Superfund Proposed Plan

U.S. Environmental Protection Agency
Region II

Vestal Water Supply Well 1-1 Superfund Site
Town of Vestal, Broome County, New York

August 2016

◄ MARK YOUR CALENDAR ►

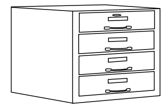
August 22, 2016 – September 21, 2016:
The public comment period for this Proposed Plan.

Public Meeting to Discuss the Proposed Plan
Vestal Town Hall
Tuesday, August 30, 2016
From 7:00 to 9:00 PM

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan describes the remedial alternatives considered for amending the remedy selected in the U.S. Environmental Protection Agency's September 27, 1990 Record of Decision (ROD) for Operable Unit Two (OU2) at the Vestal Water Supply Well 1-1 Superfund site (Site). The Proposed Plan identifies the EPA's preferred amendment to the OU2 ROD for the Site and provides the rationale for this preference. This Proposed Plan was developed by the EPA, in consultation with the New York State Department of Environmental Conservation (NYSDEC). The preferred remedial action described in this Proposed Plan addresses human and environmental risks associated with contaminants present in soils in two areas in the Stage Road Industrial Park part of the Site. These areas are identified as Area 3 and Area 4 (described below).

In accordance with Section 117(a) of the Comprehensive Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. § 9617(a), and Section 300.435(c)(2)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. § 300.435(c)(2)(ii), if the EPA decides to fundamentally alter a remedy selected in a ROD, the EPA's proposed changes must first be made available for public comment in a proposed plan before the EPA amends the ROD. The EPA is issuing this Proposed Plan as part of its public participation responsibilities under CERCLA Section 117(a) and



The **Administrative Record** file contains the documents upon which EPA based its selection of the preferred remedy and is available at the following locations:

Vestal Public Library
320 Vestal Parkway
East Vestal, New York 13850
Phone: (607) 754-4243
Hours: Mon: 10:00 am to 9:00 pm
Tues – Thurs: 9:00 am to 9:00 pm
Fri: 9:00 am to 5:00 pm

EPA Region II - Superfund Records Center
290 Broadway, 18th Floor
New York, New York 10007-1866
Phone: (212) 637-4308
Hours: Mon-Fri: 9:00 am to 5:00 pm

EPA's website for the Vestal Water Supply Well 1-1 site: www.epa.gov/superfund/vestal-well-1-1

Sections 300.430(f) and 300.435(c) of the NCP, 40 C.F.R. §§ 300.430(f) and 300.435(c).

The nature and extent of the soil contamination at Areas 3 and 4, the associated human health and ecological risks and the remedial alternatives that are summarized in this Proposed Plan are described in greater detail in the following documents: 1) Conceptual Site Model (CSM) for Non-Aqueous Phase Liquid (NAPL) Sources – June 2015 Final Report (compared to a Remedial Investigation (RI) report), 2) Human Health Risk Assessment Report (HHRA) – December 2015 and 3) the Focused Feasibility Study (FFS) Report (August 2016). The EPA and NYSDEC encourage the public to review these documents, as well as other documents in the OU2 Administrative Record and OU2 Administrative Record Update for the Site, in order to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted.

This Proposed Plan is being provided as a supplement to the above-noted documents to inform the public of EPA's preferred remedy and to solicit public comments pertaining to all of the soil remedial alternatives evaluated.

In this Proposed Plan, the EPA proposes a change to the original soil cleanup technology which was soil vapor extraction (SVE) for Area 4. The EPA is also including an additional area of soil contamination (Area3). Area 3 is located off the northeast corner of the Site building. Area 4 is located in the parking lots on the south side of the Site building. The SVE system was not effective in treating the soils in Area 4; therefore, the EPA is selecting a new soil remedial technology, in-situ thermal treatment (ISTT), for removing volatile organic compounds (VOCs) in both Areas 3 and 4. In addition, the EPA proposes to excavate and dispose of off-site soils contaminated with recently discovered polychlorinated biphenyls (PCBs) in Area 3.

The EPA is soliciting public comment on all the alternatives considered in both the Proposed Plan and the FFS report.

Changes to the preferred remedy or a change from the preferred remedy to another remedy may be made if public comments and/or additional data indicate that such a change would result in a more appropriate remedial action. The final decision regarding the selected remedy will be made in a ROD Amendment after the EPA has taken into consideration all public comments.

COMMUNITY ROLE IN SELECTION PROCESS

The EPA relies 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 CSM, HHRA, FFS reports and this Proposed Plan have been made available to the public for a 30-day public comment period which begins on August 22, 2016. See above for document repositories.

A public meeting will be held during the public comment period on Tuesday, August 30, 2016 to present the findings and conclusions of the CSM, HHRA and FFS reports, to elaborate further on the reasons for recommending the preferred remedy and to receive public comments.

The EPA response to comments received at the public meeting, as well as written comments, will be documented in the Responsiveness Summary section of the OU2 ROD Amendment which formalizes the selection of the remedy.

Written comments on the Proposed Plan should be addressed to:

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SCOPE AND ROLE OF ACTION

Site remediation activities are sometimes segregated into different phases, or operable units (OUs), so that remediation of different aspects of a site can proceed separately, resulting in a more expeditious cleanup of the entire site. This Site is being addressed by the EPA in two OUs. OU2, which is the subject of this Proposed Plan, addresses soil contamination in discrete source areas (Areas 3 and 4) that has resulted in downgradient groundwater contamination. OU1 addresses contaminated groundwater.

With this Proposed Plan, the EPA is modifying the scope and role of the response action identified in the 1990 OU2 ROD, which selected the treatment of soil contamination in Areas 2 and 4 using SVE (no action was deemed necessary for Areas 1 and 3 at that time). Remediation of contaminated soils in Area 2 was successfully completed in November 2000. In 2003, a larger, full-scale SVE system was installed in Area 4. However, after operating the system for several years, it was determined that SVE would not be able to achieve cleanup objectives in portions of Area 4. Additional evaluation of the soils was performed at the Site to further characterize the Area 4 soils to determine what technologies could be used to achieve cleanup objectives in this area; this evaluation also led to the identification of additional contamination in Area 3. As a result, the EPA proposes to change the soil cleanup technology for Area 4 from SVE to ISTT. In addition, the EPA is proposing that Area 3 soils that are contaminated with PCBs be excavated and disposed off-site and that Area 3 soils contaminated with VOCs be treated by ISTT subsequent to the excavation of PCB-contaminated soils.

The primary objectives of this action are to remediate the source contamination (soils) at the Site which continues to affect Site groundwater.

SITE BACKGROUND

Site Description

The Vestal Water Supply Well 1-1 Site is located in the Town of Vestal, southwestern Broome County, New York, approximately 10 miles west of Binghamton, New York and is divided into a western portion and an eastern portion. Several marshy areas and drainage ditches bound the Site to the north, east and south.

The western portion, located between the Susquehanna River and New York State Route 17, includes a wellfield (Well 1-1) is located on Pumphouse Road), a fire department training center, state-owned forest lands and a recreational field is not being addressed in this Proposed Plan. The eastern portion of the Site is the Stage Road Industrial Park which is located approximately 1500 feet southeast of Well 1-1.This study area occupies approximately 5.5 acres (Figure 1). This area is generally flat and lies approximately 1,180 feet south of the Susquehanna River (within the 500-year flood plain).

Four areas located within the Stage Road Industrial Park, identified as Areas 1-4, were originally investigated as potential sources of contamination to Well 1-1 in OU2.

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For the purposes of this Proposed Plan, the EPA is focusing on the 200 Stage Road (Stage Road) location within the larger Stage Road Industrial Park. Stage Road is zoned for commercial/light industry. It is anticipated that Stage Road will continue to be zoned and used for commercial/light industrial activities.

Stage Road includes a 60,000 square foot building that was formerly used to manufacture transformers and, later, electronic circuit boards. The circuit board manufacturing operations ceased in May 2002. From 2007 through 2013, the building was used to recycle electronic equipment. Currently, a portion of the building is being used for light automotive work.

Two Stage Road areas, identified as Area 3 and Area 4 (see Figure 2), are located adjacent to the main building and are considered to be current sources of groundwater contamination and are the subject of this Proposed Plan.

Area 3 is located on the northeast side of the building. Area 4 is located along the entire southern perimeter of the building, primarily within an asphalt-covered parking lot.

Site History

In 1979, a chemical spill (or leak) occurred from an underground storage tank at the IBM Endicott facility, located on the north side of the Susquehanna River (approximately one mile north of the Site). In response to the spill, all drinking water supply wells in the area were tested for synthetic organic chemicals. Water samples from Vestal Well 1-1 were found to contain high concentrations of chlorinated VOCs, including trichloroethene or TCE, 1,1,1-trichloroethane or TCA, cis-1,2-dichlorothene or DCE and 1,1-dichloroethane or DCA. However, subsequent investigations determined that the IBM spill was not the source of VOCs found in Well 1-1. In 1986, a remedial investigation/feasibility study (RI/FS), conducted by the NYSDEC, focused on the contamination of groundwater by VOCs in the Vestal Well 1-1 study area. This RI/FS suggested that the source of the VOC contamination in groundwater was located in Stage Road area. A supplemental RI/FS, conducted by the EPA in 1988-89, confirmed that the VOC contamination originated from Stage Road and indicated that releases of VOCs had occurred in several areas there.

Since 1990, when the Vestal Water Supply Well 1-1 was abandoned, the entire impacted area was and continues to be addressed in two OUs. OU1 addresses groundwater contamination through groundwater extraction and treatment (air stripping) of Well 1-1A which was installed subsequent to the abandonment of Well 1-1. The OU1 treatment system has been operational since 1993. OU2 addresses discrete source areas (Areas 1, 2, 3 and 4) of subsurface contaminated soils at Stage Road that resulted in downgradient groundwater contamination.

Since limited soil contamination was found in Areas 1 and 3, no action was deemed necessary. To address contaminated soils in Areas 2 and 4, two separate SVE systems were installed as called for in the 1990 ROD. Remediation of contaminated soils in Area 2 was completed in November 2000.

In 2003, a larger, full-scale SVE system was installed in Area 4. After approximately two years of operation, the EPA conducted soil and groundwater sampling in Area 4 to evaluate the cleanup progress. Soil sampling results showed that high levels of VOCs still remained at two locations that had been treated with the SVE system, *i.e.*, areas beneath a parking lot, just south of the Stage Road building. Because of the fine-grained soils in the saturated zone in Area 4, the soils here was not as conducive to SVE remediation as that in Area 2. As a result, the SVE system would not achieve the cleanup goals identified in the 1990 ROD for all of Area 4.

Subsequently, in January 2006, the Area 4 SVE system was shut down after removing approximately 2,300 pounds of VOCs from the subsurface soils. The EPA's Environmental Response Team (ERT) subsequently conducted additional field investigations which delineated the horizontal and vertical extent of Area 4 contamination, as well as determined that an additional soil contamination source was located in Area 3.

These investigations also revealed that the soil contamination from Areas 3 and 4 extended partially beneath the building and that a different suite of VOCs, as well as PCBs, was found in soils on the northeast side of the building (Area 3). These additional VOCs include DCE, 1,2,4-trimethylbenzene (1,2,4-TMB) and 1,3,5-TMB. These contaminants appeared to have originated from another source than that found on the south side of the building.

Further investigation within Area 4 identified the presence of residual non-aqueous phase liquid (NAPL) within the subsurface. Additionally, one monitoring well in Area 3 (ERT-1S) was found to contain evidence of light non-aqueous phase liquid (LNAPL).

Site Geology/Hydrogeology

Within the source areas at the Site, a number of distinct stratigraphic units are known to occur based on examination of records and drilling logs from previous investigations.

The individual geologic units are briefly described below:

Post-Glacial Alluvial Deposits and Fill: Primarily silt and clay with occasional inter-bedded lenses of sand and infrequent gravel. Surficial silty "fill" material occurs from approximately 0 to 5 feet below ground surface (bgs) in most areas of the Site. The average thickness of this layer is approximately 19 feet. The horizontal hydraulic conductivity of these unconfined deposits ranges from approximately 0.04 to 1.4 feet per day.

Upper Glaciofluvial Sand & Gravel Deposits: This is a mixture comprised of sand and gravel. The average thickness beneath the Site is approximately 18.5 feet. The horizontal hydraulic conductivity of these semi-confined deposits ranges from approximately 120 to 380 feet per day.

Glacial Till: An un-stratified mixture of sand, silt, clay, and gravel. The average horizontal hydraulic conductivity of this leaky-confined layer is estimated to be less than 1-foot per day.

Bedrock: The bedrock is comprised of shale and siltstone; the upper 10 to 15 feet is highly weathered and broken. Fractures and bedding planes form a small part of the unweathered rock volume and provide the only significant void spaces in which water can be stored and transmitted. The horizontal hydraulic conductivity of this upper, leaky-confined layer is estimated to range from less than 1 foot per day to approximately 3 feet per day.

Generally, groundwater flows in a west/northwest direction across the Site (toward Vestal Well 1-1). The water table depth at the Site has an average range from approximately 12 to 14 feet bgs.

Site Characterization and Response

In 1980, after chlorinated organic solvents were discovered in Well 1-1, the well was taken out of service.

The Site was formally added to the National Priorities List (NPL) on September 8, 1983.

In April, 1985, the NYSDEC began an RI/FS of the Site. The RI/FS and risk assessment were completed in 1986 and confirmed the presence of VOCs in the groundwater southeast and east of Well 1-1 and identified a future risk to residents consuming drinking water contaminated with TCE. The contaminants of concern identified in the risk assessment for the ingestion of groundwater were primarily the VOCs TCE, TCA, DCE and DCA. Based on the RI/FS and the risk assessment, the EPA issued a ROD for OU1 in June 1987 which selected a remedy that addressed the VOCs in the groundwater. The OU1 ROD also recommended that a second RI/FS be undertaken to evaluate suspected source areas of contamination upgradient of Well 1-1.

In November 1988, the EPA conducted an RI/FS for OU2. The EPA investigated four areas of concern in Stage Road (Areas 1-4, as shown on Figure 1). The results of the RI/FS revealed significant VOC contamination in subsurface soils located in Areas 2 and 4 and limited soil contamination in Area 1 and Area 3. Most of the subsurface contamination was determined to reside between five and 25 feet below ground surface with the highest VOC concentrations at depths greater than 10 feet.

The original OU2 risk assessment identified unacceptable risks to future construction workers exposed through ingestion and dermal contact with the contaminated soils and inhalation of VOCs in Areas 2 and 4. In addition, the risk assessment identified unacceptable risk to residents within the entire Site area from the ingestion of groundwater contaminants which were leached from the soils. Potential exposure pathways considered were ingestion of groundwater from directly below source Area 2 and Area 4 and from Well 1-1. VOCs, including TCE, TCA, DCE, DCA and tetrachloroethene or PCE were identified as contributing to the health risks to construction workers and to residents.

The OU2 ecological risk assessment determined that it is unlikely that the soil and groundwater contamination in the study area has adversely affected any plant life in the study area, particularly wetlands, as a result of the considerable depths at which the higher concentrations of contaminants have been detected (*i.e.*, below root levels). As a result, EPA considered the study area to have limited ecological significance to both flora and fauna. Based on the RI/FS and risk assessment, the EPA signed a ROD for OU2 on September 27, 1990 which addressed the contaminated soils located in the two discrete source areas, Area 2 and Area 4.

The EPA performed the remedial design/remedial action (RD/RA) for OU1 and for Area 2 of OU2 because no viable potentially responsible parties were identified. In March 1991, the EPA issued a unilateral administrative order (UAO) to three potentially responsible parties for the performance of the RD/RA at Area 4. Two of the potentially responsible parties (PRPs) initially complied with the order; however, subsequently they indicated that financial constraints would prevent their full compliance the UAO. The EPA, therefore, assumed performance of the remaining work. In May 1999, the EPA completed a settlement with the PRPs that provided for the payment of $775,000 towards the EPA's costs of performing the Area 4 RA.

<u>OU1</u>

In May 1989, the EPA began construction of the air stripping facility which was completed in July 1990. In December 1993, as a result of poor performance of an aged Well 1-1, Well 1-1 was abandoned and a new well, Well 1-1A, was installed with a maximum pumping capacity of 1150 gallons per minute (gpm), averaging 300 to 500 gpm.

In March 1995, the EPA issued a RA Report which determined that Well 1-1A and the associated air stripping facility were fully operational and functional as a potable water supply. In May 1995, the Town of Vestal indicated that it no longer required the water from Well 1-1A for its drinking water supply. As a result, the EPA performed the first 10 years of the long term response action to treat the extracted groundwater and discharged the treated water from Well 1-1A to the Susquehanna River.

In 2006, NYSDEC assumed responsibility for the operation and maintenance (O&M) of the groundwater extraction and treatment facility for Well 1-1A. In 2014, NYSDEC performed a remedy system optimization (RSO) for the groundwater remedy in order to evaluate the current OU1 remedy. Even though the treatment system was effective in treating the contaminated groundwater down to maximum contaminant levels (MCLs), the groundwater concentrations within the aquifer were not being reduced. This indicated that a continuing source of groundwater contamination was still present, *i.e.*, contaminated soils. The RSO determined that continued operation of the treatment facility was no longer necessary to protect the operating Vestal public water supply wells from the groundwater plume. Vestal current public water supply wells (Vestal 1-2A and 1-3) are approximately 1500 feet west of the treatment facility and are both fitted with treatment units. As a result, NYSDEC decided to shut down the facility but continue monitoring the groundwater plume which continues to show VOC concentrations above maximum contaminant levels (MCLs).

In 2014, NYSDEC performed a remedy system optimization for the groundwater remedy. As a result, the current OU1 remedy was found to be not effective in remediating the groundwater and that its operation was no longer necessary to protect Vestal's water supply. As a result, NYSDEC decided to shut down the facility but continue monitoring the groundwater plume which continued to show VOC concentrations above maximum contaminant levels (MCLs). Subsequently, NYSDEC requested that the EPA investigate the apparent continuing source (soils) of groundwater contamination.

<u>OU2</u>

In January 1997, as per the OU2 1990 ROD remedy, the SVE system, designed to remove VOCs from the unsaturated soils, began operation in Area 2. In December 1997, four additional vertical SVE wells were installed to extend the treated area to the contaminated soils in the eastern portion of Area 2. In November 2000, the SVE was terminated in Area 2 as a result of successfully achieving the ROD soil cleanup levels.

During September and October 2001, soil sampling was performed in Area 4 to delineate further the area of contamination. In June 2003, the SVE system, similar to that in Area 2, began operating in Area 4. In February, September and October 2005, as a result of low VOC contaminant removal rates, the EPA conducted soil and groundwater sampling at the Site to evaluate the progress of the SVE system in cleaning-up Area 4. The results of the sampling showed that very high levels of VOCs still remained in the deep unsaturated and shallow saturated zones. In January 2006, the SVE system was temporarily shut down in order to determine if the modifications to the SVE system could achieve OU2 soil cleanup levels.

Based on the results of this evaluation, the EPA determined that, without enhancement, the SVE system in Area 4 would be unable to address the remaining VOC contamination in the fine-textured soils at the Site.

In order to evaluate alternatives methods of remediating the soils in Area 4 as well as identify additional areas of contamination at the Site, the EPA conducted further soil and groundwater sampling to delineate fully the horizontal and vertical extent of VOC contamination remaining at the Site and to evaluate the subsurface geology/hydrology.

During August and September 2006, 56 soil borings were drilled at the Site as an initial effort for defining the extent of subsurface contamination. A total of 133 soil samples was collected for VOC analyses.

In November and December 2007, an additional 54 soil borings were drilled at the Site to define the horizontal and vertical extents of subsurface contamination. A total of 153 soil samples were collected for analysis of VOCs.

During May and June 2008, four monitoring well clusters (ERT-1 through ERT-4) were installed at the Site to assess concentrations of VOCs in groundwater with depth. In July 2008, as part of this field effort, nine soil borings, all 20 feet in depth, were drilled around the northeast corner of the Site building to investigate the extent of subsurface contamination within this area, based on initial detections in previous borings. A total of 39 soil samples were collected from the nine borings for analysis of VOCs.

During this time, LNAPL was detected in well ERT-1S. A groundwater sample from this well indicated the presence of VOCs and petroleum hydrocarbons.

In March 2009, eight additional soil borings were drilled around the northeast corner of the Site building (Area 3) to characterize further the nature and extent of subsurface VOC contamination. A total of 27 soil samples were collected for analysis of VOCs.
During June and July 2009, five 1.5-inch diameter PVC monitoring wells were installed around the northeast corner of the Site building to define the extent of LNAPL source contamination within this area. Three deep 2-inch diameter PVC monitoring wells were additionally installed during this investigation to assess VOC concentrations in groundwater within the weathered bedrock beneath the Site. A total of 20 soil samples were collected from the borings associated with the deep wells for analysis of VOCs and PCBs.
In May 2010, four 2-inch stainless steel monitoring wells were installed on the northeast side of the building (near well ERT-1S) to delineate the horizontal extent of the LNAPL within this area. One additional 2-inch PVC monitoring well was installed along the northwest side of the building to monitor groundwater quality within deeper strata, *i.e.*, lower glacial till and upper weathered bedrock.

In December 2012, over 250 soil samples were collected from 44 borings to characterize the horizontal and vertical extents of additional contaminants of concern at the Site; namely, PCBs and semi-volatile organic compounds (SVOCs). A total of 13 surface samples (between 0 and 1-foot depth) were additionally collected at 13 borehole locations for analysis of VOCs. The results of this investigation, along with previously acquired data, were used to support the human health risk assessment for the Site.

In July 2013, nine directional or horizontal borings were drilled beneath the northeast corner of the building to assess the horizontal and vertical extents of contamination in subsurface deposits. A total of 18 subsurface samples was collected for analysis of VOC, SVOCs and PCBs. The results of the soil sampling revealed that the TCA and TCE were the most prevalent contaminants, exhibited the highest concentrations and are expected to be the primary focus of the VOC soil cleanup. These VOC concentrations were detected in the 10-to-20 foot depth range where fine-textured soils and the capillary fringe of the aquifer exist. The VOCs were detected in two areas of the parking lot, located on the south side of the building, underneath the building and in the northeast corner of the Site.

RESULTS OF THE REMEDIAL INVESTIGATION

The evaluation of the nature and extent of contamination focuses on Site-related contaminants that were identified during previous and recent investigations.

The primary contaminants of concern (COCs) at the Site include the following:

- 1,1,1-TCA
- TCE
- cis-1,2-DCE
- 1,2,4-TMB
- 1,3,5-TMB
- PCBs

The selection of the above contaminants as primary COCs is based on 1) frequency of detection, 2) wide-spread occurrence in soils, 3) higher concentrations relative to other contaminants found at the Site and 4) need for remediation. Additionally, based on their overall physical properties, the above contaminants (excluding PCBs) are considered to be representative of other VOCs detected at the Site.

The characterization of Site conditions emphasizes the spatial distribution of contaminants in Site soils (*i.e.*, unconsolidated deposits) based on approximately 640 samples collected from 180 borings that were advanced up to 30 feet bgs. Analytical results indicate that VOCs are ubiquitous in Areas 3 and 4.

Figure 2 illustrates the lateral extent of the primary COCs at Stage Road. Most of the contamination resides between five and 25 feet bgs. Around the northeast corner of the building, most of the contamination is between five and 20 feet bgs.

The highest level of contamination detected in the Area 4 parking lot for TCA was 23,600 milligrams per kilogram (mg/kg) or parts per million (ppm) at approximately 17.5 feet bgs and for TCE was 13,000 mg/kg or ppm at approximately 16.5 feet bgs. These high concentrations indicate the presence of dense non-aqueous phase liquid (DNAPL).

This VOC contamination appears to be limited to 1) an area approximately 20 feet long by less than 10 feet wide in the eastern area of the parking lot and 2) an area approximately 25 feet by 20 feet in the western area of the parking lot. Lower levels of VOCs were also detected beneath the building, up to 83 mg/kg TCA and 108 mg/kg TCE.

In the northeast corner of the Site (Area 3), the highest concentration found for TCA, TCE and 1,2,4-TMB were 5.9 mg/kg, 244 mg/kg and 107 mg/kg, respectively. The highest concentration of other COCs (DCE, 1,3,5-TMB and 1,2,4-TMB) detected in unconsolidated deposits around the northeast corner of the building (Area 3) are as follows:

- DCE – 19.6 mg/kg, average depth at around 19 feet
- 1,3,5-TMB – 45.9 mg/kg, detected at around 6.9 feet
- 1,2,4-TMB – 107 mg/kg, detected at around 9.5 feet

The presence of TMBs around the northeast corner of the building suggests they originated from a different source, as compared to the two source areas in the parking lot on the south side of the building (Area 4).

In Area 3, the depths of PCB soil samples ranged from approximately five to 20 feet with concentrations ranging from 0.13 to 31.4 mg/kg. In Area 3, total PCBs sampled below one foot only exceeded 10 mg/kg in in one samples. Also, low concentrations of PCBs, up to 8.5 micrograms per liter (µg/L), were detected in groundwater from two monitor wells within this area (MW-F and MW-I).

Because PCBs are known to be present in the LNAPL in Area 3, their extent would essentially be limited to the extent of the LNAPL (approximately 110 cubic yards). In Area 4, approximately 120 cubic yards of DNAPL, contained in the soils, is located in the western parking lot area and approximately 160 cubic yards of DNAPL, contained in the soils, is located in the eastern parking lot area. The presence of PCBs is believed to result from their association with NAPLs that were previously released to (or spilled onto) the ground surface. Other chemicals or compounds in the NAPLs could have increased the mobility of PCBs (through co-solvency), which caused them to vertically migrate through the shallow unconsolidated deposits. As part of this investigation, the EPA and ERT developed the FFS to identify remedial alternatives for cleaning up the contaminated soils located in Areas 3 and 4.

Also, in order to be protective, the EPA currently performs biennial subslab and indoor air sampling at the Stage Road building.

PRINCIPAL THREAT WASTES

What is a "Principal Threat"?

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, surface water or air, or acts as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

As an ongoing source of groundwater contamination, approximately 28,000 cubic yards of VOC-contaminated soils and 730 cubic yards of PCB-contaminated soils would be considered principal threat wastes.

RISK SUMMARY

The purpose of the risk assessment is to identify potential cancer risks and noncancer health hazards at the Site assuming no further remedial action and in the absence of institutional controls to prevent exposures. A baseline HHRA was developed to evaluate potential exposures to soils in Area 3 and 4 in order to assess current and future cancer risks and noncancer health hazards, based on the data results of the CSM.

A screening-level ecological risk assessment (SLERA) was also conducted to assess the risk posed to ecological receptors as a result of Site-related contamination.

Human Health Risk Assessment

EPA conducted a baseline HHRA in order to estimate the cancer risks and non-cancer hazards associated with the current and future effects of contaminants on human health and the environment. A baseline HHRA is an analysis of the potential adverse human health effects caused by hazardous-substance exposure in the absence of any actions to control or to mitigate such exposure under current and future land uses. The EPA's evaluation of potential exposure during the development of a risk assessment uses the term Chemicals of Potential Concern or COPCs.

Site Description

The baseline HHRA for the Site focused on Stage Road, which is zoned for commercial-light industry use. The property is expected to continue to be zoned for commercial/light industrial use. Stage Road consists of a large one-story building, with an area covering approximately 60,000 square feet, an adjacent parking lot and surrounding open space. Based on its small area, the Stage Road property was addressed as a single exposure unit (EU). The building was used to manufacture transformers and later electronic circuit boards. The circuit board manufacturing operations ceased in May 2002. From 2007 through 2013, the building was used to recycle electronic equipment and is currently being used for storage and automotive accessory installations.

Numerous studies have documented the presence of VOCs in surface and subsurface soils at this Site; (SVOCs) and (PCBs) were also identified as being present. Future residents, although unlikely, as well as current and future outdoor workers or trespassers may be exposed to surface soils (*e.g.*, depths of zero to one foot) at the Site through incidental ingestion, dermal contact, and/or inhalation. Construction workers may be exposed to both surface and subsurface soils (from zero to 10 feet) at the Site through incidental ingestion, dermal contact and/or inhalation of COPCs in soils Exposure to groundwater through consumption of tap water was not evaluated in this BHHRA since it was previously addressed in the 1986 OU1 ROD.

WHAT IS RISK AND HOW IS IT CALCULATED?

Human Health Risk Assessment: 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 potential concern (COPCs) 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 in air, water, soil, etc. identified in the previous step are evaluated. Examples of exposure pathways include incidental ingestion of and dermal contact with contaminated soil and ingestion of and dermal contact with contaminated groundwater. Factors relating to the exposure assessment include, but are not limited to, the concentrations in specific media that people might be exposed to and the frequency and duration of that 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 hazards, 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 hazards.

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COPCs. 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 identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of 10^{-4} to 10^{-6}, corresponding to a one in ten thousand to a one in a million excess cancer risk. For non-cancer health effects, a "hazard index" (HI) is calculated. The key concept for a non-cancer HI is that a "threshold" (measured as an HI of less than or equal to 1) exists below which non-cancer health hazards are not expected to occur. The goal of protection is 10^{-6} for cancer risk and an HI of 1 for a non-cancer health hazard. Chemicals that exceed a 10^{-4} cancer risk or an HI of 1 are typically those that will require remedial action at the site and are referred to as Chemicals of Concern or COCs in the final Record of Decision.

Risk Assessment Process

A four-step human health risk assessment process was used for assessing site-related cancer risks and non-cancer health hazards. The four-step process is comprised of: Hazard Identification of Chemicals of Potential Concern (COPCs), Exposure Assessment, Toxicity Assessment, and Risk Characterization. For further information, please see the previous box: What is Risk and How is it Calculated?.

The baseline HHRA began with selecting COPCs in surface and subsurface soils that could potentially cause adverse health effects in exposed individuals.

Exposures

The primary receptors of concern at the Site are as follows: 1) under current conditions, outdoor workers and teenage trespassers and 2) under future conditions: residents and construction workers.

Exposed individuals and potential receptor pathways are listed below.

- Outdoor Worker: Adults (18 years and older) who may be exposed through current and future ingestion, dermal contact and inhalation of surface soils (depth of zero to 1 foot) surrounding the building.
- Teenage Trespasser: Adolescents (ages 7 to 18 years) who may be exposed under current and future land use conditions through ingestion and dermal contact with surface soils.
- Residents. Resident (adult older than 18 years) /child (6 years and younger)) who may be exposed through future ingestion and dermal contact with surface soils (zero to 1 feet in depth) and to VOCs in indoor air off-gassing from surface soils or subsurface soils excavated to the surface and not managed consistent with a Site Management Plan for contaminated soils.
- Construction Worker: Adult (18 years and older) who may be exposed in the future through the ingestion, dermal contact and inhalation of surface and subsurface soils (zero to 10 feet in depth).

In this assessment, exposure point concentrations were estimated using either the maximum detected concentration of a contaminant or the 95% upper-confidence limit (UCL) of the average concentration. Chronic daily intakes were calculated based on the reasonable maximum exposure (RME), which is the highest exposure reasonably anticipated to occur at the Site. The RME is intended to estimate a conservative exposure scenario that is still within the range of possible exposures.

Central tendency exposure (CTE) assumptions, which represent typical average exposures, were also developed. A complete summary of all exposure scenarios can be found in the BHHRA that is part of the Administrative Record.

Toxicity Assessment

Toxicity information that was obtained is consistent with the Superfund Toxicity Hierarchy (USEPA 2003).

Risk Characterization

Surface and Subsurface Soils

Risks and hazards were evaluated for the potential current and future exposure to surface and subsurface soils. The populations of interest included outdoor workers, future residential adults and children and future construction workers. The cancer risks were below or within the EPA acceptable ranges for all receptors. The non-cancer hazards exceeded the goal of protection of an HI = 1 for the construction worker with an HI = 2 from exposure to PCBs in surface and subsurface soils. Therefore PCBs were identified as a COPC for the surface or subsurface soils (see Table 1 below).

The risks and hazards associated with soil exposure to all receptors, with the exception of exposures to the construction worker, were within the risk range and below an HI = 1. As a result, there is a need to address the soils through a remedial action for this exposure. A complete discussion of the risks and hazards can be found in the baseline HHRA in the Site repository.

Impact to Groundwater

The risks and hazards associated with soil exposure in to all receptors, with the exception of exposures to the construction worker in Area 3, were within the risk range and below an HI = 1. The OU1 and OU2 RODs addressed groundwater contamination. The soil concentrations in the EU are above the concentrations that are associated with an adverse impact to groundwater; thus, there is a need to address the soil contamination to protect the groundwater resource.

A complete discussion of the risks and hazards can be found in the baseline HRRA.

Table 1. Summary of Hazards and Risks Associated with Surface and Subsurface Soil at Vestal 1-1

Receptor	Hazard Index	Cancer Risk
Surface Soils		
Outdoor Worker - adult (current)	0.2	9×10^{-7}
Trespasser - adolescent (current / future)	0.02	4×10^{-7}
Residential - adult/child (future)	0.05 A 0.2 C	1.1×10^{-5}
Surface/Subsurface Soils		
Construction Worker – adult (future)	2.0	2×10^{-5}

Ecological Risk Assessment

The OU2 ROD indicated that study area was determined to have limited ecological significance to both flora and fauna. The ecological assessment for the Site addressed the potential impact on ecological receptors of soil contamination. Although elevated concentrations of volatile and semi-volatile organic compounds (VOCs and SVOCs) at the Site were detected at considerable depths (*i.e.,* well below root levels), EPA requested that a focused screening level ecological risk assessment (SLERA) be conducted to evaluate potential ecological risk posed by surface soil contamination.

Surface soil concentrations were compared to ecological screening values as an indicator of the potential for adverse effects to ecological receptors. Food chain modeling using various exposure scenarios was also utilized to assess potential risks to upper trophic level receptors (vermivores). A complete summary of all exposure scenarios can be found in the SLERA.

Based on food chain calculations conducted in the SLERA, there is a potential risk to vermivorous birds using conservative exposure parameters for PCBs. Risk from exposure to PCBs were calculated for vermivorous mammals also using conservative parameters. Additionally, the comparison of COPC concentrations in surface soils with ecological soil screening values indicates a potential for ecological risk from several polycyclic aromatic hydrocarbons (PAHs) including anthracene, fluoranthene, naphthalene, phenanthrene and pyrene. Although PAHs are not identified as primary COCs for the Site, these will be addressed during remedial action.

Conclusion

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

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are based on available information and standards, such as applicable relevant and appropriate requirements (ARARs) and to-be-considered guidances (TBCs).

The specific RAOs identified for the Site in the 1990 OU2 ROD were as follows:

- Ensure protection of groundwater from the continued release of VOC contamination from soils.
- Ensure protection of Vestal Well 1-1 water quality from any groundwater contamination not addressed in the first operable unit.
- Ensure protection of human health, presumably that of site workers who are exposed to contaminated soils through excavation.

Note that first and third RAOs identified above are applicable to the soils being addressed in this Proposed Plan. The second RAO was intended to ensure that if the potential existed for Well 1-1 to be impacted by metals contamination, appropriate measures would be taken; monitoring subsequent to the issuance of the 1990 ROD, confirmed the EPA's belief that Well 1-1 would not be impacted by metals contamination.

The revised RAOs for OU2 are as follows:

- Prevent and or minimize human and ecological exposures, including ingestion, inhalation and dermal contact to the contaminants present in soils.
- Ensure protection of construction workers who could be exposed to contaminated soils through excavation.
- Ensure protection of groundwater from the continued release of VOCs from soils.

As part of the evaluation of remedial alternatives in the FFS, primary and secondary preliminary remediation goals (PRGs) were included as part of each remedial alternative for contaminated soils. These PRGs were based on NYS Part 375 soil cleanup objectives (SCOs) and NYS CP-51 soil cleanup guidance. The primary PRGs are SCOs identified for protection of public health under the "restricted commercial land use" SCO category. The secondary PRGs are SCOs identified for the protection of groundwater under the "restricted use" SCO category.

In this Proposed Plan, the PRGs for the VOC-contaminated soils ensure the protection of groundwater. The PRGs for the PCB-contaminated soils ensure the NYS presumptive remedy is achieved.

Table 2. The PRGs for the Site and this Proposed Plan

Contaminants of Concern (COCs)	Preliminary Remediation Goals (mg/kg)
1,1,1-Trichloroethane (TCA)	0.68
Trichloroethene (TCE)	0.47
cis-1,2-Dichloroethene (DCE)	0.25
1,2,4-Trimethylbenzene (1,2,4-TMB)	3.6
1,3,5-Trimethylbenzene (1,3,5-TMB)	8.4
Total PCBs (0 to 1 foot)	1.0
Total PCBs (greater than 1 foot)	10.0

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 and utilize permanent solutions, 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).

With respect to the areas to be remediated, as shown on Figure 2, Area 3 is divided into two locations: Area 3 is outside of the building and Area 3B is under the building. Area 4 is divided into three locations: Area 4-1 is the western parking lot area, Area 4-2 is the eastern parking lot area and Area 4-2B is under the building.

Table 3. Distribution of COCs, Based on the PRGs

Areas	Primary COCs	Impacted Area (ft^2)	Impacted Soil Volume (yd^3)	Contaminant Mass (kg)
Area 4-1 Depth: 5-25 ft.	TCA TCE	8,457	6,264	874
Area 4-2 Depth: 5-25 ft.	TCA TCE	9,419	6,977	715
Area 4-2B Depth : 5-25 ft.	TCA TCE	9,010	6,674	17
Area 3 Depth: 5-20 ft.	1,2,4-TMB TCE TCA	12,839	6403	≤ 125
Area 3 Depth: 5-10 ft.	PCBs	1,517	730	≤ 10
Area 3B Depth: 5-20 ft.	TCE DCE	1,984	1,102	< 1

Common Elements

Each soil remedial alternative has common elements which will be included as part of each soil remedial alternative. With the exception of five-year site reviews, the common elements listed below do not apply to the No Action alternatives. The common elements include the following:

Institutional Controls (ICs): A governmental IC in the form of the commercial/light industrial zoning that is currently in place would be relied upon as an IC until the preferred remedial alternative is fully implemented and allows for unrestricted use/unlimited exposure. The original 1990 OU2 ROD did not include ICs as part of the selected remedy.

Five-Year Site Reviews: As per CERCLA, alternatives resulting in contaminants remaining above levels, which allow for unrestricted use and unlimited exposure, require that the Site be reviewed at least once every five years. If justified by the review, additional remedial actions may be implemented to remove, to treat or to contain the contaminated soils.

Alternative #1: No Action

Capital Cost	$0
Annual OM&M	$0
Construction Time	N/A

A "no action" alternative is required by the NCP to provide an environmental baseline against which impacts of the various remedial alternatives can be compared. Under this alternative, no further action would be taken to remedy the contaminated soils or to monitor contaminant concentrations to address the associated risks to human health or the environment. 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 or treat the wastes.

Alternative R2: Excavation and Off-site Disposal

Capital Cost	$39,223,160
Present Worth	$39,223,160
Annual OM&M	$0
Construction Time	~12 months

Under this alternative, contaminated soils in the source areas (Areas 3 and 4) outside the Site building footprint would be excavated and transported off-site for disposal at a Resource Conservation and Recovery Act (RCRA) permitted Subtitle C or D landfill based on results of Toxicity Characteristic Leaching Procedure (TCLP) testing. All excavated areas would be backfilled with clean soils. Based on the extent of source areas shown in Figure 2, in order to achieve the PRGs for VOCs, approximately 32,000 cubic yards would need to be excavated and transported off-site from Areas 3 and 4; in order to achieve the PRGs for PCBs, approximately 730 cubic yards of soils would need to be excavated from Area 3 only.

With the exception of PCBs around the northeast corner of the building, most of the contaminated areas are fairly well defined. It is, therefore, assumed that a pre-design investigation would only be necessary around the northeast corner of the building, prior to excavation, in order to delineate the volume of PCBs in the subsurface.

Post-excavation samples in Area 3 would additionally be collected to verify that the PRGs are achieved. Excavated material would be loaded into dump trucks and transported to a RCRA Subtitle C or D landfill for disposal, as applicable. If post excavation sampling shows that some contaminated soils are above 50 mg/kg PCBs, then this soils would need to comply with the disposal requirements of the Toxic Substance Control Act. For purposes of costing, it is assumed that 50% of the soils would require disposal at a Subtitle C landfill as a result of the high VOC concentrations in some areas beneath the Stage Road property.

In summary, excavation and off-site disposal would include (but not be limited to) the following:

- Decommissioning of existing monitoring wells (those within and around the excavation footprints).
- Installation (and removal) of sheet piling and associated tie-backs.
- Excavation dewatering.
- On-site treatment of contaminated groundwater that is collected as part of any necessary dewatering operations and subsequent discharge to a publicly-owned treatment works or other permitted outfall.
- Excavation and removal of contaminated soils.
- Trucking and off-site disposal of contaminated soils, along with any ex situ pre-treatment (e.g. chemical oxidation, incineration), if required, and
- Backfilling excavations with clean fill - along with asphalt paving, topsoil, seeding, etc.

Alternative R3: In situ Thermal Treatment and Excavation and Off-site Disposal[1]

Capital Cost	$14,500,000
Present Worth	$14,500,000
Annual O&M	$0
Construction Time	11-14 months

Under this alternative, soil contamination would be addressed by ISTT and limited excavation and disposal. For the purposes of evaluation, comparison and costing, Thermal Conductive Heating (TCH) and Steam Enhanced Extraction (SEE) were used as the representative thermal technologies. However, Electrical Resistance Heating (ERH) or some combination of three processes may be considered during the RD phase. TCH can achieve very high contaminant removal efficiency in soils and SEE overcomes heat losses in soils where groundwater flow is greater than one foot per day, *i.e.*, sand & gravel deposits.

The conceptual ISTT approach includes:

- Installation of TCH heater wells (at a spacing of approximately 15 feet) with area-specific treatment temperatures;
- Application of steam to the sand & gravel (beneath the overlying alluvial deposits) to control heating;

[1] *Note: The FFS described Alternative R3 as In Situ Thermal Treatment for the VOC-contaminated soils. This Proposed Plan now defines Alternative R3) as ISTT for the VOC-contaminated soils and the excavation and off-site disposal of the PCB-contaminated soils (as indicated in Alternative R2).*

- Extraction of soil vapor and steam from centroid multiphase extraction (MPE) wells and SVE wells to capture vaporized contaminants;
- Treatment of extracted liquid (condensate) and vapor using granular activated carbon (GAC), and monitoring for mass removal and discharge compliance; and
- Monitoring of temperature and pressure to track subsurface heating, pneumatic, and hydraulic control.

Since there is a potential for significant groundwater flow within the subsurface remediation areas, which would adversely affect an ISTT remedy, it may be necessary to install sheet piling prior to any thermal treatment in order to reduce such groundwater flow in the more transmissive zones of the subsurface environment.

If the treatment beneath the building is considered necessary in order to achieve the PRGs, the installation of treatment wells beneath the building will be further evaluated during the RD. Hence, under the building only, all well types would either be installed either at an angle or horizontally (via directional drilling) in order to reach the treatment areas.

To achieve the PRGs for VOCs, approximately 28,000 cubic yards of soils would need to be treated within the areas 3 and 4, as shown in Figure 2.

To achieve the PRGs for PCBs in Area 3, approximately 730 cubic yards of contaminated soils would be excavated down to 10 feet bgs. The excavated soils would then be transported off-site for disposal at a RCRA permitted Subtitle C or D landfill. To achieve the PRGs for VOCs, ISTT would be used to address the remaining targeted treatment zone in Area 3 subsequent to backfilling of clean soils in the excavation area for PCBs.

Because the Site geology is well-defined and the thermal technologies are well-proven, it is assumed that pre-design treatability testing (*i.e.*, pilot studies) would not be required prior to the implementation of the full-scale ISTT at the Site. It is also assumed that a pre-design sampling investigation would be necessary around the northeast corner of the building (Area 3) to define further the nature and extent of PCBs in the subsurface. Subsequent to the ISTT, post-remediation soil samples would be collected to verify that the RGs are achieved.

COMPARATIVE ANALYSIS OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria: overall protection of human health and the environment, compliance with ARARs, long-term effectiveness and permanence, reduction of toxicity, mobility or volume through treatment, short-term effectiveness, implementability, cost, and state and community acceptance. These criteria are explained below.

The first two criteria above (overall protection of human health and the environment and compliance with ARARs) are known as “threshold criteria” because they are the minimum requirements that each response measure must meet in order to be eligible for selection as a remedy. The next five Superfund criteria (long-term protectiveness and permanence, reduction of toxicity, mobility, or volume through treatment, short-term effectiveness, implementability and cost) are known as “primary balancing criteria” and are factors with which tradeoffs between response measures are assessed so that the best option will be chosen, given site-specific data and conditions. The final two evaluation criteria (state acceptance and community acceptance) are called “modifying criteria” because new information or comments from the state or the community on the Proposed Plan may cause the EPA to modify the preferred response measure or cause another response measure to be considered.

Overall Protection of Human Health and the Environment

Alternative R1 would not protect human health and the environment. Alternatives R2 and R3 would provide overall protection to human health and the environment. For Alternative R2, human health risk would be eliminated through removal of contaminated soils. Contaminated land could be restored to beneficial use, and groundwater quality would be protected by treatment or removal of the contaminated soils to meet the PRGs. Alternative R3 eliminates human health risk by reducing the mass of contamination in both subsurface soils and groundwater in the source areas. Alternative R1 would not meet the RAOs. Alternatives R2 and R3 would meet the RAOs.

Compliance with ARARs

The EPA has identified New York State’s soil cleanup objectives (SCOs) for protection of groundwater (6 NYCRR Part 375-6) as ARARs, TBCs or other guidelines to address contaminated soils in Areas 3 and 4. Alternative R1 would not comply with the SCOs because no action would be taken. Alternatives R2 and R3 would comply with the SCOs through contaminated soil removal and off-site disposal and contaminant mass removal of COCs via ISTT. Action-specific and location-specific ARARs are not applicable to Alternative R1, since no action would be taken. Alternatives R2 and R3 would comply with action-specific ARARs by implementing health and safety measures during the remedial action and (for R2) by meeting transportation and disposal requirements for excavated soils. Alternatives R2 and R3 would also comply with location-specific ARARs.

NINE EVALUATION CRITERIA FOR REMEDIAL ALTERNARTIVES

- 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, regulations and other 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 costs, 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.
- 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.

Long-Term Effectiveness and Permanence

Alternative R1 is not considered a permanent remedy since no action would be taken. Alternatives R2 and R3 would achieve long-term effectiveness through the removal of contaminated soils through excavation and off-site disposal and through contaminated mass removal though ISTT, resulting in unrestricted land use.

Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative R1 would not reduce toxicity, mobility, or volume through treatment since no treatment would be implemented. Alternative R2 would reduce the volume of on-Site contaminated soils through excavation and removal. Alternative R3 would provide the greatest level of reduction of toxicity, mobility and volume through ISTT.

Short-Term Effectiveness

Alternative R1 would not have any short-term impact since no action would be taken. Alternative R2 would have some impact to the surrounding areas during excavation activities. Alternative R2 and R3 would also result in short-term risk to Site workers and the local community during system construction. Alternatives R2 and R3 would generate noise and impact traffic as a result of heavy construction equipment. These would need to be mitigated through Site control and traffic control measures. Alternatives R2 and R3 also may temporarily increase particulate emissions. Dust control would need to be implemented through the use of dust suppression techniques (*e.g.*, water or foam sprays) to minimize impact to the workers and the local community. Storm water runoff would need to be controlled through the use of conventional, temporary storm water/erosion control features (e.g., berms, ditches, or silt fences). In addition, air monitoring would be required to reduce risks to workers and the local community from fugitive emissions during on-Site activities. Potential risks to workers associated with direct contact with contaminated material would be mitigated through the use of personal protective equipment (PPE) and standard health and safety practices. Alternative R2 would have the biggest impact to the local community since it would involve heavy traffic on local roadways (during Site transportation of contaminated soils and transportation of clean fill to the Site). Truck traffic needed for the R3 PCB excavation and the thermal treatment equipment also would impact local roadways but to a significantly lesser degree than R2.

Implementability

Alternative R1 would be the easiest to implement since it involves no action. Alternative R2 would use conventional construction equipment and is technically implementable. Alternative R3 is technically and administratively implementable although a limited number of vendors will be able to provide the technology. While permits are not required for on-site activities at Superfund sites, the technical requirements contained within the permits (regarding air emissions, installation of wells, piping, and related remediation system equipment) would be met. The estimated time frame for the construction and implementation of Alternatives R2 and R3 is approximately one year.

Cost

Alternative R1 would not involve any costs. The capital costs associated with Alternative R2 are approximately $39.2 million for the excavation and off-site disposal of contaminated soils. The capital costs associated with Alternative R3 are $14.5 million if contamination beneath the building is addressed. There are no O&M costs associated with any of the alternatives.

Table 4. Cost Estimates for the Three Alternatives

Alternatives	Capital Cost	Annual O&M Costs	Total Present Worth Cost
RI	$0	$0	$0
R2	$39,223,160	$0	$39,223,160
R3	$14,500,000	$0	$14,500,000

State/Support Agency Acceptance

NYSDEC concurs with the preferred alternative for the Site.

Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends, and this evaluation will be further detailed in a Responsiveness Summary for the OU2 ROD Amendment.

PREFERRED REMEDY

Based on an evaluation of the three remedial alternatives, the EPA and NYSDEC recommend Alternative R3 – In situ Thermal Treatment for VOCs and Excavation and Off-Site Disposal for PCBs along with the common elements noted above.

Under this alternative, soil contamination would be addressed by ISTT. The conceptual ISTT approach includes:

- Installation of TCH heater wells with area-specific treatment temperatures;
- Application of steam to the sand & gravel (beneath the overlying alluvial deposits) to control heating;
- Extraction of soil vapor and steam from centroid MPE wells and SVE wells to capture vaporized contaminants;
- Treatment of extracted liquid (condensate) and vapor using GAC, and monitoring for mass removal and discharge compliance; and
- Monitoring of temperature and pressure to track subsurface heating, pneumatic, and hydraulic control.

During the RD, the need for installation of treatment wells beneath the building will be further evaluated. For purposes of developing this alternative, installation of treatment wells below a portion of the building is considered to be necessary. For the treatment under the building only, all well types would either be installed either at an angle or horizontally (via directional drilling) in order to reach the treatment areas.

This alternative would also require that Area 3 soils containing PCBs above the PRGs in the source areas outside the Site building footprint be addressed prior to implementation of ISTT as follows:

- Pre-design sampling to identify the limits of excavation..
- Decommissioning of existing monitoring wells (those within and around the excavation footprints).
- Installation (and removal) of sheet piling and associated tie-backs.
- Excavation dewatering.
- On-site treatment of contaminated groundwater that is collected as part of any necessary dewatering operations and subsequent discharge to a POTW or permitted outfall.
- Excavation of soils to a depth of approximately 10 feet yielding approximately 2,640 cubic yards of soils.
- Transport and off-site disposal of excavated soils in accordance with applicable RCRA and TSCA requirements.
- Backfilling excavations with clean fill - along with asphalt paving, topsoil, seeding, etc.

The Stage Road building is expected to remain in place both during and after Site remediation although some operations within the building may need to be temporarily relocated during the remedial action.

Even though the action that is identified with the preferred remedy is anticipated to allow for unrestricted use and unlimited exposure, the Site-wide remedy will be reviewed at least once every five years, since VOC concentrations in groundwater remain above MCLs. If justified by the review, additional remedial actions may be implemented to remove, treat or contain the contaminants.

The environmental benefits of the preferred alternative may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance with the both the EPA Region 2's Clean and Green Energy Policy and NYSDEC's Green Remediation Policy[2]. This would include consideration of green remediation technologies and practices.

Basis for the Remedy Preference

Although both Alternatives 2 and 3 would achieve the RAOs. Alternative 3 will do so at substantially less cost. The preferred remedy Alternative 3 is protective of human health and the environment because it will significantly reduce the principal threat mass of COCs in both surface and subsurface soils through treatment. Achieving these reductions would substantially reduce contaminants within residual source areas so that downgradient concentrations in groundwater would decrease at a more rapid rate than currently exists. The reduction in contaminant mass through both excavation and thermal treatment would also reduce the risk to human health and the environment and eliminate exposure pathways. The estimated present-worth cost of the preferred alternative is $14.5 million.

Additional investigations conducted subsequent to the release of the OU2 ROD revealed conditions that were not known at the time of its issuance. The additional investigations revealed additional VOC contamination, as well as PCB contamination, in previously investigated areas, both outside and beneath the Site building. The geological conditions prevented the original OU2 SVE remedy from fully achieving remediation goals in Area 4.

Based upon the information currently available, the EPA and NYSDEC believe that the assessment of the three alternatives has produced a preferred remedy that would provide the best balance of trade-offs in assessing the evaluating criteria and satisfy the statutory requirements of CERCLA §121(b) in that the remedy be 1) protective of human health and the environment; 2) be cost effective; and, 3) utilize permanent solutions, alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The preferred alternative will comply with ARARs and satisfy the preference for treatment as a principal element. With respect to the two modifying criteria of state and community acceptance, NYSDEC concurs with the preferred alternative. Community acceptance will be evaluated upon the close of the public comment period.

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[2] See http://www.epa.gov/greenercleanups/epa-region-2-clean-and-green-policy and http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf

Map created using orthoimagery data from NY state website, sample result data in 2010.

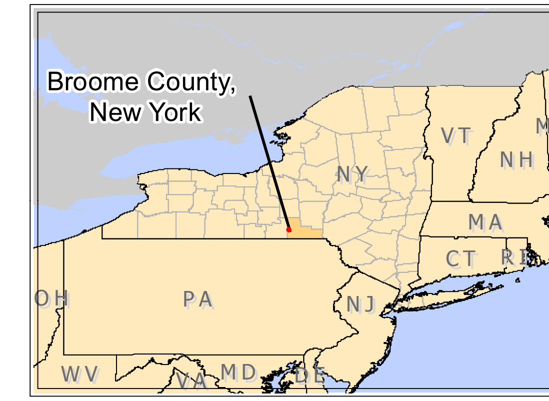
Map Creation Date: 11 April 2016

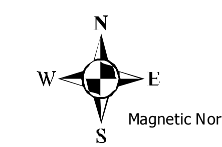
Coordinate system: New York State Plane (Central)
FIPS: 3102
Datum: NAD83
Units: Feet

300 0 300
Feet

U.S EPA Environmental Response Team Scientific Engineering Response and Analytical Services EP-W-09-031 W.A.# SERAS-064	Figure 1 Site Location and Surrounding Areas Vestal Chlorinated Solvent Site Vestal, New York

Data: g:\arcviewprojects\SERAS01\00-064
MXD file: g:\arcinfoprojects\SERAS01\SERA00064_Vestal_Chlorinated\FS_Report_2016/064_FS2016_f1_SIteLocation_SurroundingAreas_f1.mxd





Legend

Potential Excavation Areas

- West Parking Lot Area (9,300 sq.ft., 386 ft.)
- East Parking Lot Area (9,950 sq.ft., 413 ft.)
- Northeast Corner of Building (15,619 sq.ft., 537 ft.)

Contaminated Areas

- West Parking Lot Area (8,457 sq.ft.)
- East Parking Lot Area (9,419 sq.ft.)
- Northeast Side of Building (12,839 sq.ft.)
- Beneath Northeast Corner(1,984 sq.ft.)
- Beneath Building (9,010 sq.ft.)
- Defined Extent of PCB Contamination > 3 mg/kg (1,517 sq.ft.)

Map created using orthoimagery data from NY state website, sample result data in 2012.

Map Creation Date: 30 March 2016

Coordinate system: New York State Plan (Central)
FIPS: 3102
Datum: NAD83
Units: Feet

60 0 60 Feet

The above areas represent the extent of all contaminants of concern (COCs) that are discussed in the FS narrative.

Note:
sq.ft. = square feet

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Figure 2
Maximum Extents of Contamination Exceeding Secondary Remediation Goals
Vestal Chlorinated Solvent Site
Vestal, New York

Data: g:\arcviewprojects\SERAS01\00-064
MXD file: g:\ArcInfoProjects\SERAS01\SER00064_Vestal Chlorinated\FS_Report_2016\064_FS2016_f9_MaxI_Extents_ofContamination_ExceedingSecondaryRemediationGoals_f9V2.mxd