Five-Year Review Report
Little Valley Superfund Site
Little Valley
Cattaraugus County, New York

Prepared by:

United States Environmental Protection Agency
Region 2
New York, New York

May 2007

EXECUTIVE SUMMARY

This is the second five-year review for the Little Valley Superfund site. A groundwater plume of trichloroethylene extending approximately eight miles southeastward from the Village of Little Valley through the Town of Little Valley to the northern edge of the City of Salamanca (Cattaraugus County) is considered the site. The site is located in a rural, agricultural area with a number of small, active and inactive industries and more than 200 residential properties which are situated along Route 353, the main transportation route between Little Valley and the City of Salamanca. Currently, the remedy is functioning as intended by the decision documents and is protecting human health and the environment.

Five-Year Review Summary Form

SITE IDENTIFICATION

Site Name *(from WasteLAN)*: Little Valley

EPA ID *(from WasteLAN)*: NY0001233634

Region: 2 | **State:** NY | **City/County:** Little Valley/Cattaraugus

SITE STATUS

NPL Status: ■ Final ☐ Deleted ☐ Other (specify)_____

Remediation Status (choose all that apply): ☐ Under Construction ■ Operating ☐ Complete

Multiple OUs? ■ YES ☐ NO | **Construction completion date:** 09/26/2006

Has site been put into reuse? ☐ YES ☐ NO ■ N/A (site involves groundwater plume underlying residential, commercial, and industrial properties and two source areas which have been in continuous use)

REVIEW STATUS

Lead agency: ■ EPA ☐ State ☐ Tribe ☐ Other Federal Agency _____

Author name: John DiMartino

Author title: Remedial Project Manager | **Author affiliation:** EPA

Review period:** 05/16/2002 to 05/16/2007

Date(s) of site inspection: 09/25/2006, 09/26/2006, and 09/28/2006

Type of review:

☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only
☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead
☐ Regional Discretion ■ Policy

Review number: ☐ 1 (first) ■ 2 (second) ☐ 3 (third) ☐ Other (specify) _____

Triggering action:

☐ Actual RA Onsite Construction at OU #____ ☐ Actual RA Start at OU#__1__
☐ Construction Completion ■ Previous Five-Year Review Report
☐ Other (specify) _____

Triggering action date *(from WasteLAN)*: 05/16/2002

Due date *(five years after triggering action date)*: 05/16/2007

Does the report include recommendation(s) and follow-up action(s)? ☐ yes ■ no

Acres in use or suitable for use: **restricted:** 26.4 **unrestricted:** ___

Five-Year Review Summary Form (continued)

Recommendations and Follow-Up Actions

There are no recommendations or follow-up actions.

This site has ongoing operation, maintenance, and monitoring activities as part of the selected remedy. As was anticipated by the decision documents, these activities are subject to routine modification and adjustment.

Soil vapor data from two resampled homes suggest that vapors continue to collect beneath the subslab. While the concentrations are not high enough to warrant a response, they should continue to be monitored. Since the source removal is underway and ongoing groundwater monitoring suggests that trichloroethylene concentrations are continuing to decrease throughout the plume, it is recommended that the two residences be sampled again during the next heating season to ensure that the subslab and indoor air concentrations remain below levels of concern.

Protectiveness Statement

Since the remedial actions at both operable units are protective, the site is protective of human health and the environment.

I. Introduction

This second five-year review for the Little Valley site, located in Little Valley, Cattaraugus County, New York, was conducted by United States Environmental Protection Agency (EPA) Remedial Project Manager (RPM) John DiMartino. The five-year review was conducted in accordance with the Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P (June 2001). The purpose of five-year reviews is to ensure that implemented remedies protect public health and the environment and function as intended by the decision documents . This document will become part of the site file.

The site is being addressed in two phases—an interim groundwater remedy consisting of point-of-use treatment units (Operable Unit One) and a final groundwater remedy, including the control of the sources of groundwater contamination (Operable Unit Two). Under Operable Unit One (OU1), point-of-use treatment units were installed on private wells. Under Operable Unit Two (OU2), EPA selected groundwater and source control remedies and made the interim alternate water supply remedy the final remedy for the water supply.

In accordance with the Section 1.5.3 of the five-year review guidance, a statutory five-year review is triggered by an interim remedy. The trigger for the first five-year review was the start of the installation of the point-of-use treatment units on May 14, 1997. In accordance with the Section 1.3.3 of the five-year review guidance, a subsequent five-year review is triggered by the signature date of the last review (May 16, 2002). Following the first five-year review, a subsequent Record of Decision (ROD) and ROD amendment were issued. These documents define a remedy that restores groundwater to meet state and federal standards within a reasonable time frame, reduces or eliminates any direct contact or inhalation threat associated with contaminated soils and groundwater, and eliminates any inhalation threat associated with soil vapor. These objectives are consistent with a policy review and, therefore, this and subsequent reviews at this site will be policy reviews. This second five-year review provides background information, covers the site history, discusses past data-collection efforts along with information collected in the past five years, and reevaluates risk and remedy protectiveness based on updated assumptions.

This five-year review evaluated both operable units and found that the implemented remedies protect human health and the environment.

II. Site Chronology

Table 1 (attached) summarizes the site-related events from discovery to construction completion.

III. Background

Physical Characteristics

The site area includes a plume of trichloroethylene (TCE)-contaminated groundwater, which extends approximately eight miles along Route 353 between the Village of Little Valley and the northern edge of the City of Salamanca (see Figure 1). The plume 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 above msl near the northern edge of the City of Salamanca. The plume area is bordered by steeply sloping wooded hillsides, which attain slopes of up to 25 percent and elevations of 2,200 feet above msl.

The nearest surface water bodies associated with the site are the Little Valley Creek and its tributaries. Little Valley Creek flows southeast, then south through the Little Valley site for approximately eight miles before joining the Allegheny River. Typical stream flow at Little Valley Creek ranges from 20 to 80 cubic feet per second (cfs) during normal precipitation periods and one to ten cfs during severe drought conditions. During periods of dry hydrologic conditions (such as September 2002), the upper reach of the stream channel of Little Valley Creek can be dry between storm events since the local water table can drop below the streambed.

Site Geology/Hydrogeology

The site geology consists of a U-shaped glacial valley filled with glacially-derived outwash deposits that are frequently overlain by more recent alluvial deposits. The glacial-derived deposits of Little Valley are predominately coarse sand and gravel with isolated lenses of silt and clay. Typically, there are five to thirty feet of alluvial silt and fine sand over the gravel. In some areas, the sand and gravel aquifer is overlain by glaciolacustrine silty clay or clay. These thin lenses are not laterally or vertically extensive.

The water table in the valley ranges from near the surface to 50 below the ground surface. In general, the water table is deepest in the upper (northern) portion of the valley and gets closer to the ground surface as one moves down the valley toward the Allegheny River. The overall groundwater flow direction is from north to south, following the slope of the valley topography. The highly permeable sand and gravel aquifer combined with the observed groundwater gradients result in relatively high estimates of groundwater-flow velocity (more than 5 feet/day).

Land and Resource Use

While the site is located in a rural, agricultural area, a number of active and inactive small industrial facilities are located in the area. There are more than two hundred residential properties situated along Route 353. Private water supply wells constitute the only source of drinking water for these properties.

History of Contamination

In 1982, the Cattaraugus County Health Department (CCHD) and the New York State Department of Environmental Conservation (NYSDEC), while investigating TCE contamination in the vicinity of a small manufacturing facility on Route 353, detected TCE in nearby private wells. In 1989, CCHD and New York State Department of Health (NYSDOH) determined that the TCE contamination plume extended from the Village of Little Valley to the northern edge of the City of Salamanca. NYSDEC installed a number of monitoring wells in the area to investigate possible sources of the contamination. No sources were found.

Initial Response

Although CCHD issued health advisories to the exposed residents in 1989, affected well owners were not provided with alternate water sources. About six property owners independently installed granular activated carbon filter systems and others purchased bottled water.

Basis for Taking Action

Following the listing of the site on the National Priorities List in June 1996, EPA prepared a focused feasibility study (FFS) to develop, screen, and evaluate alternatives for an alternative water supply system for the affected and potentially affected residences at the site.

IV. Remedial Actions

Remedy Selection

Based upon the findings of the FFS, EPA issued a ROD on September 30, 1996, providing for the installation of air stripper treatment units[1] on all affected and potentially affected private wells to ensure that drinking water standards are met[2]. The ROD also called for an evaluation of the efficacy of the 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

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[1] The ROD called for the installation of air stripper treatment units on TCE-contaminated private wells associated with the site. 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. Subsequently, granular activated carbon units were installed in addition to the air strippers as polishing units to insure the consistent removal of contaminants.

[2] The Maximum Contaminant Level (MCL) (*i.e.*, the drinking water standard) for TCE, the contaminant of concern, is 5 micrograms per liter (µg/l).

of a final remedy for the site, which will address the source area(s) and the groundwater contamination. EPA also determined that because of the downward trend in contaminant concentrations in the private wells[3], granular activated carbon units alone will effectively remove the contamination. Subsequently, the air stripper treatment units were removed from each well and replaced with a second granular activated carbon unit.

A remedial investigation (RI), conducted from 1997 through 2003, investigated 10 potential source areas for the presence of TCE and/or TCE-related compounds. Based upon the data that were collected, five of these 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. Based upon the results of a June 2005 RI/feasibility study report, on August 19, 2005, a ROD (2005 ROD) was signed which called for the excavation and off-site treatment/disposal of an estimated 220 cubic yards of contaminated soils located on the Cattaraugus Cutlery Area and monitored natural attenuation (MNA) for the site-wide groundwater. The 2005 ROD also called for an evaluation of the potential for soil vapor intrusion into structures within the study area and mitigation, if necessary. In addition, the ROD included institutional controls in the form of informational devices (*e.g.*, notifications).

As is noted above, the 1996 ROD provided for the installation and maintenance of point-of-use treatment systems for private wells affected by Site contamination as an interim remedy. The 2005 ROD also made the interim alternate water supply remedy the final remedy for the water supply.

In September and November 2005, in accordance with the selected remedy for the soil, EPA undertook pre-excavation soil sampling to define the boundaries of the soil contamination at the Cattaraugus Cutlery Area. The results from this sampling effort indicated that the volume of contaminated soil is substantially greater than originally estimated in the 2005 ROD (it increased from approximately 220 cubic yards to approximately 3,000 cubic yards).

Since EPA believed that the increased volume of contaminated soil at the Cattaraugus Cutlery Area would impact the feasibility, effectiveness, and overall cost effectiveness of the selected remedy, the remedial alternatives for the soil component of the remedy selected in the 2005 ROD were reevaluated in *Focused Feasibility Study Report, Presentation of Air Permeability Testing Results and Evaluation of Soil Remedial Alternatives Related to the Cattaraugus Cutlery Area, Little Valley Superfund Site, Cattaraugus County, New York*, EPA, July 2006 (2006 FFS) report. Based upon the findings of the 2006 FFS and the results of a treatability study, it was determined that in-situ vapor extraction (ISVE) would be effective in addressing the contaminated soil at the Cattaraugus Cutlery Area.

On September 28, 2006, a ROD amendment was approved, changing the soil remedy selected in the 2005 ROD to ISVE. The 2006 ROD amendment also calls for excavation and off-site treatment/disposal as a contingency remedy should operational data indicate that ISVE will not address all of the contaminated soils.

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[3] The highest concentration of TCE is now 18.5 µg/l, as compared to an historical high of 50 µg/l.

The objectives of the two RODs, ROD amendment, and the ESD are to prevent exposure of area residents to contaminated groundwater, 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, 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.

Remedy Implementation

Point-of-Use Treatment Systems

The 1996 ROD called for the installation of air stripper treatment units on TCE-contaminated private wells associated with the site. 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 activated carbon treatment units[4].

The design related to the point-of-use treatment units was performed from December 1996 through March 1997. Air stripper treatment units were installed on 91 private wells by EPA's Removal Contractor from May 1997 through October 1997. Subsequently, 1.5 cubic foot-granular activated carbon treatment units were installed hydraulically downgradient of the air strippers.

An Interim Remedial Action Report for the alternate water supply was approved on September 29, 1998.

After five years of operation, it was determined that the air strippers were reaching the end of their useful life. Therefore, it was assumed that the maintenance requirements associated with these units would increase. Because of the significant reduction in contaminant concentrations in the private wells, EPA determined that granular activated carbon units alone would be able to effectively remove the contamination. EPA also determined that the activated carbon units alone would be as protective of public health as the combined air stripper/activated carbon treatment units. For these reasons, EPA decided to remove the air stripper treatment units and use only activated carbon treatment units to address the contamination in the private wells.

While the existing granular activated carbon units alone would adequately remove the TCE from the groundwater, under NYSDEC and NYSDOH standard operating procedures, the carbon in single carbon units must be replaced every two years. However, if two granular activated carbon treatment units are installed in series, the above-noted standard operating procedures allow the carbon to be replaced once sampling shows that the carbon in the primary tank (the first tank) is no longer

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[4] The cost of operating carbon treatment units is largely a function of the "useful life" of the carbon (*i.e.*, how long the carbon can effectively treat the water before it needs to be replaced). The useful life of the carbon depends on the contaminant levels in the water that is passed through the treatment unit. The greater the contamination levels, the shorter the life of the carbon, which will require more frequent replacement of the carbon in the treatment unit.

effectively removing the contaminants (the secondary tank would remove any contaminants that pass through the primary tank, thereby continuing to protect the water supply). Since the long-term cost of installing an additional carbon unit on each well and the carbon replacement expenses related to two granular activated carbon treatment units installed in series would be significantly less than the carbon replacement expenses associated with single carbon units, when the air strippers were removed, an additional carbon unit was installed on each well. The conversion was performed from August to September 2002. On October 3, 2002, the responsibility for maintaining the point-of-use treatment systems and monitoring the private wells was transferred from EPA to NYSDEC.

Soil Vapor Extraction System

ISVE works best in high permeability soils. Because of concerns about the viability of ISVE at the Cattaraugus Cutlery Area due to the predominance of silt, from April 15 – 16, 2006, EPA performed an air flow study to provide an indication as to whether or not ISVE could successfully be used to remediate volatile organic compound (VOC)-contaminated soils.

Six soil vapor extraction/monitoring wells were installed from seven to 12 feet below the ground surface in the contaminated area for evaluation. Air flow and vapor concentration data were collected during testing of each well and from the combined air stream of all six wells. The results of the testing indicated that air flow rates, contaminant concentration levels, and the radius of influence of the ISVE extraction/monitoring wells were suitable to support full-scale ISVE pilot test operations.

An ISVE system, consisting of 25 additional vapor extraction wells and a positive displacement blower rated at 500 CFM air flow at 5 inches of Hg, was subsequently installed. The ISVE system (blower, etc.) is located in a sealed, metal cargo container. Off-gas treatment from the ISVE system is provided by two 2,000-pound vapor phase granular activated carbon vessels arranged in series. The pilot test commenced on August 14, 2006. From September 27-28, 2006, a subsurface horizontal vapor extraction well was installed to address subsurface soil contamination beneath one of the buildings.

Soil Vapor Intrusion Mitigation

Concerns about TCE vapors from the groundwater getting into the air inside homes in the study area prompted the 2005 ROD to call for an evaluation of the potential for soil vapor intrusion into structures within the study area and the installation of mitigation systems, if necessary.

To evaluate the possibility of soil vapor intrusion, in September 2005, EPA tested under the foundations of 23 homes and the Luminite facility as a representative sample of the more than 300 residences and businesses overlying the contaminant plume. In January 2006, EPA revisited 12 of the homes tested in September 2005 to sample the indoor air quality and also tested under the foundations of an additional four homes. Based upon these results, EPA collected subslab samples

from an additional 82 homes in July 2006[5]. In August 2006, indoor air samples were collected from 36 homes and subslab samples were collected from beneath two homes.

Based upon the results of the soil vapor intrusion sampling effort, subslab mitigation systems were installed beneath two residences from September 27-28, 2006.

Monitored Natural Attenuation

The 2005 ROD called for MNA of the TCE-contaminated groundwater underlying the Bush Industries, Cattaraugus Cutlery, Great Triangle, and Ninth Street Landfill Areas, as well as the site-wide groundwater plume.

EPA's contractor, TetraTech, prepared an MNA plan, which was approved by EPA on May 8, 2006. The MNA plan is being implemented as a limited action for one year. The limited action commenced on July 26, 2006. After one year of MNA data collection and evidence of natural attenuation, an operational and functional determination will be made. The MNA monitoring will then continue as a long-term response action.

The first round of MNA samples was collected in late October 2006.

Institutional Controls Implementation

In the 2005 ROD, a number of institutional controls—notices, deed restrictions, contractual agreements, and informational devices (*e.g.*, notifications) were considered to further prevent human exposure to contaminated groundwater underlying the Bush Industries and Cattaraugus Cutlery Areas until groundwater standards are met. Both Bush Industries and the facility located on the Cattaraugus Cutlery Area obtain potable water from the Public Water Supply of the Village of Little Valley. In addition, groundwater standards are expected to be achieved in these areas through 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, EPA 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. Specifically, after an initial notification, NYSDEC, NYSDOH, and/or CCHD will 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. In addition, EPA notified 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 at the Bush Industries and Cattaraugus Cutlery Areas, the properties are to be inspected annually to verify that wells without treatment systems have not been installed. An annual report summarizing the results of the

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[5] Although soil vapor intrusion information packets and access agreements were provided to over 300 homeowners/tenants, a public meeting was held on June 14, 2006 to discuss the soil vapor intrusion program, and follow up letters were sent to those homeowners/tenants that failed to respond to the initial access agreement package, only 148 consented to the sampling program.

groundwater monitoring and the findings of such inspections will be prepared.

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 prevent human exposure to contaminated groundwater from these properties (until groundwater standards are met) were determined to be unnecessary.

System Operations/Operation and Maintenance

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 point-of-use treatment systems 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. Private wells in the area are sampled annually.

The ISVE system's granular activated carbon will be replaced as necessary. Periodic monitoring of the off-gases is conducted.

Natural attenuation monitoring of the TCE-contaminated groundwater underlying the Bush Industries, Cattaraugus Cutlery, Great Triangle, and Ninth Street Landfill Areas, as well as the site-wide groundwater plume, will be conducted on an annual basis. The first monitoring was conducted in October 2006.

The estimated annual operation and maintenance (O&M) cost related to the point-of-use treatment systems, ISVE system O&M, and natural attenuation monitoring are $64,000, $36,000, and $166,000, respectively. The costs are broken down in Table 2 (attached).

V. Progress Since Last Five-Year Review

The first five-year review concluded that the individual treatment units (OU1) were protecting residents from exposure to contaminated groundwater and that it was expected that the remedy would remain protective of public health until the next five-year review. Therefore, the first five-year review concluded that for OU1, it appeared that human exposure is under control. The individual treatment units continue to protect residents from exposure to contaminated groundwater.

A protectiveness determination related to OU2 could not be made during the first five-year review since the source control and groundwater RI/FS was underway at that time. The first five-year review did, however, note that the investigation, to date, had not identified any direct exposure to contamination other than groundwater contamination. Since the first five-year review, remedies to address the contaminated soil and groundwater have been selected and implemented.

The first five-year review for this site presented two recommendations and followup actions (see Table 3, attached). As can be seen by the table, the recommendations and follow-up actions have been addressed.

VI. Five-Year Review Process

Administrative Components

The five-year review team consisted of:

John DiMartino (EPA RPM)
Louis DiGuardia (EPA On-Scene Coordinator)
Michael Scorca (EPA hydrogeologist)
Mindy Pensak (EPA ecological risk assessor)
Michael Sivak (EPA human health risk assessor)
Linda Ross (NYSDEC RPM)

Community Involvement

The EPA Community Involvement Coordinator (CIC) for the Little Valley site, Michael Basile, published notices in the *Olean Times Herald* and the *Salamanca Press,* the local newspapers, on March 15, 2007, notifying the community of the initiation of the five-year review process. The notice indicated that EPA would be conducting a five-year review of the remedy for the site to ensure that the implemented remedy remains protective of public health and the environment and is functioning as designed. It was also indicated that once the five-year report is completed, the results will be made available in the local site repository. In addition, the notice included the RPM's address and telephone number for questions related to the five-year review process or the Little Valley site.

Document Review

The documents, data, and information which were reviewed in completing the five-year review are summarized in Table 4 (attached).

Data Review

The most recent sampling of groundwater quality was conducted in October 2006 at 24 monitoring wells near the source areas and downgradient within the valley. During this period, the highest TCE concentration in groundwater was detected at the Bush Industries property (93 µg/l). The highest TCE concentration that was observed in groundwater at the Cattaraugus Cutlery Area was 28 µg/l.

Of the 91 private residential wells that have point-of-use treatment systems installed, 90 were

sampled annually by NYSDEC during the review period[6]. From 2002 to 2006, the TCE concentrations in 76 of the private wells either stayed constant or decreased slightly; the TCE concentrations in 14 wells increased slightly (one well increased by 5 µg/l, but most increased by only 1 or 2 µg/l). TCE concentrations in the sampled residential wells during this five-year period ranged from not detected to 24 µg/l. Based upon the 2006 results, the TCE concentrations in 36 of the wells are at or below the MCL.

Statistical information from the residential well data was generated by grouping the results for each sampling period and determining basic statistics (maximum, minimum, median, and average concentrations, as well as the percentage of samples that exceed the MCL). The results of this analysis are shown on Figure 2. Overall, each of the statistical values show decreased concentrations since 1997 (annual sampling of the private wells began following the installation of the point-of-use treatment systems), with some variability. Specifically, since 1997, the number of wells with TCE excursions has decreased from over 90 percent in 1997 to about 60 percent in the most current round (2006), and was even as low as about 44 percent in 2004. The results show an overall progression toward improvement of the groundwater quality.

TCE concentrations are generally lower in the southern downgradient portion of the plume (*i.e.*, nearer the border with Salamanca) in comparison to the northern portion of the Site (*i.e.*, Bush Industries, Cattaraugus Cutlery and/or Great Triangle Areas).

Natural attenuation of TCE via reduction dechlorination produces daughter products such as 1,1-dichloroethylene (DCE), 1,2-DCE, and vinyl chloride. The results of the October 2006 MNA sampling indicate that the current groundwater quality is not readily conducive to biodegradation by reductive dechlorination throughout most of the plume, however, some daughter products are detected within the plume and appear to indicate that limited degradation of TCE is occurring in some locations. The presence of these daughter products in the Bush Industries Area, and to a lesser extent, the Cattaraugus Cutlery and Great Triangle Areas, indicates that dechlorination is occurring near the source areas. Further downgradient areas in the valley showed no detectable concentrations of daughter products.

Concentrations of selected VOCs (TCE, 1,2-DCE, and vinyl chloride) were evaluated statistically at selected individual monitoring and residential wells across the valley. None of the selected wells showed a statistically increasing trend for the selected VOCs.

Other natural attenuation mechanisms, such as dilution, dispersion, and/or adsorption, and biodegradation by cometabolism, may also be occurring within the valley aquifer system. These mechanisms, and the installation of a soil remedy at the Cattaraugus Cutlery property, should continue to improve the quality of water in the valley over time.

As was noted above, based upon the results of the soil vapor intrusion sampling effort, subslab mitigation systems were installed beneath two residences in 2006. Indoor air samples collected after

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[6] One property is vacant; the well was inaccessible.

the mitigation systems were installed are all at concentrations less than the level of concern[7]. Subslab concentrations from samples collected from two other homes indicate the presence of TCE vapors, but at levels which do not warrant mitigation[8].

Site Inspection

Site inspections were performed on three different occasions as follows. On September 25, 2006, the groundwater monitoring wells associated with the MNA sampling effort were inspected. On September 26, 2006, the majority of the ISVE system was inspected (the remaining portion of the system was inspected subsequently, see below), and on September 28, 2006, the two vapor mitigation systems and the subsurface horizontal vapor extraction well were inspected. Inspection participants included:

John DiMartino, EPA RPM
Lou DiGuardia, EPA OSC
Jeff Catanzarita, EPA Environmental Response Team
Linda Ross, NYSDEC RPM
Tom Williams, WRS

Interviews

No interviews were conducted during the review period.

Institutional Controls Verification and Effectiveness

The 2005 ROD called for institutional controls. Specifically, after an initial notification, NYSDEC, NYSDOH, and/or CCHD will 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 will 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 at the Bush Industries and Cattaraugus Cutlery Areas, the properties will be inspected annually to verify that wells without treatment systems have not been installed.

On December 21, 2005, EPA notified the Bush Industries and Cattaraugus Cutlery Area property owners via letters that the selected remedy includes MNA and institutional controls and that the groundwater underlying their respective properties is contaminated and should not be used without treatment. On December 22, 2005, the local governmental agencies were notified via letters 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.

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[7] The concentrations of TCE were below the screening level for indoor air of 5 micrograms per cubic meter ($\mu g/m^3$).

[8] The TCE concentrations in subslab were below the screening level is 50 $\mu g/m^3$.

As part of EPA's natural attenuation monitoring at the Bush Industries and Cattaraugus Cutlery Areas, the properties are to be inspected annually to verify that wells without treatment systems have not been installed. Visual inspections were performed at the Bush Industries and Cattaraugus Cutlery Areas during the October 2006 sampling event. No new wells were identified.

In March 2007, NYSDEC indicated that after discussion between NYSDOH, CCHD and NYSDEC, letters to the local governmental agencies reminding 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, will be sent out by CCHD. This year, the letters will be sent out as soon as they are approved. Subsequently, letters will be sent out on an annual basis in January.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The objectives of the two RODs, ROD amendment, and the ESD are to prevent exposure of area residents to contaminated groundwater, 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, 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. Based upon the review of the documents summarized in Table 3 and the results of the routine evaluations of the treatment units and the ISVE system and the first round of MNA sampling, it has been concluded that the remedy is functioning as intended by the decision documents.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. There have been no changes in the Applicable or Relevant and Appropriate Requirements and no new standards affecting the protectiveness of the remedy.

The exposure assumptions used to develop the human health risk assessments were residential exposure to contaminated groundwater via ingestion, direct contact, and inhalation during bathing and commercial worker exposure to contaminated soils and to contaminated groundwater used as process water or commercial car washes.

There have been no changes in the toxicity factors for TCE that were used in the baseline risk assessments and no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

Indoor air samples collected after the mitigation systems were installed in the two homes are all at

concentrations less than the level of concern[9]. Subslab concentrations from samples collected from two other homes indicate the presence of TCE vapors at levels which do not warrant mitigation[10].

Since the source removal is underway, and ongoing groundwater monitoring suggests TCE concentrations are continuing to decrease throughout the plume, it is recommended that the 2 residences with elevated subslab concentrations be sampled again during the next heating season to ensure that the subslab and indoor air concentrations remain below levels of concern.

The remedial action objectives noted in Question A, above, are still valid.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

There is no information that calls into question the protectiveness of the remedies.

Technical Assessment Summary

Based upon the results of the five-year review, it has been concluded that the point-of-use treatment units are functioning as intended by the 1996 ROD, as modified by the ESD. 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, TCE concentrations in the groundwater will naturally attenuate.

Based upon operational data, the ISVE system has already successfully recovered approximately 400 pounds of contaminants since it became operational in August 2006[11].

VIII. Recommendations and Follow-Up Actions

There are no recommendations or follow-up actions.

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9 The concentrations of TCE were below the screening level for indoor air of 5 $\mu g/m^3$.

10 The TCE concentrations in subslab were below the screening level is 50 $\mu g/m^3$.

11 Although the 2006 ROD amendment has a contingency remedy of excavation and off-site treatment/disposal should operational data indicate that ISVE will not address all of the contaminated soils, based upon the yields of VOCs and the operational data that has been collected, it appears that the contingency remedy will not be needed.

This site has ongoing operation, maintenance, and monitoring activities as part of the selected remedies. As was anticipated by the decision documents, these activities are subject to routine modification and adjustment.

Soil vapor data from two resampled homes suggest that vapors continue to collect beneath the subslab. While the concentrations are not high enough to warrant a response, they should continue to be monitored. Since the source removal is underway, and ongoing groundwater monitoring suggests that TCE concentrations are continuing to decrease throughout the plume, the two residences will be sampled again during the next heating season to ensure that the subslab and indoor air concentrations remain below levels of concern (see Table 5).

IX. Protectiveness Statement

Since the remedial actions at both OUs are protective, the site is protective of human health and the environment.

X. Next Review

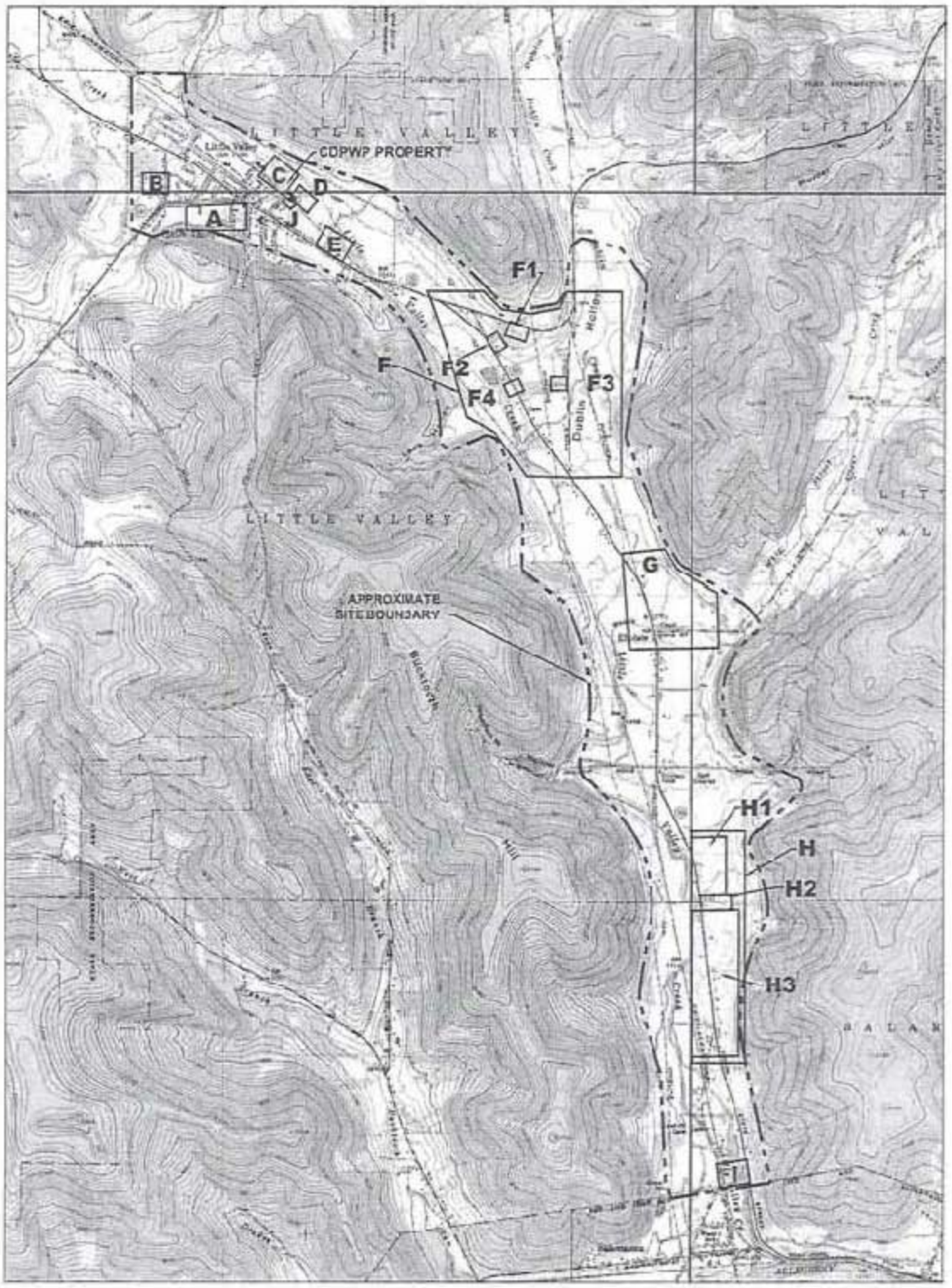
The next five-year review for the Little Valley site should be completed before May 2012.

Approved:

William McCabe

George Pavlou, Director
Emergency and Remedial Response Division

5-16-07
Date



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 1946 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

0 3000 5000
APPROXIMATE GRAPHIC SCALE

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)

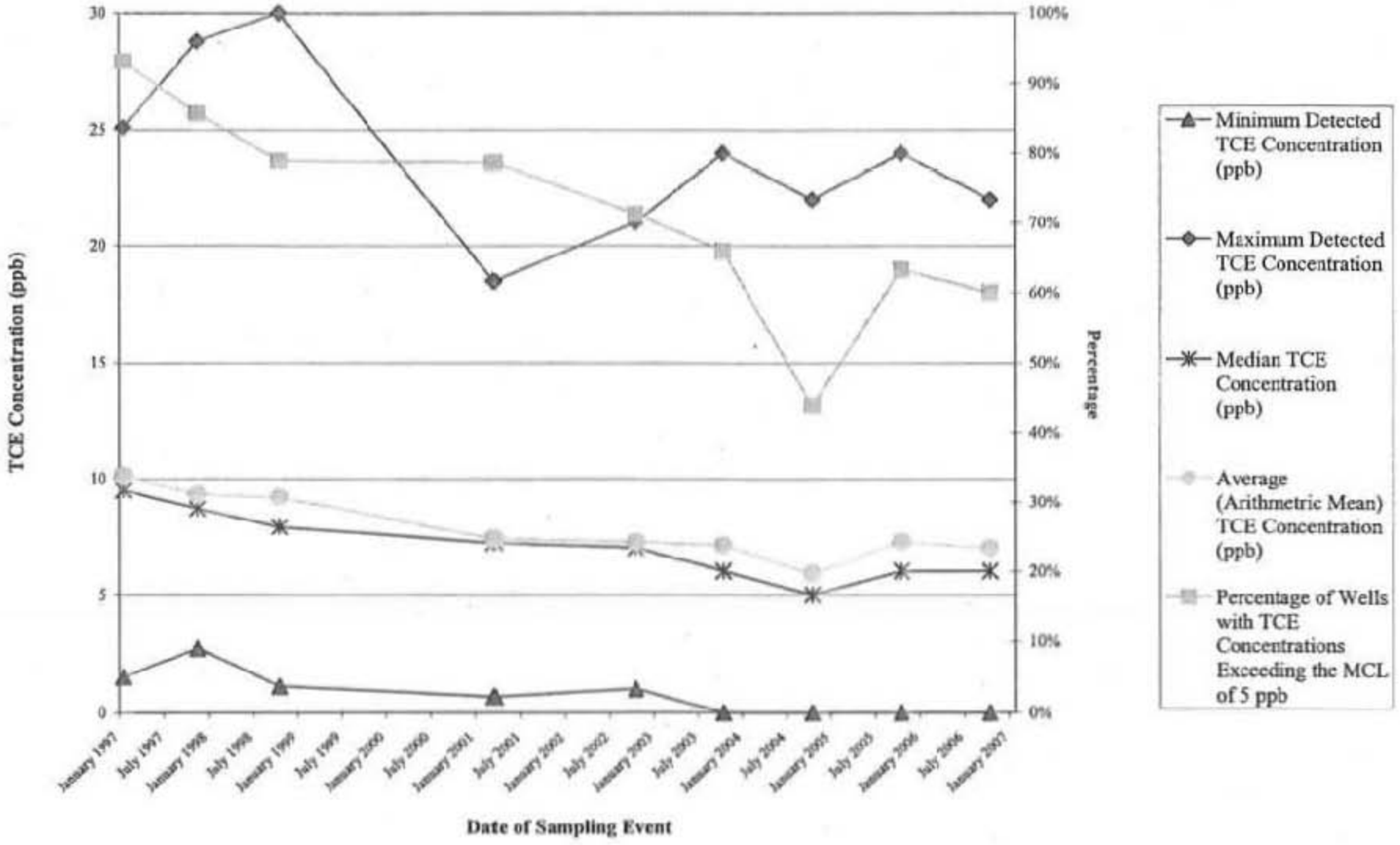
LITTLE VALLEY SUPERFUND SITE

LITTLE VALLEY
CATTARAUGUS COUNTY, NEW YORK

FIGURE 1
SITE BOUNDARY AND
POTENTIAL SOURCE AREAS

TETRA TECH FW, INC.

FIGURE 2
Residential Well Statistical Calculations Graph
Little Valley Superfund Site



NOTE: Sampling events occurred in January 1997, November 1997, between October 1998 and February 1999, March 2001, October 2002, October 2003, October 2004, October 2005, and October 2006.

Table 1: Chronology of Site Events	
Event	**Date(s)**
Cattaraugus County Health Department (CCHD) and New York State Department of Environmental Conservation (NYSDEC) investigate trichloroethylene contamination at a local manufacturing facility.	1982
CCHD and New York State Department of Health sample residential wells.	1989-1996
NYSDEC conducts a source investigation.	1989-1994
Little Valley Site listed on National Priorities List.	1996
Alternate water supply Record of Decision signed.	1996
Source identification and control remedial investigation and feasibility study commences.	1997
Installation of stripper treatment units on impacted residential wells.	1997
Alternate water supply Explanation of Significant Differences issued.	2002
First five-year review	2002
NYSDEC assumes responsibility for the operation and maintenance of the point-of-use treatment units and annual sampling of private wells.	2002
Source identification and control remedial investigation and feasibility study completed.	2005
Source identification and control Record of Decision signed.	2005
Soil sampling and reassessment of soil remedy.	2005-2006
Amendment to Record of Decision (Soil)	2006
Commence Monitored Natural Attenuation Sampling	2006
Soil vapor extraction (ISVE) pilot study and design	2006
Commence full-scale operation of ISVE system	2006
Preliminary Close-Out Report	2006

Table 2a: Annual Point-of-Use Treatment System Operating Costs	
Activity	Annual Cost
Labor	$51,000
Materials	$14,000
Total Estimated Annual Operating Cost:	**$65,000**

Table 2b: Annual In-Situ Vapor Extraction Operating Costs			
Activity	Unit Cost	Quantity	Annual Cost
General O&M	$1,000 /month	12months/yr.	$12,000
Electricity ($0.15 KW HR)	$500 /month	12 months/yr.	$6,000
GAC Replacement	$1,000 /month	12 months/yr.	$12,000
Air Monitoring	$500 /month	12 months/yr.	$6,000
Total Estimated Annual Operating Cost:			**$36,000**

Table 2c: Annual Monitored Natural Attenuation Costs		
First-Year Charges		
Task No.	Task Description	Estimated Cost
1	Project Planning and Support (evaluate existing data and documents, develop draft work plan and budget estimate)	$90,000
2	Develop/Site-Specific Quality Assurance Project Plan and Health and Safety Plan	$2,800
3	Data Collection and Evaluation (mobilization and demobilization, monitoring well sampling [24 monitoring wells], per diem, transportation, lodging, inspections, and data evaluation report preparation)	$125,000
4	Sample Analysis	$26,000
5	Analytical Support and Data Validation	$4,200
First-Year Cost:		$248,000

Second- Through Ninth-Year Charges		
Task No.	Task Description	Estimated Cost
3	Data Collection and Evaluation (mobilization and demobilization, monitoring well sampling [24 monitoring wells], per diem, transportation, lodging, inspections, and data evaluation report preparation)	$125,000
4	Sample Analysis	$26,000
5	Analytical Support and Data Validation	$4,200
Total Second- Through Ninth-Year Cost:		$155,200

Table 2c Continued: Annual Monitored Natural Attenuation Costs		
Tenth-Year Charges		
Task No.	Task Description	Estimated Cost
3	Data Collection and Evaluation (mobilization and demobilization, monitoring well sampling [24 monitoring wells], per diem, transportation, lodging, inspections, and data evaluation report preparation)	$125,000
4	Sample Analysis	$26,000
5	Analytical Support and Data Validation	$4,200
6	Work Assignment Closeout	$21,000
Tenth-Year Cost:		$176,200

Monitored Natural Attenuation Cost Summary	
First-Year Cost:	$248,000
Total Second- Through Ninth-Year Charges ($155,200 x 8)	$1,241,600
Tenth-Year Cost:	$176,200
Total Cost for 10 Years:	$1,665,800
Total Present-Worth Cost (10 years at a 7% discount rate):	$1,169,988
AVERAGE ANNUAL MONITORED NATURAL ATTENUATION COST:	$166,600

Table 3: Recommendations and Follow-up Actions from the 2002 Five-Year Review		
Issue	**Recommendations and Follow-Up Actions**	**Status**
Replace the air strippers with granulated activated carbon units.	Upon execution of the Superfund State Contract by New York State, funding will be provided for the removal of the air strippers and the installation of an additional granulated activated carbon unit on each well.	Removal of air strippers and installation of an additional granulated activated carbon unit on each well was completed in 2002.
Source control and final groundwater remedy has not been selected.	Complete Proposed Plan and ROD for OU2.	A ROD was issued in 2005. An amendment to the ROD was issued in 2006.

Table 4: Documents, Data, and Information Reviewed in Completing the Five-year Review
• Focused Feasibility Study Report, EPA, August 1996
• Record of Decision (Operable Unit One), EPA, September 1996.
• Remedial Design Report, EPA, March 1997.
• Operation and Maintenance Manual, Earth Tech, Inc., August 1997.
• Remedial Action Report, EPA, September 1998.
• Assessment of individual treatment units Costs, EPA, January 2002.
• Residential Well Sampling Data, 1989 - 2001.
• Assessment of individual treatment units Costs, Little Valley Superfund Site, EPA, October 2001
• Explanation of Significant Differences, EPA, April 2002.
• EPA Hazardous Substance Response Fund Contractor Cost/Receiving Reports from 1997 - 2002.
• Sampling Trip Reports and Data Transmittal Memos, prepared by Roy F. Weston, Inc. for EPA.
• Remedial Investigation and Feasibility Study, Little Valley Superfund Site, Cattaraugus County, New York, Tetra Tech FW, Inc., January 2005.
• Record of Decision (Operable Unit Two), EPA, August 2005.
• Focused Feasibility Study Report, Presentation of Air Permeability Testing Results and Evaluation of Soil Remedial Alternatives Related to the Cattaraugus Cutlery Area, Little Valley Superfund Site, Cattaraugus County, New York, EPA, July 2006.
• Amendment to Record of Decision (Operable Unit Two), EPA, September 2006.
• Draft Data Evaluation Report #1 for the Remedial Action, Little Valley Superfund Site, Cattaraugus County, New York, Tetra Tech EC, Inc., March 2007
• Annual Sampling Reports for GAC Treatment Systems, Little Valley, EarthTech, 2002-2006
• EPA guidance for conducting five-year reviews and other guidance and regulations to determine if any new applicable or relevant and appropriate requirements relating to the protectiveness of the remedy have been developed since EPA issued the ROD.

Table 5: Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls	
Comment	**Suggestion**
Soil vapor data from two resampled homes suggest that vapors continue to collect beneath the subslab. While the concentrations are not high enough to warrant a response, they should continue to be monitored.	Since the source removal is underway, and ongoing groundwater monitoring suggests that TCE concentrations continuing to decrease throughout the plume, it is recommended that the two residences be sampled again during the next heating season to ensure that the subslab and indoor air concentrations remain below levels of concern.

Table 6: Acronyms Used in this Document	
CCHD	Cattaraugus County Health Department
DCE	Dichloroethylene
EPA	United States Environmental Protection Agency
CIC	Community Involvement Coordinator
cfs	Cubic Feet per Second
ESD	Explanation of Significant Differences
FFS	Focused Feasibility Study
MCL	Maximum Contaminant Level
µg/l	Micrograms per Liter
$\mu g/m^3$	Micrograms per Cubic Meter
msl	Mean Sea Level
MNA	Monitored Natural Attenuation
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Protection
NYSDOH	New York State Department of Health
O&M	Operation and Maintenance
OU1	Operable Unit 1
OU2	Operable Unit 2
RA	Remedial Action
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
TCE	Trichloroethylene
VOC	Volatile Organic Compound