth of each basement. The approach will be to monitor indoor air quality as system operation continues. The goal of eliminating the potential for inhalation of vapor should be achieved by reducing groundwater concentrations as low as possible.

Question 7: Will the proposed trench location be changed in response to the plume configuration at the time of implementation? If not, how will the objectives of the localized plume containment be affected?

Response 7: Yes, as a initial component of the remedial design a pre-design investigation will be conducted during beginning stages of the remedial design. The purpose of this investigation is to fill any data gaps and to determine whether conditions are similar to those that existed at the time of the FS. Modifications are then made to the remedy, if necessary, to address any changes that have occurred.

Question 8: Please clarify the estimated cleanup time for in-well stripping and the basis for any hypothesized difference with the cleanup time for pump-and-treat.

Response 8: In-well air stripping relies on the aggressive re-circulation of groundwater around the well, providing a flushing effect within the area of influence of the well. Multiple wells are employed as necessary to address the full extent of the plume. Pump and treat, as selected, relies more on the natural flow of groundwater to reach the influence of the pumping well or trench, and therefore is expected to require more time. The time frame included in the FS for in-well air stripping is based on information provided by the vendors of the technology. The time estimate for pump and treat was based on USEPA guidance citing nation wide experience showing pump and treat to be a relatively long term approach to aquifer restoration. The USEPA recommends 30 years as a general baseline for total cleanup time. Splitting the plume into 3 distinct units, however, as shown in the PRAP, is expected to accelerate the cleanup time requirements.

Question 9: Was a cost and feasibility analysis performed on the use of surfactants/co-solvents? If not, what is the likelihood that these enhancements to pump-and-treat could be practically implemented after a remedy is finalized?

Response 9: A cost and feasibility analysis for the use of surfactants or cosolvents was not included in the FS. The potential application of surfactants or cosolvents was included in the FS as an enhancement option after the pump and treat system has been operated for a period of time sufficient to show complete hydraulic control, but that a source of contamination (DNAPL) likely remained in the subsurface. If it is determined such enhancements are appropriate, implementation should be relatively straight forward.

Question 10: Once the remedy is finalized, will there be any future opportunities to consider new remediation technologies?

Response 10: Yes, a remedy is evaluated at least every five years to ensure effectiveness and to consider new technologies that could enhance or even replace the existing system if warranted.

A copy of the letter dated July 10, 2000 from Mr. Schaack, Gowanda Electronics, containing comments prepared by their consultant, Benchmark Environmental Engineering and Science (Benchmark), is included in Appendix A of this Responsiveness Summary. The letter contained several numbered, multipoint comments on the FS and PRAP. The State's response to each point is provided below according to the corresponding comment number. Please refer to Appendix A for the text of each comment.

Response to Comment No. 1: The FS was prepared in large part according to the guidance presented in the USEPA Directive 9283.1-12, Presumptive Response Strategy and Ex-situ Treatment Technologies for Contaminated Ground Water at CERCLA Sites, (Directive) consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The Directive was developed to streamline the selection of remedial technologies and shift the time and resources employed in remedy selection to other more fundamental aspects of the groundwater remedy. The presumptive remedy strategy accomplishes this through recommendation of remedial alternatives that have been shown effective and appropriate at sites of similar characteristics, reducing the level of detail otherwise required for the "Detailed Analysis of Alternatives". The FS was developed in accordance with the Directive's expectations and objectives, including that even in the event that it may not be practical to restore the groundwater to "beneficial uses", it is expected to prevent further migration of the contaminant plume. The conceptual design of the selected remedy, separating the contaminant plume into three distinct sections, was developed to accomplish the goal of eliminating the continued migration of contaminants northward through the residential neighborhood in an efficient and effective manner. This approach is consistent with the Directive's recommendation to address groundwater contamination sites with a pump and treat system.

Rather than perform quantitative risk assessments, which rely on a number of assumptions that may or may not represent actual conditions and therefore has the potential for misleading results, the State utilizes a qualitative exposure assessment to establish the remedial goals for a site. A qualitative exposure assessment consists of characterizing the exposure setting (including the physical environment and potentially exposed human populations), identifying exposure pathways, and evaluating contaminant fate and transport. It 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. Based on the findings of the RI, the results of the exposure assessment, and the remedial goals developed for the site, remedial alternatives are developed and evaluated against the criteria specified in the NCP and 6NYCRR Part 375. The selected remedy was selected based on its meeting all of the criteria. It was evaluated to be the most effective method of achieving the primary goal of eliminating the potential for direct exposure through inhalation of vapors in basement air by preventing the highest concentrations of contaminants from migrating to Chestnut Street, where it is anticipated residences would have a higher susceptibility to vapor impacts from the contaminated groundwater. Additionally, residences where such impacts have been documented will have a reduction in risks associated with the vapors due to the pump and treat system removing contaminants from the aquifer and therefore reducing concentrations in the groundwater.

Groundwater modeling was performed at the conceptual model level for this site, consistent with the Directive. Computer modeling of the groundwater conditions is often applied during the FS stage at sites with less hydrogeologic complexity. However at sites such as this, the high degree of complexity requires many assumptions and estimations of hydraulic properties that may or may not represent actual conditions, resulting in a computer simulation that may be inaccurate. Such results, which commonly do occur, are of no value for developing remedial alternatives, yet requires significant effort to complete. The conceptual model developed for this site provided the level of detail necessary to derive remedial alternatives appropriate for achieving the RAOs. It may be appropriate during the operation and maintenance stage of the project to apply computer groundwater modeling to fine tune and increase the efficiency of the system. At that time, more data will have been acquired though the construction and startup phases of the remedy, allowing the modeler to better represent actual conditions.

Response to Comment No. 2 - The No Further Action alternative was developed and carried through completion of the FS, consistent with the NCP to serve as a baseline to compare other remedial alternatives throughout the detailed analysis. Based on the RI, the remedial action objectives (RAOs) for this site included "Reduce, control, or eliminate to the extent practicable, the continued migration of contaminated groundwater and suspected DNAPL throughout the residential area north of the site". Because the no further action alternative would leave the site in its present condition, with significant concentrations of VOCs in the groundwater migrating beneath houses in the neighborhood to the north, it was determined this alternative would be ineffective toward accomplishing this goal and therefore not be protective of human health or the environment, especially compared to the remedial alternatives carried through the detailed analysis.

The time frame of 30 years for pump and treat alternatives is recommended by the USEPA based on the experience gained over the span of the Superfund program. This time frame was used to develop a consistent basis for a comparative analysis of costs for the various pump and treat alternatives. The 30 year period may or may not accurately represent the actual time frame required to achieve the RAOs. As discussed in detail in the FS and the PRAP, the approach of breaking the plume into 3 units, each addressed with a specific remedial technology (extraction wells, collection trench, reactive iron wall), was developed to accelerate the cleanup and provide containment of the migrating plume in an efficient manner. Due to the complexity of the hydrogeologic setting at the site, numerous assumptions for the various hydraulic properties would be required to attempt to calculate the time to reach the RAOs (see groundwater model discussion above). Using such assumptions would, at best, only result in the determination of a wide range for the expected cleanup time. Operational data once the system is in place will provide the best information for determining the required time for cleanup, as well as provide information for fine tuning of the system to increase efficiency.

The RAO of reducing or eliminating the continued migration of contaminated groundwater and suspected DNAPL requires action as soon as practical. Once the remedy is in place and operating, progress toward reducing the continued migration of contaminants will begin, reducing risks that have been predicted if the high concentrations of contaminants currently beneath Torrance Place were allowed to migrate to Chestnut Street. This cannot be said for the no further action or monitored natural attenuation alternatives, as both would leave the site in its current condition with the contaminants migrating northward.

Monitored natural attenuation (MNA) and no further action were eliminated largely based on their lack of protection of human health and the environment and their inability or ineffectiveness for achieving compliance with SCGs. While it is recognized that the recommended remedy may not achieve strict compliance with SCGs, it is important to note that it was selected due to its capability to provide containment of the plume and through removal of contaminants from the environment, to mitigate or eliminate the completed public health exposure pathway of TCE vapors in homes, and to provide a higher degree of effectiveness toward compliance with SCGs. Furthermore, USEPA guidance states that MNA is inappropriate at sites where a source of contamination or DNAPL is suspected, and consistent with the NCP, expects source control and prevention of continued plume migration to be a component of the remedial measures. Due to the extraordinarily high concentrations of VOCs and suspected DNAPL beneath Torrance Place beyond the influence of the current on-site groundwater extraction well, it is considered an uncontrolled source of contamination that continues to contribute to the plume with a completed exposure pathway, and therefore MNA was eliminated during the preliminary screening step of the FS.

Response to Comment No. 3 - The High Resolution Seismic Survey was conducted to provide a continuous detailed image of the subsurface, most importantly the till surface and vertical fractures within the till, throughout the study area to better understand the geologic features between the numerous borehole locations. Most subsurface geophysical exploration techniques, including the seismic reflection technique utilized for the High Resolution Seismic Survey, employ a step in the process known as "ground truthing" to determine if the data has been processed correctly through confirmation that the results of the geophysical survey represent actual subsurface conditions. When a discrepancy appears between the geophysical survey results and the ground truthing data, as occurred with the High Resolution Seismic survey, the data collection and processing methods are reviewed to determine if any errors have been made that can be attributed to the discrepancy. A detailed evaluation revealed that a simple, yet significant, error had been made in the computer processing of the data, resulting in the discrepancies identified during the ground truthing step. Corrections were made and the entire data set was reprocessed, yielding the final results that produced an image consistent with the borehole data from the RI and the ground truthing data collected under the observation of Benchmark.

Geoprobe borings were conducted for the purpose of ground truthing, with the primary goal of determining the elevation of the till surface at selected locations. An approach of advancing as many boreholes as possible to determine the top of the till surface at as many locations as possible was employed. A Benchmark representative was present for this two day portion of the survey, as well as geologists from the NYSDEC that had been responsible for the previous RI work completed at the site. Based on the experience acquired during the RI, the contact between the alluvial deposits and the dense silt and clay rich till was easily recognizable, therefore the logging (visual description) of the soils overlying the till was abandoned as an effort to save time and accomplish as many soil borings as possible.

The discrepancy between the original interpretation of the seismic data and the borehole data was discovered when the till surface was observed to be higher than predicted along the backyards on the south side of Torrance Place, just northwest of the source area. The fact that there were no detections of VOCs with field instrumentation or visual and olfactory observations, from soil samples in this area of higher till surface is supported by the explanation presented in the RI that TCE, as a DNAPL, cannot migrate under gravitational forces up the slope of the till surface. However, the High Resolution Seismic Survey, in addition to mapping the surface of the till, also identified numerous vertical fractures within the till that are thought to be capable of transmitting

DNAPL with the properties characteristic of TCE. While it is agreed that migration of TCE has not likely occurred over the high till area described above based on observations and analytical data, the fact remains that very high concentrations of TCE and associated breakdown products exist further north beneath Torrance Place. It is possible that such migration has occurred through a narrow erosional channel within the till to the east of the till high area, or migration has occurred through the fractures identified within the till. In addition to the geoprobe borings conducted in the back yards, borings were also advanced to the top of till near the sidewalk on the south side of Torrance Place, where the depth to till was observed to be significantly deeper (21 feet versus 13 feet in the back yards), and contamination was visible as a sheen within the saturated soil sample, containing an odor and was detected on the field screening equipment at elevated levels. This too, is consistent with observations and conclusions presented in the RI, identifying this area as containing the highest concentrations of contaminants, with strong indication, both by observation of the physical properties of the sample and by analytical results of groundwater, that DNAPL exists along the till surface beneath Torrance Place.

Response to Comment No. 4 - The element of groundwater extraction enhancement utilizing surfactants or co-solvents was discussed throughout the development of the remedy in the FS. It was included in the selected remedy as an option to be considered once the pump and treat components of the remedy had been implemented and operated for a period sufficient to fully understand the hydraulic effectiveness of the system. Furthermore, such enhancements were proposed if, based on analytical data, there is at that time indication that DNAPL persists and therefore removal rates could be improved thus accelerating the overall cleanup time.

Details with regard to the type of surfactants or co-solvents, the concentrations and frequencies of injection, and the methods to deliver them, will be determined once it has been decided such enhancements are necessary. Once the pump and treat component of the remedy is operating, data will be readily available for pilot or bench scale tests to determine the most effective combination of materials to be used and method of employment. In addition to engineering review by the State, vendors specializing in the application of such technologies will be consulted to benefit from their experience at other sites. It may be recommended that injection take place elsewhere within the plume, however, it is premature to determine at this time. The injection of any material into the subsurface must be reviewed for compliance with the applicable SCGs and approved by the State prior to actual use.

The purpose of utilizing surfactants or co-solvents is to increase the mobility of DNAPL so that it can be removed from the aquifer in a more efficient manner, either through physically breaking it loose to move through the pore spaces in the soil, or through increasing the solubility to allow more rapid solution into the groundwater. As explained in the FS and PRAP, the resulting increased mobility is the reason that the surfactant or co-solvent enhancements will not be employed until full hydraulic control of the groundwater has been established through the operation of the pump and treat component of the remedy.

Potential negative impacts to the environment as a result of the injection of surfactants or co-solvents will be carefully evaluated. The overall goal of any remedy is to improve or clean up the environment and reduce or eliminate risks, therefore, if it determined that an intended enhancement would in fact work to the contrary, alternative methods of improving the remedy would be explored.

A quantitative reduction of contaminant mass cannot be calculated at this time. The goal is to increase the rate at which the contaminant mass is removed, reducing the overall time required for the remedy to accomplish adequate cleanup. System operation will be routinely monitored and adjustments made as necessary to maintain optimal performance. The sooner the problem is cleaned up, the sooner the risks to public health are eliminated.

Since the details have not yet been determined, costs associated with the proposed enhancements have not been developed.

Response to Comment No. 5 - Monitoring requirements and methods will be determined in the Remedial Design. These will likely include, at a minimum, the placement of monitoring wells on both sides of the wall to compare hydraulic conditions to ensure groundwater flow is not being obstructed and to compare analytical results to ensure the iron media is effectively reducing contaminant levels.

Response to Comment No. 6 - The wedge configuration of the passive reactive iron wall was placed on the figures in the FS only as a conceptual reference to illustrate its general location relative to the plume and the other remedial components. The size was an estimation based on the understanding of the shape and size of the plume, with the costs associated with the wall consistently applied during the comparison of alternatives. The actual configuration and size will be determined in the RD, with the pre-design sampling activities planned to adequately address data needs to ensure the wall will be effective.

Response to Comment No. 7 - Operational data from the Gowanda Electronics extraction well will be factored into the design of the extraction wells planned for Torrance Place, so that all the wells will operate together as a remedial system. It is not intended to pump the wells along Torrance Place at a rate that would overwhelm the effectiveness of the on-site well, but rather intercept groundwater beyond the influence of the on-site well that continues to migrate northward.

Response to Comment No. 8 - Due to the heterogeneous nature of the alluvial material making up the shallow aquifer, specifically the sand and gravel filled channels, it was determined that a groundwater collection trench would be far superior to traditional pumping wells for the purpose of intercepting all preferential flow paths. The proposed location is critical to the protection of the homes further to the north, especially those along the south side of Chestnut Street. If allowed to continue to migrate further north, the higher concentrations of contaminants within the plume pose a threat to those residences through the indoor air pathway. This is due to the thinning of the flood plain silts and clay that overlie the water bearing alluvial deposits as you move northward. The flood plain deposits are apparently of sufficient thickness along Torrance Place to retard the migration of vapors upward into the basements, whereas they may not be along Chestnut Street if concentrations of contaminants are allowed to increase. By cutting off as much groundwater flowing northward as possible, the collection trench will provide the greatest degree of protection for human health. Since the issuance of the PRAP, and as discussed at the Public Meeting on June 29, 2000, horizontal wells have been explored as an alternative to the collection trench. Further evaluation is necessary to ensure the same degree of protection can be achieved using horizontal wells. Minimizing the disruption to the community and more specifically the affected property owner, is a significant consideration to the Department. Horizontal wells if deemed technically feasible, would most likely be a favorable approach to this end. Access with heavy equipment would be minimized with horizontal wells if selected, and would be negotiated with the affected property owners at the appropriate time. Alternatively, if the collection trench is selected, efforts would be made to minimize short term disruption and restore properties to this current condition.

Response to Comment No. 9 - The property currently occupied by Gowanda Electronics is the sole industrial property in the vicinity of the plume and the property from which the contamination originated. Further, an extraction well and treatment system are already housed on this property. On this basis this parcel is viewed as the optimal location for the treatment plant, and no other locations have been considered for the proposed treatment plant. There is, however, flexibility regarding the location and style of the building on the property to the extent acceptable to the adjacent residential community.

Response to Comment No. 10 - USEPA guidance states that for the purpose of detailed analysis of alternatives in the FS a cost estimate with a range of -30% to +50% is expected. The important aspect at the detailed analysis stage is that a consistent level of cost estimate detail is applied to each alternative to provide for a consistent comparison. This approach was applied in the FS. The list of capital cost items included under this comment largely represent details typical of the remedial design phase, at which time cost estimates are refined. To apply this level of detail to each remedial alternative considered in an FS would require each to be carried through at least the preliminary design stage, a significant effort that is not necessary to provide an equitable comparison of costs for the expected life of the remedy. The list includes items that are pertinent to the selected remedy and will be included in the remedial design as appropriate.

Response to Comment No. 11 - Costs for groundwater monitoring report preparation was not included in the FS cost estimate. They will be included during the RD under operation and maintenance.

The same applies to the costs for indoor air reporting. Results will be reported to the NYSDOH, either directly from the laboratory or through a consultant, depending on who is responsible for the operation of the remedy. The NYSDOH will then interpret the results and provide them to the appropriate property owner.

Cost assumptions/estimates for the operation of the remedy were consistently applied as appropriate for the various alternatives. Actual costs and replacement schedules will be included in the RD.

Response to Comment No. 12 - This Record Of Decision represents the Department's technical judgment as to the appropriate remedial program for the off-Site impacts of on-Site contamination. It does not fix liability for the performance of the remedial program and it does not impose any obligations on any person. Such legal issues as may subsequently arise with respect to liability, may be resolved in due course, considering, among other factors, Voluntary Cleanup Agreement index number B9-0507-96-05 between the Department and Gowanda Electronics. Such Agreement provided for the development of a program to address on-Site groundwater contamination. The obligations of Gowanda Electronics relative to the operation of the extraction well and stripper pursuant to that Agreement are defined by that Agreement only to the extent that the operation is pertinent to the remediation of on-Site contamination. The program was designed to effectively mitigate and prevent the further degradation of off-Site groundwater by groundwater flowing from the Gowanda Electronic's property. The current system (extraction well and stripper) has been in operation for several years and it is anticipated that its operation will continue until certain criteria have been reached and maintained to the satisfaction of the Department. Gowanda Electronics is to be commended for its actions and it is hoped that the same spirit of cooperation and concern for the welfare of the public will extend to the full implementation of the off-Site remedial program.

Appendix A
to the
Responsiveness Summary
Comment Letters

JUN 12

BRUCE W. MUSACCHIO
ATTORNEY AND COUNSELOR AT LAW
215 WEST MAIN STREET
P. O. BOX 230
GOWANDA, NEW YORK 14070

VILLAGE ATTORNEY
VILLAGE OF GOWANDA

Phone
AREA CODE 716
532-3351

June 9, 2000

New York State Department
of Enviromental Conservation
Division of Enviromental Remediation
Bureau of Western Remedial Action, Room 348
50 Wolf Road
Albany, NY 12233-7010

Attention: Bradley Brown, Engineering Geologist

RE: AVM-Gowanda Site, Persia (T), Cattaraugus County, Site No. 9-05-025

Dear Mr. Brown:

In your Proposed Remedial Action Plan (PRAP), you show a drain line from a treatment plant on the property of Gowanda Electronics going along Torrance Place to Thatcher Brook. The emptying of the treatment into Thatcher Brook is questioned because of the flood potential of Thatcher Brook in relation to 150-175 houses that are in the Village of Gowanda. This flooding has happened two times in the last 15 years. The chemicals treated are dangerous. The drain should go directly to the Cattaraugus Creek, where the flood potential to the Village is much less.

The Village of Gowanda has a drainage project as part of Townsend Avenue, which could accommodate this line because it is being readied for bid now.

Very truly yours,

Bruce W. Musacchio

Bruce W. Musacchio
Village Attorney

BWM/hw

cc: Village Board Members
Thatcher Brook Flood Task Force
Cattaraugus County Health Department

Village of Gowanda
27 East Main Street, Gowanda, NY 14070
Phone 716/532-3353 Fax 716/532-2938

July 11, 2000

Mr. Bradley Brown, Project Manager
NYSDEC
50 Wolf Road
Albany, New York 12233-7010

Re: AVM – Gowanda Site (9-05-025)

Dear Mr. Brown:

I would like to comment both as a Gowanda Village Board member and resident of Torrance Place, on the Proposed Remedial Action Plan for the AVM-Gowanda site.

My feeling is very strong that the proposed plan should be the best possible combination of remedial systems to eliminate/alleviate the contamination problem. I favor the least invasive, but best, plan for the residents on the affected streets. Cost should not be a determinate for the best remedial system.

I oppose the treated effluent being piped from Gowanda Electronics Corporation to Thatcher Brook.

Sincerely,

Carol A. Sheibley

Carol A. Sheibley

University at Buffalo
State University of New York

Department of Civil, Structural and Environmental Engineering

July 11, 2000

Mr. Bradley Brown
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York, 12233-7010

Dear Brad:

Recently, I have served as a Technical Consultant for the Cattaragus Creek Citizen's Task Force to provide guidance related to the Peter Cooper (federal) Superfund site. During the course of these activities, I was provided the opportunity to review materials related to the AVM site, and I attended the public meeting held in the Village of Gowanda on June 28, 2000. In general, I strongly support the proposed remedy and feel it represents an appropriate use of current technology to protect human health and the environment. In reviewing the relevant documents, I have developed some questions aimed at clarifying certain aspects of the process, as summarized in the attachment. These comments and questions reflect my own views and do not necessarily represent the opinions of the Village or the Task Force.

Sincerely,

Alan J. Rabideau
Associate Professor
Department of Civil Structural and Environmental Engineering
University at Buffalo

Jarvis Hall Rm. 207, Box 604300, Buffalo, NY 14260-4300
Tel: (716) 645-2114 Ext. 2326 Fax: (716) 645-3667

Questions/comments on AVM Remedial Investigation and Feasibility Study

Submitted by Alan J. Rabideau, PhD., PE
Department of Civil Structural and Environmental Engineering
University at Buffalo

Comment
The conclusions of the feasibility study (FS) are reasonable and sensible. Of the currently available technologies, the recommended approach – pump-and-treat plus reactive barrier – is probably the remedy most protective of human health.

Comment
The figures given the remedial investigation (RI) and FS delineate the TCE groundwater plume using concentrations much higher than the drinking water standard of 5 ppb (contours are shown for concentrations of 250 and 1000 ppb). If suitable information is available, it would be useful to delineate the outer limits of the plume in terms of a contour in the 1 – 10 ppb range.
Question
What is the area characterized by TCE concentrations above the drinking water standard of 5 ppb?

Comment
Statements given the RI/FS and public meeting of June 28, 2000, indicate the measured indoor vapor contaminants are "not at levels that pose a health concern" (FS, page 11). My sense is that these statements primarily relate to acute, rather than long-term, health concerns.
Questions
What is the current understanding of the potential long-term health effects associated with breathing air containing elevated levels of TCE? Please delineate the process used to determine what constitutes a "health concern". Was a baseline risk assessment performed for the site? If not, why? What level of reduction in the groundwater concentrations would be considered sufficient to adequately reduce future health risks from the vapor pathway?

Comment
In the public meeting of June 28, it was stated that the current placement of the groundwater collection trench was based on the goal of intercepting a particular portion of the existing plume. However, as was also stated in the meeting, the proposed remedy may not be implemented for an additional period of 2 – 3 years. During this time, it is likely that the targeted portion of the plume will have migrated significantly northward.
Question
Will the proposed trench location be changed in response to the plume configuration at the time of implementation? If not, how will the objectives of localized plume containment be affected?

Comment
One of the remedies considered in the Feasibility Study – in-well air stripping – was described as requiring "7 to 10 years" to achieve cleanup. However, since the fundamental mechanism of removing TCE mass is the same as pump-and-treat (extraction of groundwater), it seems unlikely that the two remedies would differ significantly in the time required to achieve groundwater standards. In my opinion, the 30-year scenario given for pump-and-treat seems much more reasonable. Since in-well-stripping was rejected because of procurement issues, the reader may be left with the mistaken impression that the site could be cleaned up more quickly if these contractual matters could be resolved.
Question
Please clarify the estimated cleanup time for in-well stripping and the basis for any hypothesized difference with the cleanup time for pump-and-treat.

Comment
The FS refers to the possibility of future enhancement to pump-and-treat by surfactant and/or co-solvent flushing. However, these techniques are expensive and involve major technical challenges.
Question
Was a cost and feasibility analysis performed on the use of surfactants/co-solvents? If not, what is the likelihood that these enhancements to pump-and-treat could be practically implemented after a remedy is finalized?

Question
Once the remedy is finalized, will there be any future opportunities to consider new remediation technologies?

GOWANDA® ELECTRONICS

July 10, 2000

Mr. Bradley Brown
Project Manager
New York State Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233-7010

Re: AVM-Gowanda Site
Proposed Remedial Action Plan

Dear Mr. Brown:

Enclosed please find written comments of our consultant on the feasibility study report, proposed remedial action plan, pertaining to the AVM-Gowanda Site, Gowanda, New York, Site No. 9-05-025. These comments are being submitted during the public comment period in response to the NYSDEC proposed remedial action plan. Gowanda Electronics Corporation looks forward to the Department's response to the questions and comments presented.

Very truly yours,

David C. Schaack

Enclosure
cc: Mr. Michael Podd
Public Affairs
New York State Department of
Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14203

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AVM-GOWANDA SITE
GOWANDA, NEW YORK
SITE No. 9-05-025

COMMENTS ON FEASIBILITY STUDY REPORT/PRAP
(June 2000)
Submitted on Behalf of Gowanda Electronics Corporation
Prepared By: Benchmark Environmental Engineering & Science. PLLC
July 7, 2000

COMMENT No.1: 6 NYCRR Part 375 requires, in addition to other factors, due consideration of: the protectiveness of public health and the environment; short- and long-term effectiveness; and reduction of toxicity, mobility, and volume with treatment. The statute also requires proper application of scientific and engineering principles in the selection of a remedy not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The Feasibility Study Report (FS) has not quantified or adequately demonstrated to what extent the recommended alternative will: effectively reduce risks to public health (i.e., alleged impacts to residential indoor air quality); effectively reduce impacts on the environment; or to what extent reduce the mobility or volume of contaminants in the groundwater. The so-called "Detailed Analysis of Alternatives" only superficially and qualitatively addresses these crucial factors. For example, no modeling of collection system efficacy or estimates of contaminant capture are presented for the alternatives. Furthermore, an estimate of the magnitude of residual risk remaining at the conclusion of the remedial activities, as required by the NCP, is not presented. As such, no quantitative comparison of health risk, groundwater quality improvement, or cost-effectiveness can be made among alternatives. For that matter, expectations of indoor air quality improvements and or groundwater quality improvements over time cannot be reasonably determined for the recommended remedy based on this Report. Such shortcomings provide no reasonable basis for the impacted residents and the community, in general, to determine the acceptability of the proposed remedy on a scientific or economic basis as is required by State and Federal law. It is considered standard practice in a Superfund FS addressing groundwater remediation to perform groundwater modeling (hydraulic and/or contaminant transport) to assess the anticipated performance of alternative collection methods. Why was no modeling performed in this case?

COMMENT No. 2: The FS refers only to an "unacceptable" time frame for implementation of the "no action" and "monitored natural attenuation" alternatives. No documentation is presented to support this conclusion. The NCP requires the no further action alternative be developed and the magnitude of associated residual risks be determined. Screening out these alternatives is not consistent with the NCP. Furthermore the Report simply assumes the time to implement the groundwater extraction and treatment alternatives is 30 years without substantiation. How has the Department determined this period, and why is it considered acceptable? How much faster, if at all, is the proposed remedy to the " no action" and "monitored attenuation" alternatives? Alternatively, what are the comparative residual risks of the no further action alternative compared to the recommended remedy after 10 and 30 years? Since the Department acknowledges the recommended remedy may not meet SCGs, how can these alternatives be eliminated on the basis that they don't meet SCGs?

COMMENT No. 3: We strongly disagree with the interpretation of the findings and conclusions of the High Resolution Seismic Survey performed for the NYSDEC and summarized in the FS . The NYSDEC concludes that the data presented in the body of the FS report and Appendix A reaffirms the previous proposed theory (contained in the RI report) of northward migration of the DNAPL. The map of the till surface presented on Figure 41B and our observations of the field work conducted during this survey do not support this conclusion.

As third party observers during the performance of the survey, we noted several key deficiencies with data collection during the survey and a high degree of uncertainty by those performing the work as to the basic understanding of the site geology (previously characterized by the NYSDEC). For example, geoprobe borings were conducted as part of this survey in order to facilitate seismic soundings along the south property lines of Torrance Place homes. The NYSDEC and the contractor (Resolution Resources) did not characterize (log) or field screen the geoprobe soil samples. Benchmark screened (with a photo-ionization detector) and logged soil samples extracted by the geoprobe in the presence of the NYSDEC representatives. A total of 6 borings were completed in an east-west line across the residence back yards; there was not one recorded detection of VOCs by the PID or any visual or olfactory evidence of VOC impact (further details of this investigation are presented in Attachment 2 of the April 21, 1999 letter from Gowanda Electronics to Michael O'Toole of the NYSDEC). If the quantity of DNAPL the NYSDEC indicates has theoretically migrated in a northward direction from the original source area, how can there be no trace of the material in the presumed pathway?

COMMENT No. 4: The recommended remedial alternative superficially discusses the proposed injection of "groundwater extraction enhancements" such as surfactants or co-solvents into the head of the plume utilizing wells already installed on Gowanda Electronics property. This proposed injection process raises several concerns:

- There is no detail with regard to the types of materials, concentrations, frequency/duration and methods to be employed for the proposed injection process. These surfactants or co-solvents may contain pollutants or hazardous substances. Gowanda Electronics is opposed to the release of any pollutants or hazardous substances onto its property.

- These agents are typically injected at the source of the suspected DNAPL. Since the Report fails to adequately prove or document the existence of off-site DNAPL or a migration pathway from the Gowanda Electronics property to the north (refer to Comment 3), what is the mechanism for these agents injected into the plume on Gowanda Electronics property to materially enhance the off-site "liberation" of DNAPL alleged to be located below Torrance Place? Are these agents insoluble and heavier than water or will they be injected with the intent of entering the dissolved phase of the plume?

- What is the potential for negative impacts on the environment due to the injection of these agents? If the type and concentrations for injection have not been established – how can this be assessed? How will it be monitored?

- What is the expected reduction of contaminant mass or public health risks resulting from this proposed action?

- What is the cost of the proposed action?

<u>COMMENT No. 5:</u> The recommended remedial alternative proposes the placement of a passive reactive iron wall to the north of Chestnut Street homes. In the discussion of alternatives contained in the FS Report there is reference to the fact that these walls may require replacement based on physical or chemically induced changes to their permeability. How does the NYSDEC plan to monitor and determine the effectiveness of the reactive wall over time and maintain it's long-term viability?

<u>COMMENT No. 6:</u> The rationale for the configuration (i.e. wedge or inverted "V") of the recommended passive reactive iron wall is not readily apparent. Furthermore the effectiveness of this configuration is questionable as it spans approximately one half of the width of the plume, which will continue to grow with time due to dispersion and diffusion. It appears that this costly element of the remedy will reduce only a small percentage of the contaminant mass potentially not addressed by the other elements of the recommended remedy.

<u>COMMENT No. 7:</u> The recommended remedial alternative provides for the placement of up to three groundwater pumping wells in Torrance Place. Based on the isopotential mapping routinely conducted by Gowanda Electronics, the effectiveness of the existing on-site groundwater pumping system may be adversely impacted by the operation and hydraulic influence of these wells.

<u>COMMENT No. 8:</u> The justification for the groundwater collection trench in terms of material improvement in public health protection or long-term effectiveness is not apparent. More specifically, what is the net improvement in indoor air quality, or contaminant mass removed, or time of implementation from this element or the recommended remedy? Alternatively, wouldn't a series of 4 or 5 vertical collection wells or a horizontal well in this same location be equally effective with much less private property disruption and at a significantly reduced cost? How or where will access of heavy construction equipment (i.e. backhoes, dump trucks, etc.) be provided for construction?

<u>COMMENT No. 9:</u> The proposed groundwater treatment building and the associated untreated and treated groundwater conveyance piping and utilities will cause: significant short-term disruption of Gowanda Electric's operations during construction; continued long-term periodic disruption of operations over the assumed 30-year operating period; and permanently affect the value and potential use of the property. What. if any. alternative locations for the proposed treatment system were evaluated?

<u>COMMENT No.10:</u> The estimated capital costs of the proposed remedial action are significantly understated. Specifically, the following capital cost items appear to be understated or omitted:

- <u>Wells</u>
  - Mobilization/demobilization costs not included for drill rig and crew.
  - Costs for drill rig decontamination not included.

- Costs for containerizing and disposing of drill cuttings not included.
- Well development and development water disposal costs not included.
- Costs to provide electrical service to each well not included.
- Costs for pumping well level indicators not included.
- Costs for groundwater flow regulators (control valves or variable speed drives) to maintain a continuous well draw down not included.
- No costs included for curb boxes at wells.
- Asphalt repair costs not included.

- Groundwater Collection
  - Cost of a second, redundant sump pump not included.
  - Cost of a pump control panel not included.
  - Costs to provide electrical service to sump pumps not included.
  - A 36-inch diameter wet well would be too small to allow access for future maintenance. In addition, sump pump(s) would have to cycle on and off frequently due to the small groundwater storage volume of a 36-inch diameter wet well. A 60-inch diameter wet well would be more appropriate at a higher cost.
  - Costs not included for valves and fittings within the wet well.
  - Costs for excavation and backfill of wet well not included.
  - Unit costs for trench excavation at such depths appear to be understated
  - Costs for sheeting and shoring of trench and/or sump are not included.
  - Trench dewatering and treatment costs during construction are not included.
  - Unit costs for providing, placement, and compaction of gravel or crushed stone are understated.
  - Unit costs for providing and installing 4-inch diameter slotted PVC pipe are understated.
  - No cost provided for transportation and disposal of soil removed from the trench.
  - The quantity of excavated soils is significantly underestimated unless the approximately 10 to 20-foot deep excavation is sheeted or a "one-pass" trenching machine is used. Otherwise excavation and backfill quantities and costs will be much greater.
  - No cleanouts provided on collection trench.
  - Costs for tree and fence removal for access are not included.
  - Costs for restoration of properties (including backfilling, site grading, topsoil, seeding, fence replacement, tree replacement, etc.) not included.
  - No cost for the installation of piezometers and/or monitoring wells to monitor the effectiveness of the collection trench included.
  - Costs for piezometers and/or monitoring wells not included.

- Water Collection

  - Shouldn't the untreated groundwater conveyance piping be double-walled since leakage could release contaminated groundwater outside the plume?
  - Unit costs for sand bedding appear to be understated.
  - Assuming a 2-foot wide trench underestimates the volume of soil to be excavated and the volume of bedding material required. A trench 4 to 6 feet

deep would require sloping, benching, or the use of a trench box which would require the excavation of additional soils.

- No cost provided for transportation and disposal of excess soil removed from the trench.
- Costs for restoration of properties (including backfilling, site grading, seeding, fence replacement, tree replacement, etc.) not included.
- Costs not included for saw cutting existing asphalt pavement.
- Costs for restoration of asphalt paved areas and repair/replacement of sidewalks not included.

- <u>Water Treatment</u>
  - Pumps are shown to be sized to pump between 225 gpm and 525 gpm, but the treatment system is only designed to treat 100 gpm. Will a flow equalization tank be provided and, if so, what is the cost of the tank?
  - Installation and piping costs should be included for the air stripper, oxidizer, and scrubber.
  - Instrumentation costs (eg., level indicators, alarms, flow meters) not included.
  - No evaluation of the alternative treatment methods (i.e. GAC or AOP) is presented. The only rationale presented for the proposed air stripping is that it is used effectively on site by Gowanda Electronics to treat groundwater. While we agree that air stripping is effective, it may not be as cost-effective as AOP or AOP w/stripping, as these alternative technologies for the anticipated flows and contaminant loads, destroy VOCs rather than releasing them to the atmosphere. As such air emission and associated capital and operating costs for emission controls may be reduced for these alternative technologies.
  - Since treatment system will not be staffed full-time, will an auto-dialer alarm system be provided for the treatment process? If so, what is the cost of this system?
  - Is the cost for providing utilities (gas, water, electric, and sanitary sewer) to the building included in the cost estimate?

- <u>Iron Wall</u>
  - Unit costs for trench excavation at such depths appear to be understated
  - Costs for sheeting and shoring of trench not included.
  - Trench dewatering and groundwater treatment costs not included.
  - Does unit cost for iron filings include the required licensing fee?
  - Costs for piezometers and/or monitoring wells not included.

- <u>Disposal</u>
  - As stated previously, quantities of excavated soil appear to be underestimated.

- <u>General Comments</u>
  - No costs included for design of the collection and treatment systems.
  - No costs included for the resident engineering, inspection, and NYSDEC oversight of construction of the collection and treatment systems.
  - No costs included for contractor mobilization/demobilization, insurance, bonding, construction trailers, etc.
  - No costs are included for contingencies.
  - Labor and installation costs, where included, are generally low considering the use of State Prevailing Wage Rates would be required.

COMMENT No.11: The estimated operational and maintenance cost of the proposed remedial action are understated. The following operational and maintenance costs for the proposed remedial action appear to be understated or omitted:

- Groundwater Monitoring
  - Does report labor include preparation of groundwater isopotential and VOC isopleth maps?
- Indoor Air Monitoring
  - How will indoor air monitoring results be reported? What is the cost for the indoor air monitoring reporting? Who will notified of the air monitoring results? Who will provide the residents with interpretation of the results?
- Operation
  - In the electrical costs, does the 15 hp total load include all pumps and treatment equipment?
  - The unit cost for electricity of $0.08/kwh appears to be low for Western New York.
  - The assumption of 2 hours per week for the operator for a direct-discharge treatment system is unrealistic, especially considering travel time.
  - Total maintenance time required is underestimated.
  - No costs have been included for spare parts and equipment replacement over the 30-year project life of the remedy.
  - No costs are included for the heating and cooling the treatment building.
  - No costs are included for treatment system influent and effluent sampling or for preparation of discharge monitoring reports.
  - What is the frequency of replacing the iron filings and the associated costs?

COMMENT No.12: The recommended alternative assumes the current site owner would continue operation of the extraction well and stripper currently in place on the Gowanda Electronics property, for an undetermined amount of time, but potentially 30 years; groundwater would be conveyed back to Gowanda Electronics property via buried pipe for treatment; a separate treatment system consisting of an air stripping unit, air treatment and DNAPL separator, would all be housed in a building constructed on the Gowanda Electronics property; and treated groundwater would be conveyed via buried pipe on Gowanda Electronics property to a sewer access point or Thatcher Creek.

As the Department is aware, the requirements of Gowanda Electronics relative to the operation of the extraction well and stripper currently in place on Gowanda Electronics property is defined by the Agreement entered into between the Department and Gowanda Electronics, effective January 13, 1998. That Agreement does not have Gowanda Electronics implementing, consenting to or being responsible for any of the actions described above. In addition, the Agreement specifically provides that Gowanda Electronics has the right to discontinue operating the extraction well and stripper currently in place if certain criteria are met. The Agreement specifies the criteria for termination, and the rights of Gowanda Electronics related thereto.

The Department cannot by publication of the PRAP, Record of Decision or otherwise, modify the rights or responsibilities of Gowanda Electronics under the Agreement. Given Gowanda Electronics' termination rights, and the fact that none of the assumptions within the proposed alternative are contemplated by the Agreement, the Department does not have the unilateral right to require Gowanda Electronics to continue operating the extraction well and stripper currently in place; provide access for construction; provide land areas for construction and placement of buried piping or the treatment system and building components; or provide other access for OU-2 remedial design or remediation activities. Any such activities are inconsistent with the terms of the Agreement between the Department and Gowanda Electronics, and will cause various short-term and long-term damages to the property and operations of Gowanda Electronics.

APPENDIX B

Administrative Record

The following documents constitute the Administrative Record for the AVM-Gowanda Site Record of Decision.

April 1994	Report of Field Activities at One Industrial Place, Malcolm Pirnie, Inc.
January 1996	Report on Activities, Immediate Investigative Work Assignment, Work Assignment #D002478-33, NYSDEC
January 1998	Voluntary Cleanup Agreement, Index No. B9-0507-96-05
July 1998	Remedial Investigation Report, NYSDEC
February 2000	Final Report Revision 2, Fracture Trace Analysis and 3D High Resolution Seismic Reflection Imaging, Resolution Resources, Inc.
February 2000	Feasibility Study Report, NYSDEC
June 2000	Proposed Remedial Action Plan
June 9, 2000	Comment letter from Mr. Musacchio representing Village of Gowanda
July 10, 2000	Comment letter from Gowanda Electronics
July 11, 2000	Comment letter from Mr. Rabideau representing Cattaraugus Creek Citizen's Task Force
July 11, 2000	Comment letter from Village of Gowanda
March 2001	Responsiveness Summary for Remedial Investigation/Feasibility Study and Proposed Remedial Action Plan (Appendix A of the ROD)