Little Valley Superfund Site

Cattaraugus County, New York

EPA

Region 2

June 2005

PURPOSE OF PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered for the contaminated soil and groundwater at the Little Valley Superfund site (Site), and identifies the preferred remedy with the rationale for this preference. This Proposed Plan was developed by the U.S. Environmental Protection Agency (EPA) in consultation with the New York State Department of Environmental Conservation (NYSDEC). EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, and Sections 300.430(f) and 300.435(c) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The nature and extent of the contamination at the Site and the alternatives summarized in this Proposed Plan are described in the January 2005 remedial investigation (RI) report and April 2005 feasibility study (FS) report, respectively. EPA and NYSDEC encourage the public to review these documents to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted at the Site.

This Proposed Plan is being provided as a supplement to the FS report to inform the public of EPA's and NYSDEC's preferred remedy and to solicit public comments pertaining to the remedial alternatives evaluated, including the preferred soil and groundwater alternatives. EPA's preferred remedy consists of excavation and off-Site disposal of contaminated soils at one source area, and monitored natural attenuation and institutional controls to address the contaminated groundwater. An evaluation of the potential for soil vapor intrusion into structures within the study area will be conducted; mitigation may be performed, if necessary.

A review of the residential well sampling results since 1989 indicate that there are decreasing levels of contaminants in all but a few drinking water wells and there is no current unacceptable risk associated with exposure to the contaminated groundwater, because point-of-use treatment systems have been installed on all of the affected drinking water wells pursuant to the September 1996 remedy decision for this Site. In addition, contaminants in these wells will reach drinking water standards in an estimated ten years. Therefore, EPA also proposes to continue to protect public health with the point-of-use treatment units that were installed.

The remedy described in this Proposed Plan is the preferred remedy for the Site. Changes to the preferred remedy, or a change from the preferred remedy to another remedy, may be made if public comments or additional data indicate that such a change will result in a more appropriate remedial action. The final decision regarding the selected remedy will be made after EPA has taken into consideration all public comments. EPA is soliciting public comment on all of the alternatives considered in this Proposed Plan and in the detailed analysis section of the FS report because EPA and NYSDEC may select a remedy other than the preferred remedy.

MARK YOUR CALENDAR

June XX, 2005 - July XX, 2005: Public comment period on the Proposed Plan.

June XX, 2005 at 7:00 P.M.: Public meeting at the Little Valley Elementary Campus, 207 Rock City Street, Little Valley, NY.

COMMUNITY ROLE IN SELECTION PROCESS

EPA and NYSDEC rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site. To this end, the RI and FS reports and this Proposed Plan have been made available to the public for a public comment period which begins on June XX, 2005 and concludes on July XX, 2005.

A public meeting will be held during the public comment period at the Little Valley Elementary Campus on June XX, 2005 at 7:00 p.m. to present the conclusions of the RI/FS, to elaborate further on the reasons for recommending the preferred remedy, and to receive public comments.

Comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary Section of the Record of Decision (ROD), the document which formalizes the selection of the remedy.

INFORMATION REPOSITORIES

Copies of the Proposed Plan and supporting documentation are available at the following information repositories:

Town of Little Valley Municipal Building
103 Rock City Street
Little Valley, New York 14755

Hours: Monday - Friday, 8:15 A.M. - 4:00 P.M.

Salamanca Public Library
155 Wildwood Avenue
Salamanca, New York 14779

Hours: Monday & Friday, 9:00 AM - 5:30 PM
Tuesday & Thursday, 9:00 AM - 9:00 PM
Wednesday & Saturday, 9:00 AM - 1:00 PM

USEPA-Region II
Superfund Records Center
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637-4308

Hours: Monday - Friday, 9:00 A.M. - 5:00 P.M.

Written comments on this Proposed Plan should be addressed to:

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SCOPE AND ROLE OF ACTION

In order to remediate Superfund sites, work is often divided into operable units. The objective of the first operable unit was to prevent exposure of area residents to contaminated drinking water. The action described in this Proposed Plan represents the second and final operable unit for the Site. The primary objectives of this action are to remediate an identified source of contamination at the Site, reduce and minimize the downward migration of contaminants to the groundwater, restore groundwater quality, and minimize any potential future health and environmental impacts.

SITE BACKGROUND

Site Description

Since 1982, chemical analyses of groundwater samples collected from monitoring and private wells throughout the Site have indicated the presence of trichloroethylene (TCE), a common industrial cleaning solvent. The TCE plume, which comprises the Site, extends approximately eight miles from the Village of Little Valley to the northern edge of the City of Salamanca, which is part of the Allegheny Indian Reservation. The Site is located in a rural, agricultural area, with a number of small, active and inactive industries and over 200 residential properties situated in the study area along Route 353, the main transportation route between Little Valley and Salamanca. Private water supply wells constitute the only source of drinking water for these properties.

The nearest surface water bodies associated with the Site are Little Valley Creek and its tributaries. Little Valley Creek, a perennial stream with typical stream flow ranging from 20 to 80 cubic feet per second during normal precipitation periods, flows southeast, then south through the Site for approximately eight miles before joining the Allegheny River. The Site ranges in width from 1,000 to 2,500 feet and in elevation from nearly 1,600 feet above mean sea level (msl) in the Village of Little Valley to less than 1,400 feet msl near the Salamanca city line. The Site is bordered by steeply sloping wooded hillsides which attain slopes of up to 25 percent and elevations of 2,200 feet above msl.

Figure 1 shows the Site area.

Site History

In 1982, Cattaraugus County Health Department (CCHD) and NYSDEC, while investigating TCE contamination at the Luminite Products Corporation (Luminite), a small lithographic device manufacturing facility located along Route 353, detected TCE in nearby private wells.

In 1989, NYSDEC sampled the plant production well, process wastewater, and septic tank on the Luminite property, as well as nearby New York State Department of Transportation monitoring wells. The analytical results indicated that groundwater contamination was present both upgradient and downgradient of the Luminite facility, with the plume extending from the Village of Little Valley to the northern edge of the City of Salamanca.

Based on these findings, the CCHD issued health advisories to exposed residents and efforts were initiated to determine sources of TCE contamination upgradient of Luminite.

In 1992, NYSDEC installed a number of monitoring wells in the area, and conducted source reconnaissances at the other active and inactive industries and waste disposal areas to investigate possible sources of the contamination. No sources were found.

In June 1996, EPA listed the Site on the National Priorities List, and prepared a focused feasibility study (FFS) to develop, screen, and evaluate alternatives for an alternate water supply system for the affected and potentially affected residences to address the most immediate concerns at the Site.

Based upon the findings of the FFS, on September 30, 1996 EPA issued an interim ROD, providing for the installation of air stripper treatment units on all of the affected and potentially affected private wells to ensure that drinking water standards were met. Air strippers were selected because, based upon the maximum TCE concentrations that were present in the private wells at that time, they would be significantly less costly to maintain than granular activated carbon treatment units.

In September 1996, EPA also commenced an RI/FS to identify sources of the groundwater contamination and to evaluate remedial alternatives.

Installation of the air stripper treatment units was completed in October 1997. Subsequently, granular activated carbon units were installed in addition to the air strippers as polishing units to insure the consistent removal of contaminants.

The ROD also called for an evaluation of the efficacy of the point-of-use treatment systems within five years of their installation, and a determination as to whether or not a more permanent system (such as a water line) would be required. In an April 2002 Explanation of Significant Differences (ESD), EPA determined that it would be more appropriate to evaluate the need for a permanent alternative water supply during the selection of the final groundwater/source area remedy for the Site. EPA also determined that because of the decreasing levels of contaminant concentrations in the private wells, granular activated carbon units alone would effectively remove the contamination. Subsequently, the air stripper treatment units were removed from each well and replaced with a second granular activated carbon unit.

NYSDEC assumed responsibility for the operation and maintenance of the point-of-use treatment units and annual sampling of private wells in October 2002. Routine maintenance is conducted on the treatment units on a quarterly basis, and repairs are performed as needed. As part of the ongoing maintenance of the treatment units, NYSDEC evaluates the effectiveness of the treatment units by sampling the groundwater passing through the individual treatment systems on an annual basis.

Site Geology/Hydrogeology

Little Valley is a U-shaped glacial valley (in cross-section) filled with glacially-derived outwash deposits (*i.e.*, glaciofluvial sediments), which are frequently overlain by more recent alluvial deposits (Cadwell *et al.*, 1988). The recent alluvial deposits are described as glacially-derived, reworked sediments and are representative of the stream bed and floodplain deposits of the Little Valley Creek (Zarriello, 1987). Gravel and sand, with varying amounts of fines, are present from the surface down to the bedrock across the majority of the Bush Industries Area (a source area evaluated in the RI, see the "Results of the Remedial Investigation" section, below). Borings for the Cattaraugus Cutlery Area (another source area evaluated in the RI, see the "Results of the Remedial Investigation" section, below) indicate a relatively thin silt layer over a portion of the property underlain by gravel and sand with varying amounts of fines, which directly overlies till or bedrock.

The depth-to-groundwater in the valley ranges from near the ground surface to approximately 50 feet below ground surface (bgs). In general, the water table is deepest in the upper (northern) portion of the valley and gets progressively closer to the ground surface proceeding down the valley toward the Allegheny River. The overall groundwater flow direction in the gravel and sand aquifer is from north to south, following the slope of the valley topography. In the central portion of the valley, the gravel and sand unit is the thickest and the most permeable. This depresses the water table elevation in the central portion of the valley, compared to the edges of the valley. Along the eastern and western boundaries of the valley, the flow is toward the center of the valley.

RESULTS OF THE REMEDIAL INVESTIGATION

The source identification portion of the RI, conducted from 1997 through 2003, investigated the following potential source areas:

- Ninth Street Landfill Area;
- Bush Industries Area;
- Cattaraugus Cutlery Area;
- King Windows (Second Street) Area;
- First Street Area;
- Great Triangle Area (which includes the Envirotech Drum Storage Area, Western Burnt House Area, Winship Circle/Baker Road Area, and Triangle Southwest Area);
- Whig Street Area;
- Luminite Area;
- State Street Area; and
- Railroad Avenue Area.

The locations of these potential source areas are identified in Figure 1.

Based upon the data collected during the RI, five areas were identified as either current or likely past sources—Bush Industries Area; Cattaraugus Cutlery Area; Great Triangle Area (Drum Storage Area); Luminite Area; and Ninth Street Landfill Area. The history of these areas are described below.

The Bush Industries, Inc.'s facility was used for the manufacture of cutlery by Kinfolks, Inc. from approximately 1926 through 1958. Bush Industries, Inc. currently assembles and manufactures furniture at this location.

The Cattaraugus Cutlery Area consists of several parcels that were used to manufacture cutlery. The W.W. Wilson Cutlery Company, which was formed in the 1890s, operated on the parcels until around 1900, when the company was sold to the Cattaraugus Cutlery Company. The Cattaraugus Cutlery Company manufactured cutlery at this location until the 1950s. Subsequent owners or operators have included Knowles-Fischer (auto parts stamping) and AVM, which owned the property between 1970 and 1977. King Windows, which manufactured stamped metal window parts, is believed to have operated on portions of the property between 1977 and 1993. At present, the property is privately owned, and has been used for storage and a variety of industrial activities since 1993.

The Envirotech Drum Storage Area within the Great Triangle Area is a parcel of vacant land, approximately one acre in size, located along the southeastern right-of-way of Route 242. This parcel was used as a temporary staging area for drums of solvent wastes brought from three other temporary drum storage areas operated by Envirotech. NYSDEC's records indicate that up to 310 drums were stored on this property in 1980 or early 1981, prior to their transport to the Town of Tonawanda for final disposal.

As was noted in the "Site History" section, above, the Luminite Area, which is located along Route 353, is the former site of a small manufacturing facility.

The Ninth Street Landfill was a municipal landfill used by the Village of Little Valley from 1950 to 1972 for the disposal of sanitary and industrial wastes. It was alleged that solvent-containing wastes in containers that originated at the Cattaraugus Cutlery/Knowles-Fisher/AVM/King Windows facilities were disposed in the landfill by Village refuse collection employees. Specific time frames for the alleged disposal activities have not been determined.

The results of the RI are summarized below.

Soils

In an attempt to identify source areas, 59 soil samples were collected from 45 locations. The maximum concentration of TCE in the soil at the Site was detected in the Cattaraugus Cutlery Area (72,000 micrograms per kilogram [µg/kg] at 1.5 to 2 feet bgs). As can be seen from Table 1, only the soil in this area showed TCE concentrations exceeding the New York State Technical and Administrative Guidance Memorandum No. 94-HWR-4046 (TAGM) objective[1].

Table 1: Maximum Soil TCE Concentrations (most recent data)

Area	Maximum TCE Concentration (µg/kg)	Year
Bush Industries	61	2003
Cattaraugus Cutlery	72,000	2003
King Windows	ND[2]	1998
First Street	ND	1998
Great Triangle	3	1998
Whig Street	ND	1998
Luminite	AE[3]	AE
Ninth Street Landfill	4	1998
State Street	AE	AE
Railroad Avenue	ND	2003

Sediments and Surface Water

Sediment and surface water samples were collected from 13 locations along the Little Valley Creek and its tributaries. TCE was not detected in any sediments and at only low levels in surface waters. Potential TCE degradation

1 *Division Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels*, NYSDEC, Division of Hazardous Waste Remediation, January 24, 1994.

There are currently no federal or state promulgated standards for contaminant levels in soils. There are, however, other federal or state advisories, criteria, or guidance (To-Be-Considered guidance or "TBCs"), one of which is the New York State TAGM objectives. The soil cleanup objectives identified in NYSDEC's TAGM are either a human-health protection value or a value based on protection of groundwater (calculating the concentration in soil which would theoretically produce contaminant concentrations in the groundwater which would meet groundwater standards), whichever is more stringent. The TAGM is being used as the soil cleanup levels for this site. The TAGM for TCE is 700 µg/kg, which falls within EPA's acceptable risk range.

2 ND=Not detected.

3 AE=Area eliminated from consideration based on 1997 soil gas screening results. No soil samples were collected.

products, such as, cis-1,2-DCE, 1,2-DCA, chloromethane, and chloroethane, were present at low levels in the sediments and surface water adjacent to the Bush Industries and Cattaraugus Cutlery Areas.

Groundwater

A total of 313 groundwater samples were collected from 125 locations in an attempt to identify source areas.

As can be seen in Table 2, below, while the groundwater samples showed a valley-wide distribution of TCE, the Maximum Contaminant Level (MCL)[4] was only marginally exceeded in the Great Triangle (14 µg/L; also the maximum historical concentration) and the Ninth Street Landfill (19 µg/L; also the maximum historical concentration) Areas. While the concentration of TCE at the Luminite Area (10 µg/L) exceeded the MCL in 1998, the most recent sample results for this area (2003) show groundwater TCE levels to be below MCLs.

The results of groundwater sampling at the Bush Industries Area indicate the presence of elevated levels of TCE (the most recent sample results show a maximum concentration of 78 µg/L) and its breakdown products (such as 1,2-dichloroethene). The concentration of TCE decreases as the groundwater traverses the property; however, the concentration exceeds the MCL at the property boundary.

A review of the historical groundwater sample results from the Bush Industries Area show that natural attenuation is occurring. TCE concentrations in the two most contaminated monitoring wells have decreased from 230 µg/L and 160 µg/L in samples collected in 1999 to 36 µg/L and 78 µg/L in samples collected in 2003[5], respectively.

For the Cattaraugus Cutlery Area, groundwater concentrations of TCE were as high as 76 µg/L. Sample results do not show a downward trend over time in specific monitoring wells. While TCE concentrations were found to decrease by an order of magnitude as the groundwater traverses the property, TCE concentrations still exceed the MCL at the property boundary.

Table 2: Maximum Groundwater TCE Concentrations (most recent data)

Area	Maximum TCE Concentration (µg/L)	Year
Bush Industries	78	2003
Cattaraugus Cutlery	76	2003
King Windows	2	1998
First Street	ND[6]	1998
Great Triangle	14	2003
Whig Street	2.1	2003
Luminite	4.4	2003
Ninth Street Landfill	19	1998
State Street	AE[7]	AE
Railroad Avenue	1.9	2003

The groundwater plume was evaluated based upon private well data which has been collected since 1989. Of the 91 private wells that have treatment units installed, 90 were sampled in October 2004[8]. The results show that 49 are at or below the drinking water standard of 5 µg/L for TCE. Of the 41 wells that have contaminant levels exceeding the drinking water standard, the majority of these wells only marginally exceed 5 µg/L (32 wells have TCE levels between 6 µg/L and 10 µg/L). In addition, sampling results since 1989 indicate that there are decreasing levels of contamination throughout the plume in all but a few wells[9]; the highest concentration for the October 2004 sampling event was 22 µg/L, as compared to an historical high of 50 µg/L, and the average concentration is now 5.9 µg/L.

TCE in groundwater was identified as a chemical of potential concern (COPC) for soil vapor migration from groundwater to indoor air in the study area.

Summary

Based upon the soil data, the Cattaraugus Cutlery Area has been determined to be a current localized source of groundwater contamination at the Site. In addition, TCE

4 EPA and the New York State Department of Health (NYSDOH) have promulgated health-based protective MCLs, which are enforceable standards for various drinking water contaminants. MCLs ensure that drinking water does not pose either a short- or long-term health risk. The MCL for TCE is 5 micrograms per liter (µg/L).

5 The other monitoring wells in this area, for the most part, have shown TCE concentrations either below or marginally above the MCL.

6 ND=Not detected.

7 AE=Area eliminated from consideration based on 1997 soil gas screening results. No groundwater samples were collected.

8 One property is vacant; the well was inaccessible.

9 These wells are located in the vicinity of the Great Triangle Area.

WHAT IS RISK AND HOW IS IT CALCULATED?

A Superfund baseline human health risk assessment is an analysis of the potential adverse health effects caused by hazardous substance releases from a site in the absence of any actions to control or mitigate these under current- and future-land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

Hazard Identification: In this step, the chemicals of concern (COCs) at the site in various media (*i.e.*, soil, groundwater, surface water, and air) are identified based on such factors as toxicity, frequency of occurrence, and fate and transport of the contaminants in the environment, concentrations of the contaminants in specific media, mobility, persistence, and bioaccumulation.

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

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

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 10^{-4} cancer risk means a "one-in-ten-thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions explained in the Exposure Assessment. Current Superfund guidelines for acceptable exposures are an individual lifetime excess cancer risk in the range of 10^{-4} to 10^{-6} (corresponding to a one-in-ten-thousand to a one-in-a-million excess cancer risk) with 10^{-6} being the point o departure. For non-cancer health effects, a "hazard index" (HI) is calculated. An HI represents the sum of the individual exposure levels compared to their corresponding reference doses. The key concept for a non-cancer HI is that a "threshold level" (measured as an HI of less than 1) exists below which non-cancer health effects are not expected to occur.

concentrations in the groundwater underlying this area exceed the MCL and do not appear to be decreasing over time in specific monitoring wells. Based upon the TCE concentrations that were detected in the soil and the TCE concentrations which exceed MCLs in the groundwater, the Bush Industries Area also appears to be a current localized source of groundwater contamination. The TCE levels in this area, however, appear to be decreasing due to natural attenuation.

The Great Triangle and Ninth Street Landfill Areas have TCE concentrations in the groundwater that exceed the MCL, but due to the low levels of TCE detected in the soils in these areas, it is likely that these areas were former sources of TCE contamination. Until recently, the groundwater underlying the Luminite Area exceeded the MCL for TCE. At present, the groundwater in this area is below the MCL. While the Great Triangle, Luminite, and Ninth Street Landfill Areas may have been sources of groundwater contamination in the past, based upon the current data, they are not acting as current sources.

SITE RISKS

Based upon the results of the RI, a baseline human health risk assessment was conducted to estimate the risks associated with current and future property conditions.

The human-health estimates summarized below are based on current reasonable maximum exposure scenarios and were developed by taking into account various conservative estimates about the frequency and duration of an individual's exposure to TCE, as well as the toxicity of this contaminant.

A screening level ecological risk assessment was also conducted to assess the risk posed to ecological receptors due to Site-related contamination.

Human Health Risk Assessment

The human health risk assessment examined potential exposures of current and possible future receptors to Site soils, groundwater, surface water, and sediment in accordance with the conceptual site model developed for the Site.

Based upon the results of the risk assessment, it has been concluded that TCE is a COC for commercial workers in the Cattaraugus Cutlery Area relative to potential exposures to soil; the estimated excess lifetime cancer risk is 7.6×10^{-4}. TCE is also a COC in the Site-wide groundwater when used as process water in commercial wash down and commercial car wash scenarios, with estimated excess cancer risks of 2.6×10^{-4} and 2.6×10^{-3}, respectively.

TCE in the groundwater is a COPC for soil vapor migration from groundwater to indoor air, based on groundwater concentrations exceeding the health-based screening criteria of 5.3 µg/L. This value, which represents a cancer risk of one in ten thousand (10^{-4}), is based upon EPA's 2002 *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils*.

Under all scenarios, the total estimated HI value is less than one. Therefore, no non-cancer health effects are expected to occur.

Since point-of-use treatment systems have been installed on all of the affected drinking water wells, there is no current unacceptable risk associated with exposure to the contaminated groundwater from these wells.

Ecological Risk Assessment

Based upon the results of the ecological risk assessment, it has been concluded that the TCE present in the surface soils at the Cattaraugus Cutlery Area poses a low risk to terrestrial ecological receptors.

Surface water sampling revealed detections of TCE and TCE degradation products below corresponding ecoscreening benchmarks, and low-level TCE degradation products are also present in the sediments. The risk posed to ecological receptors by the TCE and its degradation products in the surface water and sediments in these areas is low.

The Bush Industries and Cattaraugus Cutlery Areas were found only limited value for ecological receptors, since only a small amount of terrestrial/wetland habitat (consisting of small isolated fragments of deciduous woodland or open field) exist for both.

A field-based qualitative benthic macroinvertebrate survey for both Little Valley Creek and an unnamed tributary to Little Valley Creek revealed the presence of a diverse benthic community in both water bodies. These communities did not display significant alterations in community structure in either area.

SUMMARY OF HUMAN HEALTH AND ECOLOGICAL RISKS

The risks presented in the human health risk assessment indicate that there is significant potential risk to commercial workers from direct exposure to contaminated soils in the Cattaraugus Cutlery Area and to commercial workers from exposure to contaminated groundwater used as process water or commercial car washes. These risk estimates are based on current reasonable maximum exposure scenarios and were developed by taking into account various conservative assumptions about the frequency and duration of an individual's exposure to the soil and groundwater, as well as the toxicity of TCE.

In addition, based on groundwater concentrations of TCE which exceed the health-based screening criteria, there is a potential risk related to soil vapor migration from groundwater to indoor air of homes and businesses.

Since point-of-use treatment systems have been installed on all of the affected drinking water wells, there is no current unacceptable risk associated with exposure to the contaminated groundwater from these wells.

The findings of the ecological risk assessment indicate that the potential risks to ecological receptors from TCE is expected to be low.

Based upon the results of the RI and the risk assessments, EPA has determined that actual or threatened releases of hazardous substances from the source areas, if not addressed by the preferred remedy or one of the other active measures considered, may present a current or potential threat to human health and the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), TBC guidance, and site-specific risk-based levels.

The following RAOs were established for the Site:

- Minimize or eliminate TCE migration from contaminated soils to the groundwater;
- Minimize or eliminate any contaminant migration from contaminated soils and groundwater to indoor air;
- Restore groundwater to meet state and federal standards for TCE within a reasonable time frame;
- Mitigate the migration of the affected groundwater; and
- Reduce or eliminate any direct contact or inhalation threat associated with TCE-contaminated soils and groundwater and any inhalation threat associated with soil vapor.

Soil cleanup objectives will be those established in the TAGM guidelines. Groundwater cleanup goals will be the more stringent of the state or federal promulgated standards.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA §121(b)(1), 42 U.S.C. §9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARS, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA §121(d), 42 U.S.C. §9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4), 42 U.S.C. §9621(d)(4).

Detailed descriptions of the remedial alternatives for addressing the contamination associated with the Site can be found in the FS report. This document presents four soil remediation alternatives and four groundwater remediation alternatives. To facilitate the presentation and evaluation of these alternatives, the FS report alternatives were modified to formulate the remedial alternatives discussed below.

It should be noted that although the FS report evaluated *in-situ* chemical oxidation for treatment of the TCE-contaminated groundwater at the Site, this technology is not being considered in this Proposed Plan because it is very similar to the *in-situ* air sparging alternative evaluated in the FS report, which would cost significantly less to implement. It should also be noted that active remedial measures were not considered for the Site-wide plume because there is an overall downward trend of TCE contamination in the plume.

All of the property owners/renters with drinking water wells that are protected with point-of-use treatment units are aware of the fact that the groundwater they use is contaminated and should not be used without treatment. They are reminded of this on a periodic basis when NYSDEC collects samples from their wells and/or provides maintenance related to their individual point-of-use treatment units. Therefore, institutional controls to control human exposure to contaminated groundwater from these properties until groundwater standards are met are not necessary.

A number of institutional controls—notices, deed restrictions, contractual agreements, and informational devices (*e.g.*, notifications) were considered to further control human exposure to contaminated groundwater underlying the Bush Industries and the Cattaraugus Cutlery properties until groundwater standards are met. Bush Industries and the facility on the Cattaraugus Cutlery property use public water. In addition, groundwater standards are expected to be achieved in these areas through monitored natural attenuation in 10 years, and monitoring in these areas would allow for periodic inspections to determine whether groundwater is being used without treatment. Therefore, it was concluded that notification of these property owners, in combination with the periodic inspections, would be sufficiently protective of public health until groundwater standards are achieved.

A number of institutional controls were also considered to prevent human exposure to contaminated groundwater underlying the undeveloped parcels within the Site. It was concluded that since groundwater standards are expected to be achieved through monitored natural attenuation in 10 years, periodic notification of local government agencies would be sufficiently protective of public health until groundwater standards are achieved.

For all of the groundwater alternatives, EPA would continue to protect public health with the point-of-use treatment units that were installed pursuant to the September1996 remedy decision for this Site.

The construction time for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate the performance of the remedy with any potentially responsible parties, or procure contracts for design and construction.

The remedial alternatives are described below.

Soil Remedial Alternatives

Alternative S-1: No Action

Capital Cost:	$0
Annual Operation and Maintenance Cost:	$0
Present-Worth Cost:	$0
Construction Time:	0 months

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative for soil does not include any physical remedial measures that address the problem of soil contamination at the Site.

Because this alternative would result in contaminants remaining on-Site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove, treat, or contain the contaminated soils.

Alternative S-2: Institutional Controls

Capital Cost:	$20,000
Annual Operation and Maintenance Cost:	$1,000
Present-Worth Cost:	$33,000
Construction Time:	6 months

This alternative involves the implementation of a public awareness program and institutional controls (the placement of limitations on the future use of the property) related to the Cattaraugus Cutlery Area.

The public awareness program would be directed toward on-property workers and residents in the vicinity of the Cattaraugus Cutlery Area, and would include the preparation and distribution of fact sheets and the convening of public meetings.

Under this alternative, institutional controls, such as a notice, deed restriction, or contractual agreement, would be used to prohibit the future use of the Cattaraugus Cutlery Area in a manner that would be inconsistent with on-property conditions (*e.g.*, prohibiting soil excavation activities).

The property would be inspected annually to determine whether soil excavation activities had occurred. If a notice or deed restriction were employed, property records would be searched annually to ensure that these controls are still in place. Local governmental offices, such as building and zoning offices, would be notified annually of the controls on the property and their records would also be reviewed annually to ascertain whether or not any applications or other filings had been made regarding the property. An annual report summarizing the findings of the above-noted activities would be prepared.

It is estimated that it would take six months to implement the institutional controls.

Because this alternative would result in contaminants remaining on-Site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented to remove, treat, or contain the contaminated soils.

Alternative S-3: *In-Situ* Soil Vapor Extraction

Capital Cost:	$275,000
Annual Operation and Maintenance Cost:	$0
Present-Worth Cost:	$275,000
Construction Time:	12 months

Under this alternative, approximately 200 cubic yards of TCE-contaminated soil in the Cattaraugus Cutlery Area would be remediated by *in-situ* soil vapor extraction (ISVE). ISVE involves drawing air through a series of wells to volatilize the solvents in the soils. The extracted vapors would then be treated.

The exact configuration and number of vacuum extraction wells would be determined based on the results of a pilot-scale treatability study.

While the actual period of operation of the ISVE system would be based upon soil sampling results which demonstrate that the affected soils have been treated to soil TAGM objectives, it is estimated that the system would operate for a period of 12 months.

Alternative S-4: Excavation and Off-Site Disposal

Capital Cost:	$136,000
Annual Operation and Maintenance Cost:	$0
Present-Worth Cost:	$136,000
Construction Time:	3 months

This alternative involves the excavation of approximately 200 cubic yards of TCE-contaminated soil to an estimated depth of four feet in two areas of the Cattaraugus Cutlery Area. The actual extent of the excavation and the volume of the excavated soil would be based on pre- and post-excavation confirmatory sampling. Shoring of the excavated areas and extraction and treatment of any water that enters the excavated area may be necessary.

The excavated areas would be backfilled with clean fill. All excavated material would be characterized and transported for treatment and/or disposal at an off-Site Resource Conservation and Recovery Act (RCRA)-compliant disposal facility.

It is estimated that this effort could be completed in three months.

Groundwater Remedial Alternatives

Alternative GW-1: No Action

Capital Cost:	$0
Annual Operation and Maintenance Cost:	$0
Present-Worth Cost:	$0
Construction Time:	0 months

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative would not include any physical remedial measures to address the groundwater contamination at the Site.

Based on preliminary groundwater modeling, it has been estimated that it would take ten years for the groundwater to be restored to drinking water quality under the no action alternative.

Because this alternative would result in contaminants remaining on-Site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented.

Alternative GW-2: Monitored Natural Attenuation of Source Areas and Site-Wide Plume with Institutional Controls

Capital Cost:	$0
Annual Operation and Maintenance Cost:	$35,000
Present-Worth Cost:	$245,000
Construction Time:	1 month

Under this alternative, the contaminated groundwater underlying the Bush Industries, Cattaraugus Cutlery, Great Triangle, and Ninth Street Landfill Areas, as well as the Site-wide plume, would be addressed through monitored natural attenuation, a variety of *in-situ* processes which, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in groundwater. For this Site, these *in-situ* processes include dispersion, dilution, and adsorption; limited degradation may be occurring in select areas of the Site, particularly in the suspected source areas.

Groundwater samples would be collected and analyzed regularly in order to verify that the concentrations and the extent of groundwater contaminants are declining. The exact frequency and parameters of sampling would be determined during the design phase.

This alternative would also include institutional controls. Specifically, after an initial notification, NYSDEC, NYSDOH, and/or CCHD would periodically meet with or notify local governmental agencies to remind them that if any unimproved parcel where the underlying groundwater is contaminated with TCE above the MCL is developed, the groundwater should not be used without treatment. EPA would also notify the Bush Industries and Cattaraugus Cutlery Area property owners that the underlying groundwater is contaminated and should not be used without treatment. As part of EPA's monitored natural attenuation monitoring on the Bush Industries and Cattaraugus Cutlery Areas, the properties would be inspected annually to verify that wells without treatment systems have not been installed. An annual report summarizing the results of the groundwater monitoring and the findings of such inspections would be prepared.

It is estimated that it would take 1 month to implement the institutional controls.

Based on preliminary groundwater modeling, it has been estimated that it would take ten years for the groundwater to be restored to drinking water quality.

Because this alternative would result in contaminants remaining on-Site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented.

Alternative GW-3: Source Area Extraction and Treatment and Site-Wide Plume Monitored Natural Attenuation with Institutional Controls

Capital Cost:	$2,564,000
Annual Operation and Maintenance Cost:	$589,000
Present-Worth Cost:	$5,921,000
Construction Time:	6 months

This alternative is the same as Alternative GW-2, except instead of relying upon monitored natural attenuation to address the contaminated groundwater underlying the Bush Industries and Cattaraugus Cutlery Areas, it would be removed with extraction wells (two on the Bush Industries Area and two wells on the Cattaraugus Cutlery Area). The Great Triangle and Ninth Street Landfill Areas, as well as the Site-wide plume, would be addressed through monitored natural attenuation, as in Alternative GW-2.

The extracted groundwater would be collected, treated by air-stripping to discharge standards, and discharged to the Little Valley Creek. Air stripping involves pumping untreated groundwater to the top of a "packed" column, which contains a specified amount of inert packing material. The column receives ambient air under pressure in an upward direction from the bottom of the column as the water flows downward, transferring volatile organic compounds (VOCs) to the air phase.

Based on preliminary groundwater modeling, it has been estimated that it would take eight years to remediate the groundwater at the Bush Industries and Cattaraugus Cutlery Areas using extraction and treatment. It has been estimated that it would also take eight years for the contaminated groundwater underlying the Great Triangle and Ninth Street Landfill Areas, as well as the Site-wide plume, to be restored to drinking water quality through natural attenuation.

Because this alternative would result in contaminants remaining on-Site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented.

Alternative GW-4: Source Area *In-Situ* Air Sparging and Site-Wide Plume Natural Attenuation with Institutional Controls

Capital Cost:	$860,000
Annual Operation and Maintenance Cost:	$322,000
Present-Worth Cost:	$1,562,000
Construction Time:	6 months

This alternative is the same as Alternative GW-2, except instead of relying upon monitored natural attenuation to address the contaminated groundwater underlying the Bush Industries and Cattaraugus Cutlery Areas, it would be treated with air sparging. The Great Triangle and Ninth Street Landfill Areas, as well as the Site-wide plume, would be addressed through monitored natural attenuation, as in Alternative GW-2.

In-situ air sparging involves injecting air, under pressure, into the aquifer via injection wells. Under this process, bubbles are formed from the injected air, which strip the VOCs from the groundwater. A vapor extraction system would be used to remove and treat the vapors generated. Performance and compliance monitoring and testing would be undertaken to assess the effectiveness of the in-situ air sparging system.

Based on preliminary groundwater modeling, it has been estimated that it would take two years to remediate the groundwater at the Bush Industries and Cattaraugus Cutlery Areas using air sparging. It has been estimated that it would take eight years for the contaminated groundwater underlying the Great Triangle and Ninth Street Landfill Areas, as well as the Site-wide plume, to be restored to drinking water quality through natural attenuation.

Because this alternative would result in contaminants remaining on-Site above levels that allow for unrestricted use and unlimited exposure, CERCLA requires that the Site be reviewed at least once every five years. If justified by the review, remedial actions may be implemented.

COMPARATIVE ANALYSIS OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria, namely, overall protection of human health and the environment, compliance with applicable or relevant and appropriate requirements, long-term effectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability, cost, and state and community acceptance.

The evaluation criteria are described below.

- Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
- Compliance with ARARs addresses whether or not a remedy would meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and requirements or provide grounds for invoking a waiver.
- Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.
- Reduction of toxicity, mobility, or volume through treatment is the anticipated performance of the treatment technologies, with respect to these parameters, a remedy may employ.
- Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.
- Implementability is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
- Cost includes estimated capital and operation and maintenance costs, and net present-worth costs.
- State acceptance indicates if, based on its review of the RI/FS and Proposed Plan, the state concurs with the preferred remedy at the present time.
- Community acceptance will be assessed in the ROD and refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports.

Overall Protection of Human Health and the Environment

Alternatives S-1 and S-2 would not be protective of human health and the environment, since they would not actively address the contaminated soils, which present unacceptable risks of exposure and are a source of groundwater contamination. Alternatives S-3 and S-4 would be protective of human health and the environment, since each alternative relies upon a remedial strategy or treatment technology capable of eliminating human exposure and removing the source of groundwater contamination.

Sampling and preliminary modeling results indicate that Alternatives GW-1 and GW-2 would meet state and federal groundwater standards through natural attenuation in an estimated 10 years (after an active soil remedy is implemented). Alternative GW-2 is somewhat more protective of human health than Alternative GW-1 because groundwater monitoring would be performed and institutional controls would be implemented to prevent the installation and use of groundwater wells at the Bush Industries and Cattaraugus Cutlery Areas. Alternatives GW-3 and GW-4 would actively address the contaminants in the groundwater at the Bush Industries and Cattaraugus Cutlery Areas until concentrations are reduced to federal and state groundwater standards (estimated to be eight years and two years, respectively). It would take an estimated eight years to achieve the MCL in the Great Triangle and Ninth Street Landfill Areas, as well as the Site-wide plume, under these alternatives.

Although Alternatives GW-3 and GW-4 would be more protective of the environment than Alternatives GW-1 and GW-2 since MCLs would be reached sooner and would minimize the migration of contaminated groundwater, the groundwater is only marginally contaminated and there is no current direct contact risk of human exposure associated with the groundwater, since all of the affected wells have treatment systems installed. There may, however, be a potential inhalation risk posed by vapor migration from groundwater to indoor air. If soil vapor intrusion is determined to be a problem at the Site, this risk would also be mitigated.

Until groundwater standards are met under Alternatives GW-2, GW-3, and GW-4, there would be a continued risk of human exposure to the contaminated groundwater. This risk would be mitigated by the continued use of the point-of-use treatment systems.

Compliance with ARARs

There are currently no federal or state promulgated standards for contaminant levels in soils. However, EPA is utilizing New York State soil cleanup objectives as specified in the soil TAGM (which are used as TBC criteria).

Since the contaminated soils would not be addressed under Alternatives S-1 and S-2, they would not comply with the soil cleanup objectives. Alternatives S-3 and S-4 would attain the soil cleanup objectives specified in the TAGM.

Alternative S-4 would involve the excavation of contaminated soils and would, therefore, require compliance with fugitive dust and VOC emission regulations. In addition, this alternative would be subject to New York State and federal regulations related to the transportation and off-site treatment/disposal of wastes. In the case of Alternative S-3, compliance with air emission standards would be required for the ISVE system. Specifically, treatment of off-gases would have to meet the substantive requirements of New York State Regulations for Prevention and Control of Air Contamination and Air Pollution (6 NYCRR Part 200, *et seq.*) and comply with the substantive requirements of other state and federal air emission standards.

EPA and NYSDOH have promulgated health-based protective MCLs (40 CFR Part 141, and 10 NYCRR, Chapter 1 and Part 5), which are enforceable standards for various drinking water contaminants (chemical-specific ARARs). The aquifer at the Site is classified as Class GA (6 NYCRR 701.18), meaning that it is designated as a potable water supply. Alternatives GW-1 and GW-2 do not include any active groundwater remediation; groundwater ARARs would be achieved through natural attenuation within an estimated ten years after the soil remedy is implemented. For Alternatives GW-3 and GW-4, ARARs would be achieved through the removal and in-situ treatment of contaminants in the groundwater at the two source areas, respectively, and through natural attenuation in the Great Triangle and Ninth Street Landfill Areas, as well as the Site-wide plume. Alternatives GW-3 and GW-4 would have to comply with surface water discharge requirements and the disposition of treatment residuals would have to be consistent with RCRA. Any air emissions associated with the treatment system would have to comply with air emission standards.

The requirements of New York State Environmental Conservation Law Section 27-1318, Institutional and Engineering Controls, would be applicable to the institutional controls included in Alternatives S-2, GW-2, GW-3, and GW-4.

Long-Term Effectiveness and Permanence

Alternatives S-1 and S-2 would involve no active remedial measures and, therefore, would not be effective in eliminating the potential exposure to contaminants in soil and would allow the continued migration of contaminants from the soil to the groundwater. Alternatives S-3 and S-4 would both be effective in the long term and would provide permanent remediation by either removing the contaminated soils from the Site or treating them in place.

Alternative S-3 would generate treatment residuals which would have to be appropriately handled. Alternatives S-1, S-2 and S-4 would not generate such residuals.

Once the source control remedy is implemented, it is anticipated that all of the groundwater alternatives would achieve groundwater ARARs within a reasonable time frame and would be effective in the long-term. It is anticipated that all of the alternatives would maintain reliable protection of human health and the environment over time.

Alternatives GW-3 and GW-4 would generate treatment residues which would have to be appropriately handled. Alternatives GW-1 and GW-2 would not.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternatives S-1 and S-2 would provide no reduction in toxicity, mobility or volume. Under Alternative S-3, the toxicity, mobility, and volume of contaminants would be reduced or eliminated through on-Site treatment. Under Alternative S-4, the toxicity, mobility, and volume of the contaminants would be eliminated by removing the contaminated soil from the property.

Alternatives GW-1 and GW-2 would rely solely upon natural attenuation to reduce the volume of groundwater contamination. Alternatives GW-3 and GW-4 would provide a reduction of toxicity, mobility, and volume of the contaminated groundwater through treatment of the contaminated groundwater at the Bush Industries and Cattaraugus Cutlery Areas. All of the groundwater alternatives would rely upon natural attenuation to address the groundwater contamination in the Great Triangle and Ninth Street Landfill Areas, as well as the Site-wide plume.

Short-Term Effectiveness

Alternatives S-1 and S-2 do not include any physical construction measures in any areas of contamination and, therefore, would not present any potential adverse impacts to on-property workers or the community as a result of its implementation. Alternative S-3 could result in some adverse impacts to on-property workers through dermal contact and inhalation related to the installation of ISVE wells through contaminated soils. Alternative S-4 could present some limited adverse impacts to on-property workers through dermal contact and inhalation related to excavation activities. Noise from the treatment unit and the excavation work associated with Alternatives S-3 and S-4, respectively, could present some limited adverse impacts to on-property workers and nearby residents. In addition, interim and post-remediation soil sampling activities would pose some risk. The risks to on-property workers and nearby residents under all of the alternatives could, however, be mitigated by following appropriate health and safety protocols, by exercising sound engineering practices, and by utilizing proper protective equipment.

Alternative S-4 would require the off-Site transport of contaminated soil (approximately 13 truck loads), which may pose the potential for traffic accidents, which in turn could result in releases of hazardous substances.

For Alternative S-4, there is a potential for increased stormwater runoff and erosion during construction and excavation activities that would have to be properly managed to prevent or minimize any adverse impacts. For this alternative, appropriate measures would have to be taken during excavation activities to prevent transport of fugitive dust and exposure of workers and downgradient receptors to VOCs.

Since no actions would be performed under Alternative S-1, there would be no implementation time. It is estimated that Alternative S-2 would be completed in three6 months. It is estimated that Alternative S-3 would require nine months to install the ISVE system and twelve months to achieve the soil cleanup objectives. It is estimated that it would take three months to excavate and transport the contaminated soils to an EPA-approved treatment/disposal facility under Alternative S-4.

Alternatives GW-1 and GW-2 do not include any active remediation; therefore, they would not present an additional risk to the community or workers resulting from activities at the Site. Alternatives GW-1GW-2, GW-3, and GW-24 would present some risk to on-property workers through dermal contact and inhalation from groundwater sampling activities, which could be minimized by utilizing proper protective equipment. Alternatives GW-3 and GW-4, which would require the installation of groundwater extraction or air sparging injection wells through potentially contaminated soils and groundwater, would present some risk to on-property workers through dermal contact and inhalation from construction and groundwater sampling activities. Noise from the treatment units associated with Alternatives GW-3 and GW-4 could present some limited adverse impacts to on-property workers and nearby residents. The risks to on-property workers and nearby residents under all of these alternatives could, however, be minimized by following appropriate health and safety protocols, exercising sound engineering practices, and utilizing proper protective equipment.

Since no actions would be performed under Alternative GW-1, there would be no implementation time. It is estimated that Alternative GW-2 would be completed in 1 month. It is estimated that Alternatives GW-3 and GW-4 would require 6 months to install the groundwater extraction and treatment system and in-situ treatment system, respectively.

Based upon preliminary groundwater modeling, it has been estimated that the contaminated groundwater would naturally attenuate to groundwater standards at the Bush Industries, Cattaraugus Cutlery, Great Triangle, and Ninth Street Landfill Areas, as well as the Site-wide plume in ten years (after an active soil remedy is implemented). By comparison, Alternative GW-3 would achieve groundwater standards at the Bush Industries, Cattaraugus Cutlery, Great Triangle, and Ninth Street Landfill Areas, as well as the Site-wide plume in an estimated eight years. Alternative GW-4 would achieve groundwater standards at the two source areas in an estimated two years; it would achieve groundwater standards in the Great Triangle and Ninth Street Landfill Areas, as well as the Site-wide plume in an estimated eight years.

The actual time period required for the groundwater to be remediated under all of the alternatives may vary from the estimates above and could be refined based on the results of groundwater monitoring and more comprehensive groundwater modeling.

Implementability

Alternatives S-1 and S-2 would be the easiest soil alternatives to implement, as there are no activities to undertake.

Both Alternatives S-3 and S-4 would employ technologies known to be reliable and that can be readily implemented. In addition, equipment, services, and materials needed for these alternatives are readily available, and the actions under these alternatives would be administratively feasible. Sufficient facilities are available for the treatment/disposal of the excavated materials under Alternative S-4.

Monitoring the effectiveness of the ISVE system under Alternative S-3 would be easily accomplished through soil and soil-vapor sampling and analysis. Under Alternative S-4, determining the extent of the soil cleanup could be easily accomplished through post-excavation soil sampling and analysis.

Alternative GW-1 would be the easiest groundwater alternative to implement, since it would require no activities. With the performance of institutional controls and monitoring, Alternative GW-2 would require more effort to implement than Alternative GW-1, but would be easily implemented. Alternative GW-3 (groundwater extraction and treatment) would be the most difficult to implement in that it would require the construction of a groundwater extraction system and pipelines. The services and materials that would be required for the implementation of all of the groundwater remedial alternatives are readily available.

All treatment equipment that would be used in Alternatives GW-3 and GW-4 are proven and commercially available. Transportation and disposal of treatment residues could be easily implemented using commercially-available equipment. Under these alternatives, sampling for treatment effectiveness and groundwater monitoring would be necessary, but could be easily implemented.

Cost

The estimated capital, operation and maintenance (O&M) (which includes monitoring), and present-worth costs for each of the alternatives are presented in the table, below.

Alternative	Capital	Annual O&M	Total Present-Worth
S-1	$0	$0	$0
S-2	$20,000	$1,000	$33,000
S-3	$275,000	$0	$275,000
S-4	$136,000	$0	$136,000
GW-1	$0	$0	$0
GW-2	$0	$35,000	$245,000
GW-3	$2,564,000	$589,000	$5,921,000
GW-4	$860,000	$322,000	$1,562,000

There are no annual O&M costs associated with the soil alternatives other than annual inspections and reviews related to the institutional controls associated with Alternative S-2. The present-worth cost associated with this alternative was calculated using a discount rate of seven percent and a 30-year time interval. The present-worth costs for the groundwater monitoring components of Alternatives GW-2, GW-3, and GW-4 were calculated using ten-, eight-, and eight-year time intervals, respectively. The present-worth costs for the remaining components of Alternatives GW-3 and GW-4 were calculated using eight-year (groundwater extraction and treatment) and two-year (in-situ air sparging) time intervals, respectively.

As can be seen by the cost estimates, Alternative S-1 is the least costly soil alternative at $0. Alternative S-3 is the most costly soil alternative at $275,000. The least costly groundwater alternative is GW-1 at $0. Alternative GW-3 is the most costly groundwater alternative at $5,921,000.

State Acceptance

NYSDEC concurs with the preferred source control and groundwater alternatives.

Community Acceptance

Community acceptance of the preferred alternative will be assessed in the ROD, following review of the public comments received on the Proposed Plan.

PROPOSED REMEDY

Based upon an evaluation of the various alternatives, EPA, in consultation with NYSDEC, recommends Alternative S-4, Excavation/Off-Site Disposal, and Alternative GW-2, Monitored Natural Attenuation of Source Areas and Site-wide plume with Institutional Controls, as the preferred remedy to address the soil and groundwater, respectively.

Specifically, this would involve the following:

- Excavation of approximately 200 cubic yards of TCE-contaminated soil exceeding the TAGM objective of 700 µg/kg to an estimated depth of four feet at two locations in the Cattaraugus Cutlery Area;

- Post-excavation, confirmatory soil sampling;
- Backfilling of excavated areas with clean fill;
- Characterization and transportation of excavated material for treatment and/or disposal at an off-Site RCRA-compliant disposal facility;
- Monitored natural attenuation of the contaminated groundwater underlying the Bush Industries, Cattaraugus Cutlery, Great Triangle, and Ninth Street Landfill Areas, as well as the Site-wide plume; and
- Groundwater sample collection and analyses to verify that the contaminants are declining in concentration and in extent.

This alternative would also include institutional controls. Specifically, after an initial notification, NYSDEC, NYSDOH, and/or CCHD would periodically meet with or notify local governmental agencies to remind them that if any unimproved parcel where the underlying groundwater is contaminated with TCE above the MCL is developed, the groundwater should not be used without treatment. EPA would also notify the Bush Industries and Cattaraugus Cutlery Area property owners that the underlying groundwater is contaminated and should not be used without treatment. As part of EPA's natural attenuation monitoring on the Bush Industries and Cattaraugus Cutlery Areas, the properties would be inspected annually to verify that wells without treatment systems have not been installed. An annual report summarizing the results of the groundwater monitoring and the findings of such inspections would be prepared.

An evaluation of the potential for soil vapor intrusion into structures within the study area will be conducted; mitigation may be performed, if necessary.

Upon completion of remediation, no hazardous substances would remain above levels that would prevent unlimited use or unrestricted exposure. It is the policy of EPA to conduct five-year reviews when remediation activities will continue for more than five years. Under the preferred remedy, EPA would conduct five-year reviews at least once every five years.

Basis for the Remedy Preference

While Alternatives S-3 and S-4 would both effectively achieve the 700 μg/kg soil cleanup objective, Alternative S-3 would be significantly more expensive and would take longer to construct and implement than Alternative S-4. Therefore, EPA and NYSDEC believe that Alternative S-4 would effectuate the soil cleanup while providing the best balance of tradeoffs with respect to the evaluating criteria.

While Alternative GW-2 would not actively treat the groundwater, there is currently no threat of exposure to contaminated groundwater at the Site, since point-of-use treatment systems have been installed on all of the affected drinking water wells. In addition, a review of the historical groundwater sample results from the Bush Industries Area show that natural attenuation is occurring. Although sample results from groundwater monitoring wells in the Cattaraugus Cutlery Area do not show a downward trend over time, it is expected that in combination with removing the sources of TCE from the soil in this area under Alternative S-4, TCE concentrations in the groundwater will begin to diminish. Under Alternative GW-2, TCE levels are expected to attenuate to groundwater standards Site-wide in approximately ten years.

While Alternatives GW-3 and GW-4 would actively treat the groundwater in the two source areas, thereby achieving groundwater standards in these areas in an estimated eight years and two years, respectively, these alternatives are significantly more costly to implement than Alternative GW-2.

Therefore, EPA and NYSDEC believe that Alternative GW-2 would minimize the migration of contaminated groundwater at the Site, while providing the best balance of tradeoffs among the alternatives with respect to the evaluation criteria.

The preferred remedy is protective of human health and the environment, provides long-term effectiveness, will achieve the ARARs in a reasonable time frame, and is cost-effective. Therefore, the preferred remedy will provide the best balance of tradeoffs among the alternatives with respect to the evaluation criteria. EPA and NYSDEC also believe that the preferred remedy will treat principal threats and will utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

ALTERNATIVE WATER SUPPLY REMEDY

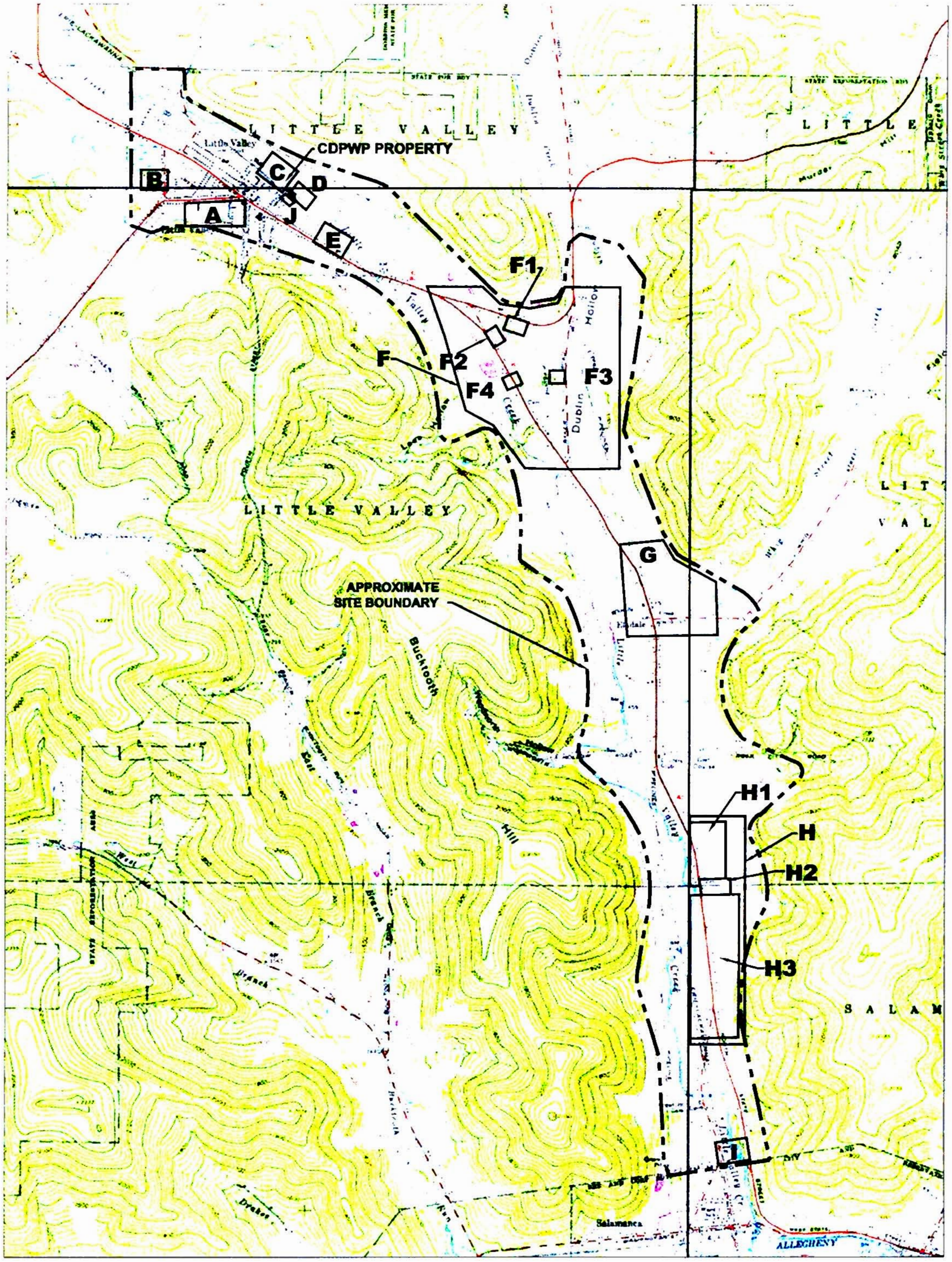
The 1996 ROD provided for the installation of point-of-use treatment units on all of the affected and potentially affected private wells to ensure that drinking water standards were met. The ROD also called for an evaluation of the efficacy of the point-of-use treatment systems within five years of their installation, and a determination as to whether or not a more permanent system (such as a water line) would be required. In the 2002 ESD, EPA determined that it would be more appropriate to evaluate the need for a permanent alternative water supply during the selection of a final remedy for the Site.

Of the 91 private wells that have treatment units installed, 90 were sampled in October 2004. The results show that 49 of the wells are at or below the drinking water standard of 5 μg/L for TCE. Of the 41 wells that have contaminant levels exceeding the drinking water standard, the majority of these wells only marginally exceed 5 μg/L (32 wells have TCE levels between 6 µg/L and 10 µg/L). In addition, sampling results since 1989 indicate that there are decreasing levels of contaminants in all but a few wells; the highest concentration for the October 2004 sampling event was 22 µg/L, as compared to an historical high of 50 µg/L, and the average concentration is now 5.9 µg/L. Also, there is no current unacceptable direct contact risk associated with exposure to the groundwater, since point-of-use treatment systems have been installed on all of the affected drinking water wells.

Since the point-of-use treatment systems need to be operated until MCLs are reached, the costs related to the O&M of these systems are impacted by the duration of the various groundwater alternatives. The estimated annual O&M cost for the point-of-use treatment systems is $101,000. For ten years of operation under the preferred alternative, Alternative GW-2, the overall present-worth cost is $710,000, as compared to an overall present-worth cost of $605,000 for eight years of operation under Alternatives GW-3 and GW-4. The estimated present-worth cost related to the construction, operation, and maintenance of a waterline ranges from $3.5 - $3.7 million.

Based on these findings, EPA proposes to continue to protect public health with the point-of-use treatment units that were installed pursuant to the 1996 remedy decision for this Site until groundwater standards are met, in approximately ten years. NYSDEC will continue to monitor the private wells and maintain the individual point-of-use treatment units until groundwater standards are met at the individual wells.

Support for this decision can be found in EPA's July 2004 *Comparison of Individual Water Treatment Systems and Permanent Water Supply Line Alternatives* (Appendix D of the FS report).



LEGEND:

NYSDEC POTENTIAL SOURCE AREAS:

- **A** BUSH INDUSTRIES AREA
- **B** NINTH STREET LANDFILL AREA
- **C** CATTARAUGUS CUTLERY AREA
- **D** KING WINDOWS (SECOND STREET) AREA
- **E** FIRST STREET AREA
- **F** GREAT TRIANGLE AREA
  INCLUDES:
  - **F1** ENVIROTECH DRUM STORAGE
  - **F2** WESTERN BURNT HOUSE
  - **F3** WINSHIP CIRCLE/BAKER ROAD
  - **F4** TRIANGLE SOUTHWEST
- **G** WHIG STREET AREA
- **H** LUMINITE AREA
  INCLUDES:
  - **H1** NORTH LUMINITE
  - **H2** LUMINITE PLANT AREA
  - **H3** SOUTH LUMINITE
- **I** STATE STREET AREA
- **J** RAILROAD AVENUE AREA
- **CDPWP** CATTARAUGUS COUNTY DEPARTMENT OF PUBLIC WORKS PROPERTY

APPROX. QUADRANGLE LOCATIONS

SOURCE:
BASE MAP ADAPTED FROM U.S.G.S. LITTLE VALLEY, ELLICOTTVILLE, SALAMANCA, AND CATTARAUGUS NEW YORK QUADRANGLES, 7.5 MINUTE SERIES (TOPOGRAPHIC).

0 3000 6000
APPROXIMATE GRAPHIC SCALE

LITTLE VALLEY SUPERFUND SITE

LITTLE VALLEY
CATTARAUGUS COUNTY, NEW YORK

FIGURE 1
SITE BOUNDARY AND
POTENTIAL SOURCE AREAS

TETRA TECH FW, INC.