

# PRELIMINARY SITE CLOSEOUT REPORT FOR VESTAL WATER SUPPLY WELL 1-1 SUPERFUND SITE

## I. INTRODUCTION

The United States Environmental Protection Agency (EPA) has determined that construction activities at the Vestal Water Supply Well 1-1 Superfund Site (Site) have been completed in accordance with the *Close-out Procedures for National Priorities List Sites (OSWER Directive 9320.2-09A-P, January 2000)*. EPA, the New York State Department of Environmental Conservation (NYSDEC), and the United States Army Corps of Engineers (USACE) conducted a final inspection of the second operable unit (OU2) remedial action for Area 4 on June 24, 2003, and determined that the contractor constructed the remedy in accordance with the remedial design (RD) plans and specifications. Other remedial actions at this site have been constructed and remedial action or interim remedial action reports approved. All of the work was constructed consistent with the 1986 and 1990 Records of Decision (RODs).

## II. SUMMARY OF SITE CONDITIONS

### Background

The Vestal Water Supply Well 1-1 is located in the Town of Vestal, Broome County, New York, about five miles southwest of the city of Binghamton, on the south bank of the Susquehanna River. Well 1-1 is one of three production wells in Water District 1 that provide drinking water for most of the western part of the Town of Vestal. The other two are Wells 1-2 and 1-3. Well 1-1 was taken off-line in 1980 because of contamination with volatile organic compounds (VOCs). After chlorinated organic solvents were discovered in Well 1-1, the well pumpage was diverted to the Susquehanna River in 1980. NYSDEC commenced a remedial investigation/feasibility study (RI/FS) of the site in April 1985 under a Cooperative Agreement with EPA. This investigation confirmed the presence of volatile organic compounds, primarily 1,1,1-trichloroethane (TCA), trichloroethene (TCE), 1,2-dichloroethene (DCE), and 1,1-dichloroethane in the groundwater southeast and east of Well 1-1, and resulted in EPA's first operable unit (OU1) ROD which addressed the drinking water supply well.

In addition to addressing the water supply, the OU1 ROD recommended that an OU2 RI/FS be undertaken to evaluate four suspected source areas of contamination upgradient of Well 1-1. EPA initiated the OU2 RI/FS in November 1988. The results of the RI/FS revealed significant VOC contamination in subsurface soils located in two areas in the Stage Road Industrial Park, which constituted a potential threat to groundwater resources. Elevated concentrations of TCA, TCE, DCE and tetrachloroethene were detected in source Areas 2 and 4.

EPA proposed the site for the National Priorities List (NPL) on December 30, 1982 (47 FR 58476), and added it to the NPL on September 8, 1983 (48 FR 40658).



## **Remedial Construction Activities**

### *OU1*

The OU1 ROD was signed by EPA on June 27, 1986, and called for the placement of an air stripper on Well 1-1 to enable the well to return to full-service as a potable water supply. This remedy was intended to accomplish the following: (1) restoration of District 1 water supply capacity to the level that existed prior to loss of Well 1-1; (2) provision of a water supply to District that protects public health; (3) hydraulic containment of the plume contaminants by pumping Well 1-1, thereby protecting other District 1 water supply wells; and (4) treatment of groundwater from Well 1-1 by air stripping to stop the discharge of contaminated water to the Susquehanna River. EPA procured Camp Dresser & McKee (CDM) to implement the remedial design of the air stripper and Ebasco Services, Inc. to implement the construction of the air stripper. The construction of the air stripping facility was started in May 1989 and completed in July 1990. However, due to problems at existing Well 1-1, Well 1-1 was replaced by a new well, Well 1-1A. Well 1-1A has a pumping capacity of approximately 1000 gallons per minute.

In March 1995, EPA issued a Remedial Action Report which determined that Well 1-1A and the associated air stripping facility were fully functional and operational as a potable water supply. However, the NYSDEC, which had previously agreed through a cooperative agreement with EPA to provide Long-Term Response Action (LTRA) for this facility, was unable to secure a contract with the Town of Vestal to perform LTRA on behalf of the State. In May 1995, the NYSDEC informed EPA that it no longer desired to perform LTRA. Therefore, EPA procured Foster Wheeler Environmental Corporation to perform the LTRA. Foster Wheeler Environmental Corporation started LTRA in October 1996. Treated water discharges to the Susquehanna River, since the Town of Vestal has indicated that it no longer requires the treated water from Well 1-1A for potable purposes.

The cleanup levels in the OU1 ROD are the federal and state drinking water standards for groundwater. The groundwater discharged from the air stripping facility to the Susquehanna River has met these standards and has also met surface water discharge requirements. It is expected that EPA will continue to fund pumping and treating of the contaminated groundwater via air stripping until October 2006, when operation of the system will be turned over to NYSDEC to perform operations and maintenance.

### *OU2*

A ROD for OU2 was signed on September 27, 1990. The remedy described in the ROD for OU2 included in-situ vacuum extraction (SVE) of volatile organic contamination from soil in source Areas 2 and 4 within the Stage Road Industrial Park, followed by carbon adsorption, with subsequent treatment and disposal of contaminated carbon at a permitted off-site facility and a monitoring program to evaluate the progress of the



vacuum extraction remedy.

The cleanup levels specified in the OU2 ROD were developed by EPA after consideration of the following remedial action objectives: (1) ensure protection of groundwater from continued release of VOC contamination from soil; (2) ensure protection of Vestal 1-1 water quality from any inorganic groundwater contamination, if necessary; and (3) ensure protection of human health, presumably that of Site workers who could be exposed to contaminated soils during excavation activities.

The cleanup goals in the OU2 ROD for the soil were 170 ug/kg of TCA, 140 micrograms per kilogram (ug/kg) of TCE, and 188 ug/kg of DCE. The remedial action objectives did not include remediation of heavy metals or semivolatiles in soils in Areas 2 and 4, since the detected concentrations do not pose an unacceptable public health risk under present or reasonably anticipated future land use scenarios. These properties are located in an area of commercial and light industrial use and are expected to remain in that use in the near future. Before deletion of this site from the NPL appropriate institutional controls will be put into place unless further studies, including a risk assessment, find that these properties are suitable for unlimited use with unlimited exposure.

EPA procured Ebasco Services, Inc. to complete fund-lead RD activities for Area 2 (September 1994) and entered into an Interagency Agreement (IAG) with the U.S. Army Corps of Engineers (USACE) to implement the Area 2 remedial action. The USACE started construction of the vacuum extraction system in October 1996. The SVE system was designed to remove VOCs from the Site unsaturated soil. Initial concentrations of compounds of concern in untreated subsurface soil in Area 2 ranged from 40 to 150,000 parts per billion (ppb). The technology was applied by inducing air flow through the target soil and collecting contaminant gases entrained in the induced air exchange. The system was designed with horizontal wells (12) to treat the upper vadose zone and vertical wells (40) to treat to the lower vadose zone down to the groundwater. The VOCs entered the entrained air flows through evaporation, gaseous and aqueous-phase diffusion, and desorptive processes. The design optimized the control of air flow paths and maximized air flow allocation throughout the intended treated volume. A semi-permeable site cover consisting of 6-inches of clay was constructed over the treatment area to minimize vertical leakage of air. The extracted soil gas was treated using two vapor-phase granular activated carbon (GAC) canisters connected in series prior to release into the atmosphere.

The SVE system operations began in January 1997 after installation and system start-up activities were completed. The SVE system operations were terminated on November 20, 2000 after the results of the Interim Soil Sampling Program confirmed that the SVE system successfully achieved ROD cleanup goals. During this period, the SVE system was shut down for four extended periods due to operating problems that occurred as a result of extremely high rainfall and subsequent elevation of the groundwater table. Actual operation of the SVE system was for approximately 30 months. The volume of treated soil was approximately 17,000 cubic yards (cy). The total VOCs removed was



approximately 1,046 pounds. A May 15, 2001 Remedial Action Report provides a detailed description of the work done in Area 2.

In March 1991, EPA issued a unilateral administrative order (UAO) to three potentially responsible parties (PRPs) for the performance of the remedial design and remedial action at Area 4 only. Although two of the PRPs, Great American Industries, Inc. (GAI) and Chenango Liquidators of New York, Inc. (CIL), completed the Area 4 RD in September 1994, the companies indicated that financial constraints would prevent their implementation of the Area 4 remedial action (the third PRP, American Board Companies, Inc. (ABC), did not participate in the performance of the RD); EPA therefore assumed performance of the Area 4 RA. EPA subsequently negotiated a settlement with the PRPs under which CIL and GAI paid \$775,000 toward EPA's expected future response costs at the Site. ABC agreed in the settlement to provide EPA with access to its property, on which Area 4 is located.

In June 2001, EPA entered into an IAG with the USACE to perform a pre-remediation soil sampling investigation in Area 4. USACE procured Severson Environmental Services, Inc. to perform the soil sampling. This investigation was completed in October 2001 and was used to delineate the area of contamination and to refine the remedial design completed in September 1994. The highest initial concentrations of compounds of concern detected in the untreated subsurface soil in Area 4 were 2,840,000 ppb of TCE and 2,250,000 ppb of TCA. The final site design layout was approved by USACE on May 30, 2002. The major components of the SVE system include a pump station comprised of matched blowers, one for injection and one for withdrawal, connected to piping manifolds with multiple taps. Soil gas is extracted using 55 vertical vadose zone SVE wells. The manifolds and individual well piping are constructed for rotational flexibility between injection and withdrawal of air to allow increased control of airflow within the treatment area. The extracted soil gas process air is treated using two vapor-phase GAC canisters prior to release into the atmosphere. The SVE system is fully automated and designed to be operated 24 hours per day, 7 days per week. The SVE system is similar to the SVE system used in Area 2.

USACE also procured Severson Environmental Services, Inc. to implement the Area 4 remedial action. Construction of the Area 4 SVE system was initiated on April 1, 2003. On June 24, 2003, EPA, NYSDEC and USACE conducted an inspection of Area 4. Based on this inspection and soil gas sampling results, EPA, NYSDEC and USACE have determined that the system is operational. As of the September 8, 2003 sampling, approximately 600 pounds of VOCs have been removed from the subsurface soils. All equipment is functioning as intended. EPA expects to achieve the ROD soil cleanup goals because the Area 4 treatment system, contaminants and geology are similar to those for Area 2. Currently, there are no public health risks associated with the site since the contaminated groundwater is being captured and treated and the contaminated soil in Area 4 is subsurface. After it is demonstrated that the system has achieved the ROD cleanup goals through soil sampling, EPA will approve the RA Report.





### III. DEMONSTRATION OF CLEANUP ACTIVITY QUALITY ASSURANCE AND QUALITY CONTROL

RA activities at the Site, consisting of construction and operation of a groundwater air stripping facility and two SVE systems, were consistent with the OU1 and OU2 RODs, and the final design documents, as modified and approved by USACE and EPA. A Quality Assurance/Quality Control (QA/QC) program was used in the development of the RDs and throughout the RAs. The QA/QC program was in conformance with EPA and NYSDEC standards. Construction testing and post-construction sampling and testing results indicate to USACE and EPA that the construction of the OU1 and OU2 remedies was properly implemented to the degree needed to assure satisfactory execution of the RAs consistent with the respective RODs. Detailed information on materials and testing is contained in the OU1 and the OU2 Source Area 2 RA report. The RA Report for OU2, Source Area 4 will also provide detailed information on materials and testing. The Foster Wheeler Environmental Corp. provided oversight of all OU1 construction activities, and the USACE provided oversight of all OU2 construction activities.

### IV. THE ACTIVITIES AND SCHEDULED FOR COMPLETION

The following activities will be completed according to the following schedule:

Activity	Responsible Organization	Estimated Completion
Approve Operation and Maintenance Manual	USACE	September 2003
Achieve Cleanup Criteria, Complete Long-Term Response Action by EPA, or Turnover Operations to the State (which ever occurs first)	EPA	October 2006
Approve RA Report for OU2, Area 4	EPA	December 2006
Complete Facility Demobilization for OU2, Area 4	EPA	March 2007
Determine that Appropriate Institutional Controls have been Implemented	EPA/NYSDEC	May 2007
Five-Year Review	EPA/NYSDEC	September 2008
Approve Final Close-Out Report	EPA	*
Deletion from NPL	EPA	*

\*The system should operate until groundwater cleanup levels are attained.

### V. SUMMARY OF REMEDIATION COSTS

*OU1 ROD*



The original cost estimate to construct the air stripping facility described in the OU1 ROD was \$389,400. The actual cost of the remedial action was approximately \$1,536,000. The increased cost from ROD to RA award is attributed to improve definition of scope of the project in going from RI/FS to final design of the project and the unexpected cost to replace Well 1-1 with a new extraction well, Well 1-1A. The estimate for construction of the air stripping facility developed by the design consultant (CDM) in August 1987 was \$933,760. The estimate for construction of new Well 1-1A developed by design consultant (Ebasco Services, Inc.) in July 1991 was \$213,465. Therefore, the total design estimate for both construction activities was \$1,147,225. The difference between the design estimate and the final cost of remedial action was \$388,775. This difference is accounted for by out-of-scope construction change orders, project delays, and associated cost increases in construction management.

The total annual operation and maintenance (O&M) cost for OU1 as estimated in the OU1 ROD is \$139,750, which includes the cost of \$20,000 for groundwater monitoring required in the OU2 ROD. The actual annual O&M costs are approximately \$250,000. The difference between the ROD O&M costs and the actual costs is an underestimation in the OU1 ROD of the labor and repair costs and an overestimation of utility cost. The OU1 ROD estimates an annual cost of \$1,000 per year for labor and does not include a cost estimate for repairs. The actual labor and repair costs are a major part of the O&M costs. The OU1 ROD annual cost estimate for utilities is \$104,850, which is higher than the actual cost of approximately \$70,000 per year.

#### *OU2 ROD*

The cost estimated to implement the on-site treatment of contaminated soil via the SVE system described in the OU2 ROD for Areas 2 and 4 was \$1,700,000, which includes construction and eight months of O&M. The actual total RA cost for completing the remedial action in Area 2 was approximately \$1,450,000. This includes O&M cost of Area 2, which was approximately \$250,000 per year. At the time that this Preliminary Closeout Report was prepared, not all of the project costs to implement the remedial action for Area 4 have not been reported. The estimated cost of construction and first year of operation for Area 4 is approximately \$1,500,000.

The increased cost from the ROD can be mainly attributed to the increased amount of time needed for treatment and the increased size of the actual SVE systems from the ROD estimates. The ROD estimated treatment of eight months for both areas compared to actual treatment of approximately 30 months in Area 2, and it is expected that a similar amount of time will be needed to treat contaminated soils in Area 4. The ROD estimated that four and fourteen extraction wells would be installed in Areas 2 and 4, respectively. The actual number of wells installed were 12 horizontal wells and 40 vertical wells in Area 2 and 55 vertical wells in Area 4. In addition, the ROD envisioned that the wells in Area 2 and 4 would be connected to a common header and operated simultaneously. The Areas 2 and 4 SVE systems, however, were operated sequentially.

## **VI. Five-Year Review**



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#### **VI. Five-Year Review**

It has not been determined that the groundwater remedy can effectively restore the entire contaminated portion of the aquifer to drinking water standards. Also, it has not been determined that Areas 2 and 4 will have been cleaned to allow for unlimited use with unrestricted exposure. Consequently, pursuant to Section 121(c) of CERCLA EPA and/or the State will conduct a review of site remedies no less often than every 5 years. The first review was completed September 30, 1998. A second review will be completed soon. The next review will be done before September 2008.

Approved:                     *g. pavlou*                     Date:           9/11/03            
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