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RECORD OF DECISION

Pohatcong Valley Groundwater Contamination Superfund Site

Operable Unit Two

Franklin and Greenwich Townships, Warren County, New Jersey

U.S. Environmental Protection Agency

Region II

September 2010

DECLARATION STATEMENT

RECORD OF DECISION

SITE NAME AND LOCATION

Pohatcong Valley Groundwater Contamination Site
Franklin and Greenwich Townships, Warren County, New Jersey
EPA ID NJD# 981179047, Operable Unit Two

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedy for contaminated groundwater at the Pohatcong Valley Groundwater Contamination Superfund Site (Site), for that portion of the groundwater located in Franklin and Greenwich Townships, Warren County, New Jersey. This portion of the Site is referred to as Operable Unit Two (OU2). The selected remedy was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record file for this Site (see Appendix V).

The State of New Jersey concurs with the selected remedy (see Appendix VI).

ASSESSMENT OF THE SITE

The response action selected in this Record of Decision (ROD) is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

DESCRIPTION OF THE SELECTED REMEDY

The response action described in this ROD addresses contaminated groundwater associated with the Site which is located in Franklin and Greenwich Townships, Warren County, New Jersey, and provides the rationale for this preference. The selected remedy addresses groundwater contaminated primarily with the volatile organic compound, trichloroethylene (TCE). It represents the second of the three planned remedial phases, or operable units, for the Site. The first operable unit (OU1) included the extraction and treatment of the Site's most highly contaminated groundwater, and reinjection of the treated groundwater to the aquifer. Long-term monitoring of natural

attenuation will be used in the downgradient portions of the OU1 plume, to restore the contaminated groundwater to beneficial use and to meet the most stringent of the state and federal standards for drinking water and New Jersey Groundwater Quality Standards. The third operable unit for the Site is within Washington Borough, and will address the contaminated source areas and soils located on, and in the vicinity of, the former American National Can facility.

The major components of the selected remedy for OU2 include the following:

- Provision of potable water to impacted and threatened properties through the construction of a water line and connections;
- Monitored natural attenuation for the remediation of groundwater contamination in the OU2 Study Area until cleanup goals are met;
- The establishment of a Classification Exception Area (CEA), which is an institutional control, to minimize the potential for exposure to contaminated groundwater until the aquifer meets the cleanup goals; and
- The abandonment of private potable wells.

DECLARATION OF STATUTORY DETERMINATIONS

Part I: Statutory Requirements
The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the extent practicable, and is cost-effective. EPA has determined that the selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site.

Part 2: Statutory Preference for Treatment
Treatment is not a principal element in the OU2 selected remedy. Treatment was selected as a component of the OU1 remedy to address the more highly contaminated areas of groundwater contamination at the Site, as outlined in the OU1 ROD issued on July 13, 2006.

Part 3: Five-Year Review Requirements

Five-Year Reviews will be conducted until remediation goals are achieved and the Site is available for unrestricted use and unlimited exposure to ensure that the remedy is, or will be, protective of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the Administrative Record file for this Site.

- Chemicals of concern and their respective concentrations may be found in the "Site Characteristics" section.
- Baseline risk represented by the chemicals of concern may be found in the "Summary of Operable Unit Two Risks" section.
- Cleanup goals for groundwater contamination can be found in the "Remedial Action Objectives" section.
- Current and reasonably anticipated future land use assumptions and current and potential future uses of groundwater used in the baseline risk assessment and ROD can be found in the "Current and Potential Future Site and Resource Uses" section.
- Estimated capital, operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected can be found in the "Description of Alternatives" section.
- Key factors that led to selecting the remedy may be found in the "Comparative Analysis of Alternatives" and "Statutory Determinations" sections.

Walter E. Mugdan, Director
Emergency & Remedial Response Division
EPA-Region II

9/30/2010
Date

RECORD OF DECISION

DECISION SUMMARY

Pohatcong Valley Groundwater Contamination Site
Operable Unit Two
Franklin and Greenwich Townships,
Warren County, New Jersey

U.S. Environmental Protection Agency
Region II
New York, New York
September 2010

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SITE NAME, LOCATION AND BRIEF DESCRIPTION

The Pohatcong Valley Groundwater Contamination Superfund Site (Site), EPA ID# NJD981179047 is located in portions of Washington Borough, Washington Township, Franklin Township, and Greenwich Township in Warren County, New Jersey (see Appendix I, Figure 5-1). The Site consists of municipal, industrial, commercial, farm, and residential land located within Pohatcong Valley. The Pohatcong Valley is a northeast-southwest trending valley that is bounded by mountains, is part of the Delaware River watershed, and is drained by Pohatcong Creek and associated tributaries. The valley is surrounded by heavily wooded areas and two parallel opposing topographic ridges. The Site lies within the elongated valley between the ridges. The Site encompasses three operable units (OUs), and a broad range of demographics. The northern portion of the OU1 Study Area contains the OU3 Area, and is within the commercial, industrial and residential portion of Washington Borough, Warren County, NJ. The southern part of the OU1 Area and the OU2 Study Area are generally rural, with scattered commercial, residential, and housing developments. Development decreases outside the OU1 and OU3 Study Areas, and OU2 consists of primarily commercial, farm, and residential land. State Route 57 traverses approximately through the center of the Site.

The OU1 Study Area consists of approximately 8.75 square miles (5,600 acres), that includes portions of Washington Borough, and extends to approximately Asbury-Broadway Road in Franklin Township. The OU2 Study Area consists of approximately 6.5 square miles (4,200 acres), and begins at the western terminus of OU1 and continues westward through portions of Franklin and Greenwich Townships. The OU2 portion of the Site is primarily zoned rural, farm, residential, commercial, and municipal. Most of the land area is occupied by agricultural or vacant land, with dispersed residences and housing development; however, a general increase in residential and commercial land uses has occurred from 1980 to 2010 within the townships. The OU1 and OU2 Site Study Areas together encompass about 15 square miles, or 9,800 acres. A third Operable Unit, OU3, includes the former American National Can (ANC) facility, previously owned by Pechiney Plastics Packaging Inc. (PPPI), and now owned by Twist Beauty Packaging, Inc, as well as adjacent areas within the Borough of Washington. OU3 includes identified source areas that contributed to the Site-wide trichloroethylene (TCE) contaminated groundwater (see Figure 1, Appendix I).

Groundwater in the vicinity of the Site is designated by the State of New Jersey as a potable water supply. Both private

wells and municipal wells use the aquifer as a potable water supply at the Site. Between 1985 and 1989 the New Jersey Department of Environmental Protection (NJDEP) installed water lines to provide a municipal water supply to properties located within the OU1 portion of the Site. Most properties located within the OU1 portion of the Site are connected to the municipal water supply. There is, however, some use of private wells for those properties where owners did not connect to public water. Municipal water is treated to meet all state and federal standards before it is distributed. A municipal water supply is not available for properties located within the OU2 portion of the Site and private wells are used extensively. There are approximately 350 to 400 residences and businesses currently on private wells within the OU2 Study Area.

The U.S. Environmental Protection Agency (EPA) is the lead agency for OU2 RI/FS activities, with the NJDEP functioning in a support role. EPA's OU2 investigations at the Site have been conducted using federal funds.

SITE HISTORY

Chlorinated volatile organic compounds (VOCs), specifically TCE and perchloroethylene (PCE), were detected in groundwater from two public potable-water supply wells in Washington Borough in the late 1970s. The two potable-water supply wells are known as the Vannatta Street Well and the Dale Avenue Well, owned and operated by New Jersey American Water Company. TCE and PCE were detected in groundwater samples collected from the Vannatta Street well in July 1978 at concentrations of 1.7 micrograms per liter (µg/l) and 8.3 µg/l, respectively. Only TCE was detected in groundwater samples collected from the Dale Avenue well in early 1979, at concentrations between 44 µg/l and 160 µg/l.

After subsequent investigations conducted by the Warren County Department of Health and NJDEP, NJDEP installed public water supply connections to homes and businesses within the contaminated area of Washington Township. These water lines were completed in 1989. Wellhead treatment systems were added to the public supply wells, and all groundwater was treated to meet the drinking water standards prior to distribution.

EPA included the Pohatcong Valley Site on the National Priorities List (NPL) in March 1989.

Due to its size and complexity, EPA has divided the Site cleanup into three phases, or OUs, referred to as OU1, OU2, and OU3.

This Record of Decision (ROD) addresses OU2, which includes contamination within the OU2 Study Area (see Figure 1, Appendix I). The status of each OU is summarized below:

OU1

EPA initiated preliminary RI work in the early 1990s, which included reviewing Site background information from the Warren County Department of Health and the NJDEP, and developing an initial list of 107 Potential Source Area (PSA) facilities to be evaluated as possible sources of chlorinated VOCs and other contaminants. EPA issued over 100 information request letters to facilities, and conducted Site visits.

In 1999, EPA initiated OU1 RI/FS activities, to delineate the nature and extent of contaminated groundwater and source areas, and evaluate potential human health and ecological risks based on Site-related contaminants.

Based on the results of the OU1 RI, elevated levels of TCE- and PCE-contaminated groundwater were detected, and elevated levels of soils were detected at several property locations. Based on these results, three general notice letters were issued naming Potentially Responsible Parties (PRPs) for the Site. These parties are PPPI, which bought the former American National Can facility in 1999, L&L Econowash Cleaners, and Modern Valet Services. A fourth source of groundwater contamination was subsequently identified by EPA in 2009 as Tung-Sol Tubing, a company which is defunct.

Past disposal practices at these identified source areas contributed contaminants to the Site groundwater within the OU1 Study Area, which continues to migrate downgradient.

EPA completed the OU1 RI/FS in 2005 and released the results to the public in July 2005. In August 2005, EPA issued a Proposed Plan to address groundwater contamination within the OU1 Study Area. The selected groundwater remedy for the OU1 Study Area was documented in the OU1 ROD, issued on July 13, 2006. The OU1 ROD provides for the implementation of a groundwater remedy which consists of pumping, treatment, and reinjection of the most contaminated part of the TCE and PCE groundwater plumes using a series of extraction wells. Long-term monitoring of natural attenuation will be performed to determine whether Site contaminants are meeting the appropriate drinking water standards. Institutional controls will be established, such as the establishment of a CEA, to further restrict the use of groundwater within the OU1 Study Area until the aquifer is

restored. Also, while most businesses and residences are connected to public water within the OU1 Study Area, if any residences or businesses within the OU1 plume are found to not be connected to public water, they will be connected, and the wells sealed, where feasible.

Two separate remedial design (RD) phases for the OU1 groundwater remedy are presently underway to address the TCE and PCE portions of the remedy in the OU1 Study Area. The RD to address the portion of the remedy for the TCE portion of the plume is being performed by PPPI, under the terms of a Unilateral Administrative Order issued by EPA. The RD for the PCE portion of the plume is being performed by EPA.

OU2

Between 2002 and 2004, NJDEP sampled more than 80 residential wells downgradient of EPA's OU1 Study Area. This sampling revealed levels of TCE detected above the New Jersey Ground Water Quality Standard (NJGWQS) of 1 microgram per liter (µg/l) in a number of the tested wells. This standard is the same or more stringent than the state of NJ and federal Maximum Contaminant Levels set for TCE of 1 µg/l and 5 µg/l, respectively. At the present time, the public water supply ends near the southwestern boundary of the OU1 Study Area and does not extend into the OU2 Study Area. Therefore, NJDEP is providing individual Point of Entry Treatment Systems (POETS) to residences where TCE concentrations have been detected above the NJGWQS. POETS treat the contamination at each well through carbon adsorption.

Residents using private wells within the OU2 Study Area may be at risk of exposure to Site-related contaminants through contaminated residential well water. NJDEP and the Warren County Department of Health recommend that residents on private wells sample their wells once a year, however, it is not clear that all residents do so.

Between 2006 and 2009, EPA conducted RI field work in the OU2 Study Area to determine the following:

- Nature and extent of contamination in groundwater downgradient of the OU1 Study Area;
- Hydraulic gradient and hydrogeologic connectivity from the OU1 to OU2 Study Areas;

- Potential human health and ecological risks based on the occurrence and distribution of contamination in sediment, surface water, and groundwater; and

- Sources of groundwater contamination.

A vapor intrusion investigation was also conducted to determine if vapors generated by the groundwater contamination posed potential human health risks.

OU3

The OU3 Study Area is within Washington Borough, and includes contaminated source areas and soils located on and in the vicinity of the former American National Can facility. EPA is currently performing the OU3 RI/FS with field work scheduled to begin in late 2010.

ENFORCEMENT ACTIVITIES

In June 2004, EPA sent a General Notice Letter to PPPI. EPA has also sent General Notice letters to Modern Valet Services and L&L Econowash Cleaners in April 2007. A subsequently identified additional PRP, the former Tung-Sol Tubing Company, was found to be defunct. EPA initially funded the OU2 RI/FS in September 2004. EPA issued a Unilateral Order to PPPI to implement the OU1 TCE part of the remedy in September 2007. EPA funded the PCE part of the OU1 remedy in September 2006. In March 2008, EPA initiated negotiations with PPPI to conduct the OU3 TCE source areas RI/FS under an Administrative Order. These negotiations were unsuccessful and ended in September 2008. EPA initiated the RI/FS for OU3 in late 2008.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The OU2 RI and FS reports and the Proposed Plan for the OU2 remedy for the Site were released to the public for comment on April 16, 2010. These documents were made available to the public in the administrative record file maintained at the Warren County Health Department's office located in Oxford, New Jersey and at the EPA Region II Records Center located at 290 Broadway, New York City. The notice of availability for these documents was published in Express Times on April 16, 2010. A public comment period on these documents was held from April 16, 2010 through May 17, 2010.

In addition, on April 29, 2010, a public meeting was conducted by EPA at the Washington Borough Municipal Building Courtroom in Washington Borough, New Jersey to discuss the findings of the OU2 RI/FS and to present EPA's Proposed Plan to local officials and the community. At this meeting, EPA representatives answered questions about the remedial alternatives developed as part of the RI/FS. Comments which were received by EPA at the pubic meeting and in writing during the public comment period are addressed in the Responsiveness Summary (see Appendix IV).

SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

As with many Superfund sites, the contamination at the Pohatcong Valley Site is complex. In order to manage the cleanup of the Site more effectively, EPA has organized the work into three phases of long-term cleanup called operable units (OUs), under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA).

With respect to immediate actions taken, the NJDEP has installed activated carbon treatment units, known as POETs, in approximately 100 homes located in the OU2 Study Area with contaminated drinking water. In addition, in 2008, EPA conducted vapor intrusion mitigations at one public school and one residence within OU2 to mitigate a potential threat from TCE vapors. A second impacted residence was remediated when the owner independently installed a vapor mitigation system during remodeling.

The long-term cleanup will be conducted in three discrete phases, or Operable Units.

- OU1, which was the subject of a 2006 ROD, is described previously.

- OU2, which is the subject of this ROD, will provide for implementation of a remedy to address the groundwater contamination in the OU2 Study Area that is downgradient of the OU1 Study Area at the Site.

- OU3 will address the sources of the TCE groundwater contamination at the Site. EPA initiated an RI/FS for OU3 in late 2008.

SUMMARY OF SITE CHARACTERISTICS

The OU2 Study Area consists of approximately 4,200 acres, and begins at the downgradient southwestern terminus of OU1, and continues southwestward through portions of Franklin and Greenwich Townships. Development decreases outside the OU1 and OU3 Study Areas. The OU2 Study Area consists of primarily less developed interspersed commercial, rural, farm, and residential land located within Pohatcong Valley. State Route 57 traverses approximately through the center of the Site.

There are two surface water bodies within OU2, the former Edison Quarry, and a smaller unnamed body of water. In addition, the Pohatcong Creek courses through the center of the OU2 Study Area.

The topography in the area around the Site is generally flat and slopes toward the southwest, as well as the adjacent New Jersey Highlands Province which boarders both the northwest and southeast edges of the Pohatcong Valley. Surface elevations across the OU2 Study Area range from approximately 380 feet above mean sea level near OU1, to 300 feet above mean sea level at the southwestern portion of OU2.

The geology of the Site consists of unconsolidated sedimentary deposits of glacial origin overlaying weathered bedrock of Paleozoic age. The unconsolidated sediments vary in thickness, but are generally between 50 and 100 feet thick within the OU1 Study Area, and from 80 feet to less than 40 feet in the OU2 Study Area. Underlying the unconsolidated sediments is the primary drinking water aquifer for the Site, which is generally composed of Paleozoic bedrock, consisting of competent, as well as fractured and karstic limestone and dolomite. A thrust fault known as the Karrsville Thrust fault is a major geologic feature of importance transversing through in the approximate center of the OU1 and OU2 portions of the Pohatcong Valley, as well.

Groundwater in the Pohatcong Valley is found to a limited extent in perched aquifers within the shallow unconsolidated deposits, and primarily in the deeper regional aquifer in the weathered overburden and bedrock. Perched aquifers do not represent a significant source of groundwater for the region. Groundwater in the regional aquifer is generally encountered at a depth of approximately 100 feet below ground surface (bgs) in the northern part of the OU1 Study Area, and decreases to a depth of approximately 40 feet bgs or less, in the downgradient, southernmost portion of the OU2 Study Area. Groundwater in the

regional aquifer generally flows to the southwest, along the length of the Pohatcong Valley. Pohatcong Creek runs approximately through the central axis of the Valley (see Appendix I, Figure 1).

Groundwater in the Pohatcong Valley occurs mainly in the Paleozoic limestone and dolomite carbonate rocks underlying the glacial sediments at the Site. These limestones and dolomites are known to form prominent karstic features such as extensive bedrock voids and sinkholes in the Pohatcong Valley, and these are sometimes observed to be evident at the surface, especially in the OU2 Study Area, where the depth to the dolomite/limestone is shallower. Both the OU1 and OU2 RI field activities and studies encountered numerous fractures, void spaces, and cavities in the subsurface, which are expected to affect groundwater and contaminant migration on the local scale.

The mountains bounding Pohatcong Valley are composed of Precambrian igneous and metamorphic rocks and were thrust up during a series of complex mountain building periods in the Paleozoic. The Pohatcong Thrust Fault has been identified near the base of Pohatcong Mountain adjacent to Pohatcong Valley and the Brass Castle Thrust Fault has been identified near the base of Scott, Oxford, and County House Mountains adjacent to Pohatcong Valley. These two thrust faults strike parallel to the Valley and dip steeply toward the southeast. A third mapped fault in the OU2 Study Area, known as the Karrsville Fault, roughly parallels the Pohatcong and Brass Castle faults.

The Karrsville Fault is a major structural feature connecting the OU1 and the OU2 Study Areas, located in the approximate center of the valley. The Karrsville Fault parallels the regional groundwater flow direction, and it influences groundwater flow on the local and regional levels. Preferential dissolution of the limestone/dolomite along the length of the fault creates a highly permeable groundwater conduit for groundwater flow within the OU1 and the OU2 Study Areas. Dissolution of the bedrock along the fault by groundwater creates local subsidence of the overburden, which influences the course of a section of the Pohatcong Creek near the OU1/OU2 border. Limestone/ dolomite water-filled former quarries, such as the larger former Edison Quarry located within OU2, are bounded by the hanging wall of this fault, and receive large volumes of groundwater flow from water bearing fractures that make up the fault. The fault's location and extension in the upgradient portion of the OU1 Study Area is obscured by overburden deposits. Within the OU1 Study Area, the Karrsville Fault is mapped as passing through the location of the high

yield New Jersey American Water Company Dale Avenue public supply well, that became impacted with TCE in the 1970's, and its route continues along the northern border of Washington Borough. Within OU1, the former American National Can facility, which is the sole identified source of the Site's TCE groundwater contamination, is located approximately one half mile upgradient of the Karrsville Fault. Figure 2, in Appendix I is a geologic map showing the bedrock geology and the trace of the Karrsville and other two major thrust faults through the OU1 and OU2 Study Areas.

The specific Paleozoic formations that underlie the Pohatcong Valley include, from oldest to youngest, the Hardyston Quartzite, Leithsville Formation, Allentown Dolomite, Lower Beekmantown Group, Upper Beekmantown Group, and Jacksonburg Limestone. These formations and the Karrsville Fault are described by Drake (1967), Drake et al (1994), and Drake et al (1996).

Source Contamination

EPA's RI in the OU2 Study Area included the investigation of potential sources of groundwater contamination.

It should be noted that a number of potential source areas located within the OU2 Study Area were previously investigated during the OU1 RI. OU2 RI field work progressed in phases. The first phase consisted of the installation of groundwater monitoring wells, the collection of groundwater, residential well samples, sediment, and surface water samples. Several subsequent phases involved the expansion of the residential well sampling program, with the sampling of hundreds of residential wells. Soil sampling was considered, but based on the results of other media sampled as part of OU2 field work, as well as on the prior OU1 RI results, EPA determined that a subsequent soils sampling phase was not necessary.

During the planning of the OU2 RI, EPA identified and evaluated potential source areas. Two facilities, located adjacent to each other along the southern periphery of the valley, were identified as potential sources. The main industrial facility within the OU2 Study Area is the Victaulic Company of America (VCA) property located along Edison Road south of State Route 57. A search for additional potential source areas in the OU2 Study Area identified a small pallet processing facility, known as the T&M Pallet Company (TPC). The TPC facility is immediately adjacent to the VCA property. During the OU1 RI,

soil and groundwater samples were collected at the VCA facility, however, soil contamination was not identified, and elevated groundwater contamination was not found. During OU2, a newly installed well downgradient of the two facilities did not detect any contaminants of concern, and samples collected from private residential wells located downgradient of the VCA and TPC facilities contained no VOCs. Based on the OU1 and OU2 RI results, the two facilities were determined not to be contributing to the groundwater contamination in the OU2 Study Area, and additional soil samples were not collected. Similarly, the former Edison Quarry was evaluated as a potential source area under the OU1 RI, and samples were collected from the quarry. Sample results indicated that the quarry is not a source of Site contaminants, but rather a reservoir primarily filled by contaminated groundwater discharging through fractures.

The results of the OU2 RI did not identify any source areas within the OU2 Study Area. Moreover, the OU2 investigation identified a dispersed groundwater plume, having no identifiable hot spot areas, which would indicate that there are no significant local sources within the OU2 Study Area. Based on these findings, soil samples were not collected during the OU2 RI.

This result is not unexpected, given the markedly lesser development and scarcity of potential source facilities located in the OU2 Study Area compared to the OU1 Study Area, and that the major land use within OU2 is rural and residential. The major source areas of the Site's groundwater contamination were previously identified within the heavily developed OU1 Study Area. As previously stated, the former Tung-Sol Tubing Company, L&L Econowash Cleaners, and Modern Valet Services, are the identified PCE sources, and the former ANC manufacturing facility, located within the OU1 Study Area, formerly owned by PPPI and now owned by Twist Beauty Packaging US, Inc., is the sole identified source for the Site's much larger TCE groundwater contaminant plume. TCE-contaminated groundwater originating at the TCE source area located in the northern portion of the OU1 Study Area, has migrated downgradient throughout the OU1 and OU2 Study Areas.

Groundwater Contamination

As noted previously, between 2002 and 2004, the NJDEP sampled more than 80 residential wells downgradient of EPA's OU1 Study Area, within the present OU2 Study Area. This sampling revealed

levels of TCE detected above the NJGWQS of 1 microgram per liter (µg/l) in a large number of the tested wells. At the same time, EPA's OU1 investigation collected 15 water samples from the Edison Quarry and collected samples at a limited number of residential wells located within the OU2 Study Area. EPA's sampling results also revealed TCE was detected in OU2 groundwater as well as in surface water at the former Edison Quarry. Based on these NJDEP and EPA efforts, EPA initiated an OU2 RI.

Because the public water supply ends near the southwestern boundary of the OU1 Study Area, residents using private wells within the OU2 Study Area may be at risk of exposure to Site-related contaminants through contaminated residential well water, and the NJDEP has been providing POETS to residences where TCE concentrations have been detected above the NJGWQS. POETS treat the TCE contamination through carbon adsorption. The NJDEP and the Warren County Department of Health also recommend that residents on private wells sample their wells once a year, however, it is not clear that all residents do so.

Between 2006 and 2009, EPA conducted RI field activities in the OU2 Study Area to: determine the nature and extent of contamination; assess the hydraulic gradient and hydrogeologic connection from the OU1 to the OU2 Study Areas; identify the presence of the geologic feature known as the Karrsville Fault, which is a major geologic feature mapped in the OU2 Study Area; and to confirm that the Karrsville Fault extends into the OU1 Study Area. To these ends, RI activities included the installation of temporary well points, called geoprobes, monitoring well installation, the collection of sediment, surface water, groundwater and residential well samples, and a seismic survey at the Asbury-Broadway Road area near the OU1/OU2 boundary to determine the status of the fault.

As part of the OU2 RI/FS, EPA drilled 105 feet of overburden and 906 feet of bedrock to install 7 new monitoring wells in the OU2 Study Area; completed a 2,640-foot line of surface geophysics and 735 feet of subsurface geophysics; performed packer testing in 12 bedrock zones; collected 14 groundwater samples from the 7 new and 4 existing monitoring wells in the OU2 Study Area; collected groundwater samples from 11 existing monitoring wells within the OU1 Study Area; collected groundwater samples from 204 residential wells; collected 6 sediment and 9 surface water samples; and utilized the results of 667 groundwater samples collected by NJDEP and the Warren County Department of Health. In addition, vapor intrusion evaluations were conducted at 9 residences and 2 public buildings within the OU2 Study Area.

Samples were collected to assess the potential for VOCs to volatize from groundwater and accumulate underneath or within buildings. Some properties were sampled multiple times. A summary of OU2 RI activities completed is outlined in Table 1, Appendix II.

Groundwater Monitoring Well Installation and Sampling

A total of seven new groundwater monitoring wells were installed and sampled within the OU2 Study Area to determine the nature and extent of groundwater contamination and to identify potential source areas. Prior to permanent monitoring well installations, temporary well points were installed at new well locations to identify contaminant impact in shallow groundwater. Packer tests were completed at selected depths in deep monitoring wells to 1) evaluate the presence of bedrock fractures and voids that may serve as preferential groundwater pathways, 2) to assess the nature of vertical movement of groundwater in the bedrock, 3) to collect depth-discrete groundwater samples for laboratory analysis, and 4) to identify zones for the placement of well screens for well completions. The analysis of groundwater samples collected included VOCs, semi-VOCs (SVOCs), and metals. Monitored natural attenuation parameters were also evaluated for consideration during the FS. Locations of monitoring wells that were installed and sampled within the OU2 Study Area are identified in Figure 3, Appendix I. Summary tables of the analytical data are located in Table 2, Appendix II.

Five new monitoring wells were installed at three locations along or near the Karrsville Fault to assess groundwater flow and contaminant migration. These monitoring well locations are designated as ABR, MWO, and SMS, with one location (ABR), being installed within the Karsville fault zone near the OU1/OU2 border along Asbury Broadway Road. Three monitoring wells were installed at the ABR location, a shallow overburden well, a deep bedrock well, and a third well was screened at four discrete depths, between the overburden and deep bedrock wells, to characterize water from discrete fractures.

Two wells were installed in areas away from the Karrsville Fault to assess potential source areas, and to evaluate the migration of contaminants away from the fault, at the QUA and RHR locations. The QUA monitoring well was located downgradient of the potential source areas VCA and TPC. The RHR and SMS monitoring wells were located in the farthest downgradient portion of OU2 Study Area, to define the extent of the

groundwater contaminant plume. Several existing monitoring wells were also sampled, designated as the SIG wells, located away from the fault and near the OU1/OU2 border.

Prior to installing the ABR wells, a geophysical, reflection seismic survey was performed perpendicular to the axis of Pohatcong Valley at the OU1/OU2 Study Area border, in the area of Asbury-Broadway Road, to identify the location of the Karrsville Fault and to help select drilling locations within the Fault. The seismic survey was 0.5-mile-long and it crossed Pohatcong Creek. The survey confirmed the subsurface location of the Karrsville Thrust Fault along the OU1/OU2 Study Area border. The survey also revealed that the fault is not one, single feature, but is comprised of multiple parallel and sub-parallel fractures and faults that create an extensive disrupted fracture zone in the bedrock, spanning a horizontal distance of greater than 150 feet, and comprises an extensive vertical extent. It should also be noted that during drilling of the ABR wells, large, karst-type voids were encountered in the bedrock that resulted in collapsed boreholes, and the shallow monitoring well produced a large volume of free flowing water during drilling.

Based on the monitoring well installation and sampling results, TCE was the only Site contaminant detected above standards from groundwater monitoring wells installed and sampled in the OU2 Study Area. TCE concentrations in groundwater, collected during packer testing and monitoring well sampling, ranged from below detection away from the Karrsville fault, to a high of 33 µg/l at the ABR wells installed within the fault zone near the OU1/OU2 border. Monitoring well results indicated a high TCE result of 21 µg/l. Consistent with known conditions in the OU1 Study Area, borehole geophysics and packer/groundwater sampling tests confirmed that the TCE occurs in bedrock fractures. However, not all bedrock fractures contain TCE, even within the Karrsville Fault itself, which indicates complex groundwater and contaminant flow and migration through the fractured bedrock. This finding also explains the pattern of elevated groundwater results in residential wells within the OU2 Study Area, as further described below.

Although PCE is an identified Site contaminant in the OU1 Study Area, PCE was only detected in several samples collected from the ABR and SMS wells, at concentrations below drinking water standards. At the ABR well location, PCE concentrations ranged from non-detect to 0.55 µg/l. At the SMS well location, installed along the Karrsville Fault in the downgradient part of OU2 Study Area, packer test groundwater samples and subsequent

completed well sample results were non-detect for TCE, however, PCE was detected at an estimated value of 0.055 µg/l. The SMS location along the trend of the Karrsville fault represents the downgradient extent of TCE in the OU2 Study Area. Similarly, the RHR well location, located at the southwestern portion of the OU2 Study Area and away from the Karrsville Fault, was non-detect for VOCs, and represents a downgradient limit to the OU2 TCE plume.

Chloroform, PCE, cis-1,2-dichloroethene (cis-1,2-DCE), and 1,1,1-TCA were also detected in groundwater samples collected from the ABR area wells. The specific concentrations of these compounds are below the NJGWQS and federal and state MCLs established for these compounds. Bis(2-ethylhexyl) phthalate (DEHP), was detected at a concentrations ranging from non-detect to 0.78 µg/l in the SIG wells, which is below groundwater standards. DEHP was detected at a concentration of 7.8 µg/l in the QUA well, which is above groundwater standards. Groundwater samples collected from the above wells also had limited detections of the metals aluminum, iron, lead, manganese, sodium, as well as one detection of arsenic and one detection of thallium, above groundwater standards. These metals results were dispersed and are not considered Site related, and may be naturally occurring.

During the OU2 RI, groundwater samples were also collected from existing groundwater monitoring wells at eight selected locations within the OU1 Study Area. These monitoring wells were selected to understand the regional groundwater flow conditions, and to provide an update of the previous detections of VOCs at these locations upgradient from the OU2 Study Area. Additionally, collecting these groundwater samples in conjunction with groundwater samples collected in the OU2 Study Area monitoring wells provided a common data set to assess the pervasiveness of VOCs along the length of the OU1 and OU2 Study Areas, and provided water level measurements to determine the hydraulic gradient, and the regional groundwater flow direction within the OU1 and OU2 Study Areas. These results are also located in Appendix II. Figure 4, located in Appendix I, presents a groundwater flow map and water levels for wells sampled in the OU1 and OU2 Study Areas. A cross-sectional view of groundwater elevations, located through OU1 and OU2 Study Area wells, is presented on Figure 5, located in Appendix I. The cross section shows that the groundwater elevation decreases from approximately 410 feet above sea level in the northeast part of OU1 Study Area, to approximately 270 feet above sea level in the southwest part of the OU2 Study Area, a decrease of approximately 140 feet. This clearly shows that the regional

groundwater flow is from the OU1 Study Area into and through the OU2 Study Area, and follows a gradient of about 0.003 ft/ft.

Residential Groundwater Sampling

EPA, NJDEP, and the Warren County Department of Health collected groundwater samples from residential potable wells prior to and concurrent with EPA's OU1 and OU2 investigations. Summary tables of all these sampling data are provided in Appendix II. The Warren County Department of Health collected 303 groundwater samples from about 185 residences in Franklin and Greenwich Townships between 2002 and 2005, with some residences being sampled multiple times. NJDEP collected 343 samples from a number of residences between 2002 and 2008, again with some residences being sampled multiple times. As a consequence of these sample results, approximately 74 residences were fitted with POETS that the NJDEP installed and continues to maintain. Within the OU2 Study Area, the POETS were installed to treat TCE. POETS are small treatment systems connected to a residential water supply line to remove VOCs from groundwater using activated carbon. The carbon has to be periodically sampled and replaced to assure that groundwater is being properly treated. Presently, NJDEP's Spill Fund pays for maintenance and monitoring of the POETS by private contractors hired by individual property owners to ensure the systems are operating properly.

As outlined in the OU2 RI, EPA conducted four residential groundwater sampling events from March 2008 through August 2009. The levels measured during the OU2 RI were compared to the appropriate NJGWQS and federal and state MCLs to determine exceedences and areas of concern. Groundwater within OU2 is classified by NJDEP as a Class IIA resource; it is a current source of drinking water, and it is expected to remain a source of drinking water in the future. The applicable groundwater cleanup standard for TCE is 1 µg/l. Properties impacted above standards have been referred to NJDEP for further evaluation and action, which included confirmation sampling, and the installation and maintenance of POETS until EPA has selected and implemented a remedy for the OU2 Study Area.

During EPA's initial residential sampling event in March 2008, EPA collected 37 samples from 22 residential wells. Of the 22 wells sampled, TCE was identified in 14 of the wells at concentrations above the NJGWQS of 1 µg/l.

Based on the results of the March 2008 residential well sampling, EPA expanded the program in 2009 to include a comprehensive sampling of all residential wells in the OU2 Study Area that were not connected to NJDEP POET systems, and for which property owners granted EPA access to sample their wells. EPA mailed approximately 650 access request letters to property owners, along with Site fact sheets updating specific Site activities. EPA then scheduled sampling at all residences where access had been granted by the property owner.

In March 2009, 112 residential wells were sampled. An additional 62 residential wells were sampled in May 2009. Additional sampling was conducted at 9 residences in August 2009. In total, EPA sampled 182 residential wells in 2009. Analytical results of the 2009 sampling program indicate that TCE contamination was identified above the NJGWQS of 1 µg/l in 33 of the 182 residential wells sampled during 2009.

Based on the results from EPA's 2008 and 2009 residential well sampling program consisting of 204 residential wells, TCE contamination was identified above NJGWQS in approximately 47 residential wells. As a result, the NJDEP installed 23 POETS in 2009 at properties where EPA's sampling results indicated that TCE contamination was above the state standard and that did not already contain treatment systems. The well sampling program is ongoing.

Based on all residential well sampling results conducted by the NJDEP, the Warren County Department of Health, and EPA, approximately 100 residential wells in the OU2 Study Area were found to contain TCE concentrations above the NJGWQS of 1 µg/l. TCE is the only Site-related compound detected above standards, and it is found dispersed over a large portion of the OU2 Study Area.

The residential well sampling investigation also identified that impacted wells are found immediately next to wells that are not impacted and that it is not possible to accurately predict potential future contaminant impacts to individual wells at the local level. It is noted that residential well samples collected immediately adjacent to the Edison Quarry and the Karrsville fault generally contain higher TCE concentrations than well samples collected further from the quarry and fault. Summary Tables of the residential well samples collected by the Warren County Department of Health, NJDEP, and EPA, are located in Table 3, Appendix II.

Surface Water and Sediment

As part of the OU2 RI, the former Edison Quarry, which is located along the Karrsville fault, was evaluated. Geologically, the quarry is located at an area where the fault emplaced a section of limestone that was quarried and used in the manufacture of cement. Limestone excavation continued until the operation intercepted high yield water bearing fractures and the flow of groundwater from the fault could no longer be controlled through pumping and the quarry filled with groundwater. The former quarry is water-filled, about 1,350 feet long, 800 feet wide, and has a depth ranging from approximately 50 to 96 feet. The former quarry continues to receive about three million gallons of water per day from the Karrsville fault, based on the volume of water discharged to Pohatcong Creek from an overflow channel. Sediment and surface water sampling locations are identified on Figure 3-2, in Appendix I.

As discussed in detail in the OU1 RI Report, surface water and depth discrete water samples had been collected during OU1 from the former Edison Quarry. Of the 15 samples that were taken at various depths in the Edison Quarry (10 feet (ft) below water surface, 10 ft above quarry bottom and at mid-point), all 15 samples had TCE detections ranging from 0.36 µg/l (estimated value) to 6.2 µg/l. The higher concentrations tended to be located in the shallower depths. These results indicate that the Edison Quarry is not itself a source of the TCE detected in its water, and that the Karrsville fault serves as an effective preferential groundwater flow and contaminant migration pathway. It is noted that residential well samples collected immediately adjacent to the Edison Quarry and the Karsville fault generally contain higher TCE concentrations than well samples collected further from the quarry (i.e., further from the Karrsville fault). The occurrence of TCE in the Karrsville fault is due to migration from the OU1 Study Area.

During the OU2 RI, 6 sediment samples and 9 surface water samples were collected from 9 locations along Pohatcong Creek. No TCE was identified in the 6 sediment samples collected. One detection of TCE was identified in the surface water in Pohatcong Creek immediately downgradient from the Edison Quarry discharge outlet, at a concentration of 1.2 µg/l. Several other VOCs were detected at low levels, however, these compounds are not considered Site related. The location of surface water and sediment samples are identified on Figure 6, in Appendix I. And Table 4, in Appendix II, presents a summary of the surface water and sediment sampling results.

Vapor Intrusion

EPA conducted vapor intrusion evaluations at 9 residences and 2 public buildings within the OU2 Study Area to address potential exposure to Site-related contaminants emanating from groundwater due to the vapor intrusion pathway. The vapor intrusion study included evaluating selected residential locations schools and daycare facilities within the OU2 Study Area. Soil gas and air samples were collected to assess the potential for volatile organic compounds to volatize from groundwater and accumulate underneath or within buildings.

Based on the results of screening sampling conducted in 2007, EPA identified several buildings in the area of Asbury-Broadway Road along the OU1/OU2 border as having elevated sub-slab TCE levels. Two residences and one public school were potentially impacted. EPA conducted follow-up sub-slab and indoor air sampling at these three locations. While the sub-slab TCE concentrations remained elevated above screening levels, indoor air was not impacted above health based risk levels. Based on the results, sub-slab depressurization systems were installed at one public school and one residence. A second impacted residence was remediated when the owner independently installed a vapor mitigation system during remodeling.

The vapor intrusion investigation results along Asbury-Broadway Road showed a strong correlation between TCE groundwater and sub-slab vapor concentrations, which both showed a consistent decrease in concentrations away from the Karrsville Fault. The three remediated structures that had elevated sub-slab TCE concentrations, and the ABR well, which had the highest TCE groundwater concentrations detected in the OU2 Study Area, are located along the Karrsville fault preferential flow pathway.

The vapor intrusion investigation indicated that vapor intrusion, while present, is not widespread within the OU2 Study Area and is currently limited to an area near the OU1/OU2 border.

Summary

Based on EPA's OU2 RI studies, a number of conclusions regarding contamination in the OU2 Study Area of the Site can be made. The media of concern in the OU2 Study Area is TCE-contaminated groundwater. TCE was the only Site-related contaminant identified at elevated levels during the OU2 RI and it is dispersed over a large part of the OU2 Study Area, at

concentrations ranging from below detection to a high of 33 µg/l.

No sources of Site-related groundwater contamination were identified within the OU2 Study Area. Further, sediment and surface water were not found to be contaminated above applicable standards by Site-related contaminants.

The OU1 and the OU2 Study Areas are hydraulically connected, and there is only one interconnected regional groundwater aquifer. Groundwater moves along the regional gradient in a southwesterly direction, from the OU1 into the OU2 Study Area. The Karrsville fault runs through the center of the Pohatcong Valley and provides the main conduit for migration of TCE-contaminated groundwater from the OU1 to the OU2 Study Area. The fault is an extensive structure, comprised of multiple fractures, dissolution flow channels, and numerous small faults, that create an extensive zone and permeable conduit allowing for the preferential migration of groundwater and TCE-contaminated groundwater. The fault runs in close proximity to the identified TCE source area within OU1, intersects the high yield Dale Avenue public water supply well within the OU1 Study Area, and extends through the OU2 Study Area. TCE originating at the OU1 source area migrates downgradient until it intersects the nearby fault zone, and flows along the fault zone following the regional flow direction into the OU2 Study Area.

Approximately 100 residential wells have been impacted by TCE contamination above the NJDEP Groundwater Quality Standard of 1 µg/l in the OU2 Study Area. This is approximately 25 percent of the residential wells within the OU2 Study Area.

Based on these OU2 RI findings, EPA has concluded that there is one continuous plume of TCE-contaminated groundwater emanating from the OU1 Study Area, which migrates downgradient and impacts the OU2 Study Area. The TCE plume is also dispersed over a large part of the OU2 Study Area. In addition to the monitoring wells and private residential wells that are impacted with TCE, there is a clear threat of impact to presently non-impacted wells. Due to the complex hydrogeology and heterogeneity of the aquifer, which includes preferential flow through fractures as well as dissolution pathways in the limestone and dolomite, it is not possible to accurately predict potential future contaminant impacts to individual wells within the plume at the local level. The approximate extent of the TCE groundwater plume in the OU1 and OU2 Study Areas is shown on Figure 1, in Appendix I.

While TCE and PCE are the Site contaminants of concern being addressed in the OU1 Study Area, thus far, PCE has not been detected above groundwater standards within the OU2 Study Area. The reason for this is because the much smaller OU1 PCE groundwater plume is largely intercepted by the nearby Vannatta Street municipal supply well, and it does not intercept the Karrsville fault zone. In contrast, the much more extensive TCE plume intercepts the Karrsville Thrust Fault. The Karrsville Thrust Fault plays a major role in groundwater movement and serves as a preferential flow path from the OU1 Study Area into the OU2 Study Area.

CURRENT AND POTENTIAL FUTURE SITE USES

The OU2 portion of the Site is expected to retain its current use and zoning. Active development of agricultural and open land is expected to continue into the future. Since the Site was listed on the NPL, several large farm properties were sold to developers, and a number of residences have been built. Recently, other farm properties have reportedly been sold to developers, as well, though the pace of development seems to have slowed, somewhat. Regardless, future development at the Site is expected to continue.

SUMMARY OF SITE RISKS

As part of the RI/FS, EPA conducted a baseline risk assessment to estimate the current and future effects of contaminants on human health and the environment. A baseline risk assessment is an analysis of the potential adverse human health and ecological effects of releases of hazardous substances from a site in the absence of any actions or controls to mitigate such releases, under current and future land uses. The baseline risk assessment includes a human health risk assessment and an ecological risk assessment. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the results of the baseline risk assessment for the Site.

Human Health Risk Assessment

A four-step process is utilized for assessing site-related human health risks for a reasonable maximum exposure scenario: *Hazard Identification* - uses the analytical data collected to identify the contaminants of potential concern at the site for each

medium, with consideration of a number of factors explained below; *Exposure Assessment* - estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed; *Toxicity Assessment* - determines the types of adverse health effects associated with chemical exposures, and the relationship between magnitude of exposure (dose) and severity of adverse effects (response); and *Risk Characterization* - summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks. The risk characterization also identifies contamination with concentrations which exceed acceptable levels, defined by the National Contingency Plan (NCP) as an excess lifetime cancer risk greater than 1×10^{-6} – 1×10^{-4}, an excess of lifetime cancer risk greater than 1×10^{-6} (i.e., point of departure) combined with site-specific circumstances, or a Hazard Index greater than 1.0; contaminants at these concentrations are considered chemicals of concern (COCs) and are typically those that will require remediation at the Site. Also included in this section is a discussion of the uncertainties associated with these risks.

Hazard Identification

In this step, the chemicals of potential concern (COPCs) in each medium were identified based on such factors as toxicity, frequency of occurrence, fate and transport of the contaminants in the environment, concentrations, mobility, persistence, and bioaccumulation. The risk assessment focused on groundwater, surface water, and sediment contaminants related to the groundwater plume associated with the Pohatcong Valley site which may pose significant risk to human health. Analytical information that was collected to determine the nature and extent of contamination revealed the presence of TCE in the groundwater at concentrations of potential concern.

A comprehensive list of all COPCs can be found in the baseline human health risk assessment (BHHRA), entitled "OU2 Remedial Investigation Report Pohatcong Valley Groundwater Contamination Superfund Site Franklin and Greenwich Townships Warren County, New Jersey" (USEPA, 2009). This document is available in the Administrative Record file. This ROD focuses on Operable Unit 02, which evaluated exposure to groundwater, surface water, and sediment within the OU2 Study Area of the Site. The groundwater pathway was the only pathway with risks and hazards that exceeded acceptable values, therefore, only the COCs, or those chemicals requiring remediation at the Site, related to

groundwater are listed in Table 1 (See Appendix III).

Exposure Assessment

Consistent with Superfund policy and guidance, the BHHRA is a baseline human health risk assessment and therefore assumes no remediation or institutional controls to mitigate or remove hazardous substance releases. Cancer risks and noncancer hazard indices were calculated based on an estimate of the reasonable maximum exposure (RME) expected to occur under current and future conditions at the Site. The RME is defined as the highest exposure that is reasonably expected to occur at a site. For those contaminants for which the risk or hazard exceeded the acceptable levels, the central tendency estimate (CTE), or the average exposure, was also evaluated.

The area above the groundwater plume is currently zoned for commercial and residential use. It is anticipated that the future land use for this area will remain consistent with its current use. The BHHRA evaluated potential risks to populations associated with both current and potential future land uses.

Exposure pathways were identified for each potentially exposed population and each potential exposure scenario for exposure to groundwater. Exposure pathways assessed in the BHHRA for the groundwater include ingestion of tap water, dermal contact with tap water, and inhalation from the showerhead by adult and child residents. In addition, ingestion of tap water was evaluated for on-site workers. Exposure pathways for surface water and sediment were also evaluated, although the risk and hazards associated with these pathways were within acceptable ranges. A summary of the exposure pathways that were evaluated can be found in Table 2 (See Appendix III). Typically, exposures are evaluated using a statistical estimate of the exposure point concentration, which is usually an upper-bound estimate of the average concentration for each contaminant, but in some cases may be the maximum detected concentration. A summary of the exposure point concentrations for the COCs in groundwater can be found in Table 1 (See Appendix III), while a comprehensive list of the exposure point concentrations for all COPCs (e.g., surface water, and sediment) can be found in the BHHRA.

Toxicity Assessment

Under current EPA guidelines, the likelihood of carcinogenic risks and noncancer hazards due to exposure to site chemicals are considered separately. Consistent with current EPA policy, it was assumed that the toxic effects of the site-related

chemicals would be additive. Thus, cancer and noncancer risks associated with exposures to individual COPCs were summed to indicate the potential risks and hazards associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Toxicity data for the human health risk assessment were provided by the Integrated Risk Information System (IRIS) database, the Provisional Peer Reviewed Toxicity Database (PPRTV), or another source that is identified as an appropriate reference for toxicity values consistent with EPA's directive on toxicity values. This information for the COCs is presented in Table 3 (See Appendix III) (noncancer toxicity data summary) and Table 4 (cancer toxicity data summary, in Appendix III). Additional toxicity information for all COPCs is presented in the BHHRA.

Risk Characterization

Noncarcinogenic risks were assessed using a hazard index (HI) approach, based on a comparison of expected contaminant intakes and benchmark comparison levels of intake (reference doses, reference concentrations). Reference doses (RfDs) and reference concentrations (RfCs) are estimates of daily exposure levels for humans (including sensitive individuals) which are thought to be safe over a lifetime of exposure. The estimated intake of chemicals identified in environmental media (*e.g.*, the amount of a chemical ingested from contaminated drinking water) is compared to the RfD or the RfC to derive the hazard quotient (HQ) for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds within a particular medium that impacts a particular receptor population.

The HQ for oral and dermal exposures is calculated as below. The HQ for inhalation exposures is calculated using a similar model that incorporates the RfC, rather than the RfD.

HQ = Intake/RfD

Where: HQ = hazard quotient
Intake = estimated intake for a chemical (mg/kg-day)
RfD = reference dose (mg/kg-day)

The intake and the RfD will represent the same exposure period (i.e., chronic, subchronic, or acute).

As previously stated, the HI is calculated by summing the HQs for all chemicals for likely exposure scenarios for a specific

population. An HI greater than 1.0 indicates that the potential exists for noncarcinogenic health effects to occur as a result of site-related exposures, with the potential for health effects increasing as the HI increases. When the HI calculated for all chemicals for a specific population exceeds 1.0, separate HI values are then calculated for those chemicals which are known to act on the same target organ. These discrete HI values are then compared to the acceptable limit of 1.0 to evaluate the potential for noncancer health effects on a specific target organ. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. A summary of the noncarcinogenic risks associated with these chemicals for each exposure pathway is contained in Table 5 (See Appendix III).

It can be seen in Table 5 (See Appendix III) that the HI for noncancer effects is primarily comprised of non-site related compounds from exposure to groundwater, through injection, dermal contact, and inhalation. It should be noted that at this time, there is not a reference dose for the Site-related compound TCE. Consequently, the potential noncancer hazard from exposure to TCE in drinking water is unknown.

For carcinogens, risks are generally expressed as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a carcinogen, using the cancer slope factor (SF) for oral and dermal exposures and the inhalation unit risk (IUR) for inhalation exposures. Excess lifetime cancer risk for oral and dermal exposures is calculated from the following equation, while the equation for inhalation exposures uses the IUR, rather than the SF:

$$Risk = LADD \times SF$$

Where: Risk = a unitless probability (1×10^{-6}) of an individual developing cancer

LADD = lifetime average daily dose averaged over 70 years (mg/kg-day)

SF = cancer slope factor, expressed as [1/(mg/kg-day)]

These risks are probabilities that are usually expressed in scientific notation (such as 1×10^{-4}). An excess lifetime cancer risk of 1×10^{-4} indicates that one additional incidence of cancer may occur in a population of 10,000 people who are exposed under the conditions identified in the assessment. Again, as stated in the National Contingency Plan, the point of departure is 10^{-6} and the acceptable risk range for site-related exposure is 10^{-6} to 10^{-4}.

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Results of the BHHRA presented in Table 6 (See Appendix III) indicate that the adult/child resident cancer risk exceeds the acceptable EPA point of departure (3.6×10^{-5}) due to exposure to TCE in groundwater. The groundwater also exceeds the State and Federal drinking water standards, which are ARARs for the Site.

In summary, TCE levels in groundwater contribute to cancer risks to residential populations that may use the contaminated groundwater. In addition, TCE in groundwater exceeds both state and federal drinking water standards. The noncancer hazards and cancer risks from all COPCs can be found in the BHHRA. Other contaminants driving the risk are primarily the inorganic compounds thallium, arsenic, cobalt, iron, manganese, and bis(2-ethylhexyl)phthalate, that are not considered to be Site-related. These chemicals are intermittently distributed in the aquifer, and the inorganics may be naturally occurring.

The primary Site contaminant of concern within the OU2 Study Area groundwater is TCE. Groundwater containing Site-related TCE contamination poses a direct human health risk and poses a potential human health threat. The response action selected in this Record of Decision is necessary to protect the public health or welfare or the environment from actual or threatened releases of contaminants into the environment.

Uncertainties

The procedures and inputs used to assess risks in this evaluation, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data.

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. Environmental chemistry-analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to

estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the risk assessment provides upper-bound estimates of the risks to populations near the Site, and is highly unlikely to underestimate actual risks related to the Site. Additionally, the reference dose for estimating non-cancer health effects from exposure to TCE is not available. This underestimates the potential hazards associated with exposure to TCE in drinking water.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the BHHRA report.

Ecological Risk Assessment

A Screening Level Risk Assessment (SLERA) evaluated the potential ecological impact of contaminants in surface water and sediment at the Site, and also evaluated the potential for groundwater discharging to sediment and surface water, specifically in Pohatcong Creek, Merrill Creek, and the Edison Quarry surface water bodies. Conservative assumptions were used to identify exposure pathways and, where possible, quantify potential ecological risks. Several VOCs were detected in the groundwater monitoring wells at concentrations that were below the screening values. No TCE was identified in sediment samples collected. One detection of TCE was identified in the surface water in Pohatcong Creek immediately downgradient from the Edison Quarry discharge outlet, at 1.2 µg/l. None of the surface water samples exceeded ecological risk screening criteria. Based on a comparison of maximum detected concentrations of contaminants in Site sediment, surface water, and groundwater to conservatively-derived ecological screening levels (ESLs), there is no potential for ecological risk from contaminants related to the Pohatcong Valley Site. The SLERA indicates no risk to ecological receptors from site-related

contaminants.

REMEDIAL ACTION OBJECTIVES

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

The following RAOs were developed for groundwater to address the human health risks and environmental concerns posed by Site-related contamination.

- Prevent or minimize current and future human exposures, including ingestion of Site-related VOCs in groundwater that present a risk to public health and the environment;
- Minimize the further migration of Site-related VOCs in groundwater; and
- Restore the aquifer to meet drinking water standards within a reasonable time-frame.

To achieve these RAOs, remediation goals for groundwater at the Site were identified based, in part, on the available information and standards such as ARARs, and to-be-considered (TBC) guidance.

The Remediation Goals selected for the OU2 Study Area groundwater are based on the groundwater ARARs for this Site, which are the Federal and state MCLs and NJGWQS. The remediation goal selected for the OU2 portion of the Site is 1 µg/l for TCE in groundwater. TCE was the only Site-related COC detected during the RI within the OU2 Study Area. TCE and PCE-contaminated groundwater are the Site-related COCs being addressed in the OU1 Study Area; however, to date, PCE has not been detected above standards in the OU2 Study Area. Based on the findings of the remedial investigation and risk assessment, soil, sediments and surface water do not pose unacceptable risks and do not require remedial action.

DESCRIPTION OF ALTERNATIVES

CERCLA requires that each remedial alternative be protective of human health and the environment, be cost effective, comply with other statutory laws, and utilize permanent solutions and

alternative treatment technologies and resource recovery technologies to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility or volume of hazardous substances. Consistent with expectations set out in the Superfund regulations, none of the alternatives developed rely exclusively on institutional controls to achieve protectiveness. Potential applicable technologies were identified and screened using effectiveness, implementability and cost as the criteria, with the most emphasis on the effectiveness of the remedial technology. A number of technologies were evaluated in the FS and screened out, including groundwater extraction, pumping, and treatment. Entire plume extraction, pumping and treatment was determined to be technically impractical, and could cause natural resource injury due to pumping large quantities of water, and is not cost-effective. This approach would likely result in limited groundwater availability and damage to surface water habitats such as streams and wetlands.

Five alternatives were retained for a detailed evaluation which is presented in the FS Report. A summary of these alternatives is presented below. Note that the present-worth costs developed for each alternative are based on a 30-year timeframe in accordance with EPA guidance. Also note that the timeframes presented below for construction do not include the time for pre-design investigations, remedial design activities, or contract procurements.

Remedial Alternatives

Alternative 1 - No Action

The No Action alternative was retained, as required by the NCP, and provides a baseline for comparison with other alternatives. No remedial actions would be implemented as part of the No Action Alternative. Furthermore, institutional and engineering controls would not be implemented. Under this alternative, TCE in the OU2 Study Area would attenuate through natural means, but this attenuation would not be monitored. In addition, residential wells would not be monitored to determine if they are impacted by Site contamination over time.

Total Capital Cost	$0
Operation and Maintenance	$0
Total Present Net Worth	$0
Timeframe	67 years

Alternative 2a - Monitored Natural Attenuation (MNA), Institutional Controls, and Private Well Head Treatment

Capital Cost:	$2,344,000
Annual O&M Cost:	$ 339,000
Present-Worth Cost:	$6,640,000
Time to Implement MNA:	67 years
Time to Install POETS:	1 year

Groundwater Alternative 2a relies on monitored natural attenuation to address the groundwater plume while placing institutional controls and groundwater use restrictions on groundwater impacted or threatened by Site contamination until the groundwater returns naturally to concentrations below the remediation goals. Private potable wells within the OU2 Study Area would be treated using POETS. Based on the number of residences estimated to be in the OU2 Study Area, approximately 320 POETS would be installed, operated and maintained. A time-frame of 1 year is estimated for the installation of POETS; however, the sampling, operation, maintenance and replacement of POETS would continue for as long as necessary to assure that potable water meets health-based standards.

Natural attenuation processes would be used for the remediation of the OU2 Study Area exceeding remediation goals. Natural attenuation is the process by which contaminant concentrations are reduced by various naturally occurring physical, chemical, and biological processes. The main processes include biodegradation, dispersion, dilution, sorption, volatilization, and chemical or biological stabilization, transformation, or destruction of contaminants. These processes occur naturally, in situ, and act to decrease the mass or concentration of contaminants in the subsurface. Only non-augmented natural processes are relied upon under this general response action. Augmentation through addition of electron acceptors or nutrients is considered an in situ treatment technology. Dispersion, diffusion, and dilution appear to be the dominant natural attenuation mechanisms identified for this Site, and to a minor extent volatilization is occurring, as well.

The implementation of MNA requires long-term monitoring to monitor contaminants as they naturally attenuate and until the groundwater returns to concentrations below remediation goals. The time for the OU2 portion of the Site to attenuate to meet the cleanup goal for TCE is estimated to be approximately 67 years.

Further, under this alternative, institutional controls would be implemented. This would include the establishment of a Classification Exception Area (CEA) in accordance with state regulations to minimize potential exposure by the public to contaminated groundwater until the groundwater meets remediation goals.

Alternative 2b - MNA, Institutional Controls, and Public Water Supply Connection

Capital Cost:	$13,992,000
Annual O&M Cost:	$ 77,000
Present-Worth Cost:	$15,040,000

Time to Implement MNA:	67 years
Time to Install Public Water Supply:	1 - 2 years

Similar to Alternative 2a, Groundwater Alternative 2b relies on MNA to address contamination in the groundwater plume while placing institutional controls and groundwater use restrictions on the areas of groundwater impacted or threatened by Site contamination, until groundwater returns naturally to concentrations below the remediation goals.

This option is different from Groundwater Alternative 2a in that all homes within the OU2 Study Area would be connected to the public water supply. Water supply lines would be extended into the OU2 Study Area from existing supplies that presently service Washington Borough, and the Phillipsburg areas. Approximately 10 miles of water supply line would be constructed within the OU2 Study Area under this alternative. Each residence or business to be connected would receive its own service-line connection from the supply line to the home or building. It is estimated that the public water supply lines would require approximately 2 years to install. Following connection to the public water supply, private potable wells within the OU2 Study Area would be abandoned in accordance with applicable requirements. Private potable wells at remote locations where connection to a public water supply is not practical would be monitored and treated using POETS as part of this alternative. Property owners for properties connected to the public water supply would be responsible for payment of water bills once the connections are complete.

Natural attenuation processes would be used for the remediation of groundwater within the OU2 Study Area exceeding remediation goals, as described in Alternative 2a, above. Monitoring of

these natural attenuation processes would be performed. In addition, a CEA would be established as an institutional control as described in Alternative 2a, above.

Alternative 3a - In-Situ Treatment, Private Well Head Treatment, and MNA

Capital Cost:	$3,644,000
Annual O&M Cost:	$ 615,000
Present-Worth Cost:	$8,200,000

Time to Implement MNA:	67 years
Time to Conduct In-Situ Treatment:	1 year
Time to Install POETS	1 year

Alternative 3a includes the in-situ oxidation (ISO) of TCE at a location near the boundary of the OU1 and OU2 Study Areas and within the geologic fault zone which serves as a preferential flow pathway of TCE into the OU2 Study Area from the source area which is located upgradient, in the OU1 Study Areas. This in-situ technology would be expected to treat an area of groundwater contamination over approximately eight acres with the highest levels of TCE within the OU2 Study Area. The downgradient portions of the plume would be monitored as the contaminants attenuate.

When ISO is used, an oxidant or oxygen releasing compound is typically injected into a well or wells placed in the contaminated groundwater. The oxidant mixes with the contaminants, and involves reduction/oxidation (redox) that chemically converts hazardous contaminants to nonhazardous or less toxic compounds that are more stable, less mobile, or inert. When the process is complete, only water and other harmless breakdown products are left in the area that is treated. The oxidizing agents most commonly used for treatment of hazardous contaminants in soil are ozone, hydrogen peroxide, hypochlorites, chlorine, chlorine dioxide, potassium permanganate, or Fentons reagent (hydrogen peroxide and iron). For in-situ chemical oxidation, injectors would be installed in a grid pattern to the desired treatment depth interval, which would be determined during the RD phase, and the oxidizing agent would be injected into the desired area.

It is estimated that in-situ ISO treatment would be ongoing in the treatment area for approximately 1 year.

As part of this alternative, private potable wells within the OU2 Study Area and remote locations would be treated using

POETS, as described in Alternative 2a, above. As described in Alternative 2a, above, natural attenuation processes would be used for the remediation of groundwater within the OU2 Study Area exceeding remediation goals that is not being addressed by ISO. Natural attenuation processes will address groundwater throughout the OU2 Study Area concurrent with and after the ISO treatment.

Institutional controls and groundwater use restrictions would be put in place placed as described in Alternative 2a, above.

Alternative 3b - In-Situ Treatment, Public Water Supply Connection, and MNA

Capital Cost:	$15,292,000
Annual O&M Cost:	$ 352,000
Present-Worth Cost:	$16,590,000

Time to Implement MNA:	67 years
Time to Install Public Water Supply:	2 years

This alternative is similar to Alternative 3a with groundwater treatment utilizing in-situ oxidation of TCE at a location near the boundary of the OU1 and OU2 Study Areas and within the geologic fault zone which serves as a preferential flow pathway of TCE into the OU2 Study Area. This eight-acre area is the area with the highest levels of TCE within the OU2 Study Area.

This alternative varies from Alternative 3a in that instead of installation of POETS throughout the entire OU2 Study Area, residences would be connected to the public water supply as described in Alternative 2b.

Natural attenuation processes would be used for the remediation of groundwater within the OU2 Study Area exceeding remediation goals as described in Alternative 2a. Monitoring of these natural attenuation processes would be performed. In addition, a CEA would be established as an institutional control as described in Alternative 2a.

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considered the factors set out in CERCLA § 121, 42 U.S.C. § 9621, by conducting a detailed analysis of the viable remedial response measures pursuant to the NCP, 40 CFR § 300.430(e)(9), and OSWER Directive 9355.3-01. The detailed analysis consisted of an assessment of the

individual response measured against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each response measure against the criteria.

Threshold Criteria - The first two criteria 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.

1. Overall Protection of Human Health and the Environment
Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

The No Action Alternative (Alternative 1) is not considered protective of human health and the environment because it does not prevent the current and future use of contaminated groundwater which presents an unacceptable human health risk. It also does not include any long-term groundwater monitoring to assess or address potential short or long term exposure to groundwater by area residents. The remaining alternatives are considered protective. They all eliminate exposure to contaminated groundwater and include institutional controls to minimize potential exposure to contaminated groundwater until the alternatives are implemented, and remediation goals have been achieved.

2. Compliance with applicable or relevant and appropriate requirements (ARARs)
Section 121 (d) of CERCLA and NCP § 300.430(f) (1) (ii) (B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d) (4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility citing laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those State standards that are identified by a state in a timely

manner and that are more stringent than Federal requirements may be applicable. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility citing laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for invoking a waiver.

The three broad categories of ARARs include chemical-specific, location-specific and action-specific ARARs. Based on the findings of the RI and HHRA, soils, sediments and surface water do not pose unacceptable risks and do not require a remedial action. However, ARARs have been established for groundwater to address risks and restore the aquifer to drinking water standards. ARARS for groundwater are the most stringent of the state and federal drinking water standards and the NJGWQS, which is currently 1 µg/l for TCE. Location and action-specific ARARs, such as wetland mitigation regulations and hazardous waste disposal regulations may also apply to OU2 and the selected remedy will be designed to ensure compliance with all applicable ARARs. A listing of the ARARs for the selected remedy is provided in Table 5 (See Appendix II).

All of the alternatives would eventually meet the chemical-specific ARAR for TCE. The No Action Alternative would not assure that residential drinking water meets the chemical-specific ARAR for TCE in the short term. Alternatives 2a, 2b, 3a and 3b assure that potable water would meet the chemical-specific ARAR for TCE in the short term. However, Alternatives 2b and 3b are the alternatives that best meet this criterion as they provide for residences to be connected to the public water supply, ensuring that potable water meets all applicable standards. Alternatives 2a and 3a would provide for potable wells to meet cleanup goals through the use of POETS. POETS require diligent operations and maintenance to assure that they continue to properly address groundwater contamination in each residence over time. All of the alternatives would comply with

location- and action-specific ARARs such as the Freshwater Wetlands Protection Act, and the Federal Clean Water Act.

Primary Balancing Criteria - The next five criteria, criteria 3 through 7, are known as "primary balancing criteria". These criteria are factors with which tradeoffs between response measures are assessed so that the best option will be chosen, given site-specific data and conditions.

3. Long-term effectiveness and permanence

A similar degree of long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of residual risk that will remain on-site following remediation and the adequacy and reliability of controls.

Alternatives 2b and 3b would be effective and permanent because they involve permanent infrastructure to convey water from a reliable contaminant-free source of potable water. Alternatives 2a and 3a would require significantly more maintenance to remain reliable, such as frequent confirmation sampling and carbon replacement in order for POETS to remain protective, and are not as permanent as Alternatives 2b and 3b. Furthermore, uncertainties associated with the protectiveness of Alternatives 2a and 3a, that rely on private treatment and POETS, to effectively remove contaminants, would be eliminated by the provision of a public water supply. A public water supply also eliminates risks associated with an inadequate sampling frequency, and with the continued installation, operation, sampling, and maintenance of hundreds of POETS over the long-term of the remedy. Long-term monitoring and servicing of hundreds of POETS for contaminant breakthrough, fouling, and regular sampling would be cumbersome, and would require highly coordinated efforts. In addition, if filters are not properly maintained, they can serve as a source of microbial as well as chemical contamination in potable water. Long-term maintenance of POETS would go on for over 60 years.

There are no significant differences in the long-term effectiveness and permanence of alternatives with an in-situ treatment component (3a and 3b) compared to the other alternatives. The in-situ component of Alternatives 3a and 3b would operate for approximately 1 year. Although this may be

effective in reducing TCE levels at the boundary of the OU1/OU2 Study Areas in the short term, contamination would continue to migrate into the OU2 Study Area from the OU1 area after the in-situ treatment ends. Significant continued injection of oxidant into the aquifer beyond the estimated 1 year timeframe may begin to cause detrimental impacts to the aquifer, such as the presence of unreacted oxidant. Therefore, the overall time to restore the aquifer to meet cleanup objectives throughout the OU2 Study Area would not be reduced by the in-situ component of Alternatives 3a and 3b.

4. Reduction of toxicity, mobility, or volume

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

This evaluation criterion addresses the statutory preference for selecting remedial actions that use treatment technologies to permanently and significantly reduce the toxicity, mobility, or volume (TMV) of the hazardous substances as their principal element.

Groundwater Alternatives 3a and 3b are the best alternatives for the reduction of TMV since they would rely on active treatment processes to remove and treat the area of groundwater within OU2 which has the highest concentration of TCE. However, once this treatment was halted, after approximately 1 year, there would be continued impact to OU2 groundwater due to the continuing migration of impacted groundwater from the OU1 Study Area. Long-term application of ISO to address continuing migration of TCE into the OU2 Study Area from the OU1 Study Area would not be practical, and would have potential detrimental impacts to the aquifer. Therefore, groundwater in the area of ISO treatment would become recontaminated as groundwater from the OU1 Study Area continues to migrate in to the OU2 Study Area for some time. Under Alternatives 2a and 3a, the POETS would remove contaminants from the groundwater at their point-of-use, but would not effectively remove the TCE mass throughout the plume. The continued pumping of the residential wells would remove only a minor volume of contaminants from the aquifer. Therefore, Alternatives 2a and 3a are comparable to Alternatives 2b and 3b under this criteria. All alternatives would have a similar degree of reduction of TMV of the TCE in groundwater through natural attenuation processes.

5. Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

Factors that are considered include protection of remediation workers and the community during remedial actions, environmental impacts from construction and implementation, and the time until remedial action is completed.

Each alternative, except the No Action Alternative, has some short-term impacts because it would be necessary to construct parts of the remedies on the property of land owners, and over roadways and right-of-ways.

The construction of a public water supply throughout the OU2 Study Area, as described in Alternatives 2b and 3b, would require approximately 2 years. Approximately 10 miles of water supply lines would be installed in streets, along right-of-ways, and on private property. This would cause some disruption to the community in the short term. Work can be phased to minimize disruption. Further, this type of construction is common and can be performed safely by adherence to appropriate safety standards. Installation of POETS in all private buildings and residences as described in Alternatives 2a and 3a would take approximately 1 year and would also cause some short-term disruption to property owners since some work would be done in each residence.

Alternatives 3a and 3b, which include in-situ chemical oxidation, would involve short-term disruption to landowners in the northeastern part of the OU2 Study Area, near the fault zone, where well construction and above ground delivery and conveyance systems would be built and then maintained for approximately one year. The full extent of any impacts would depend on the number and location of the injection wells. The oxidation of the organic compounds found in the groundwater involves chemicals that require special handling, and involves an exothermic (heat generating) reaction. Special precautions would be needed to protect workers on the Site. Also, there would be the potential that unreacted oxidant would migrate downgradient and pose a risk to private potable wells. It is estimated that a near-Site in-situ chemical oxidation system, when constructed, would operate for one year.

Alternatives 2b and 3b would take longer to construct compared to 2a and 3a because the waterlines are more involved to construct compared to the installation of POETS. In addition, the engineering design of the water line is more complex and would take longer to complete compared to the design needed for the installation of POETS. However, the waterline is considered more permanent and protective in the long term compared to the POETS because alternatives that include a public water supply would eliminate issues of contaminant breakthrough and regular maintenance of individual POETS.

Under Alternatives 2b and 3b, the existing POETS would continue to be operated and maintained by NJDEP to protect public health in the short-term, until the residences are connected to the waterlines to be installed. Further, private wells within the OU2 Study Area which do not have POETS installed would be sampled on a regular basis until the remedy is implemented. POETS would be installed on these wells by the state of New Jersey if data shows that TCE levels exceed its chemical-specific ARAR, until the remedy is completed.

6. Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

This criterion addresses technical and administrative feasibility of implementing the alternative, and the availability of services and materials required for its implementation. Factors that are considered include reliability of the technology, ability to construct and operate the technology, ease of undertaking additional remedial actions (if necessary), ability to monitor effectiveness of the remedy, coordination with other agencies, availability of the treatment, storage, and disposal services necessary to implement the alternative; the availability of the technologies; and the availability of additional equipment or specialists.

All of the alternatives are technically and administratively feasible, have been implemented at other similar sites, and make use of standard engineering practices. Alternative 1 (No Action) requires the least effort to implement; however, it would not meet the RAOs for OU2.

All retained alternatives can be implemented with available

equipment and technology. Substantive permitting requirements would need to be met and access to private property would be required for Alternatives 2a, 2b, 3a and 3b.

Alternatives 3a and 3b include in-situ chemical oxidation injection, and are the most difficult alternatives to implement as introduction and proper distribution of the oxidant presents a number of technical challenges. Problems with achieving proper distribution of oxidant into the aquifer could lead to inadequate contact with the TCE. This is due to the complex geology of the Site. Also, there would be the potential that unreacted oxidant would migrate downgradient and pose a risk to private potable wells. In addition to the difficulties in implementing Alternatives 3a and 3b compared to the other alternatives, the overall benefit of the ISO component is minimal, as contamination would continue to migrate into the OU2 Study Area from the OU1 Study Area. As a result, there would be no reduction in the overall aquifer remediation timeframe with ISO treatment (Alternatives 3a and 3b) and without ISO treatment (Alternatives 2a and 2b).

The public water supply connection component of Alternatives 2b and 3b would be more difficult to implement initially than Alternatives 2a and 3a which rely on POETS, due to the type and amount of design, permitting, and construction required. These difficulties would include the short term disruption to the community due to the estimated 10 miles of water supply lines that would be constructed. Alternatives 2a and 3a would be easier to implement initially, but would require significant ongoing efforts associated with the sampling, installation and long-term operation and maintenance of POETS. Long-term maintenance of POETS would go on for over 60 years. This would require regular sampling, as well as replacement of POETS and/or POET components within hundreds of individual residences and businesses. Significant resources would be required to provide for access to do this work within so many homes over such an extensive length of time. Under Alternatives 2b and 3b, public water supply lines, once constructed, would be maintained by private water companies.

7. Cost

Includes estimated capital and O&M costs, and net present worth value of capital and O&M costs.

An estimate of the cost for each alternative is determined so that the cost can be compared to the level of protectiveness that each alternative provides. The types of costs that are assessed include the capital costs, O&M costs, and present net

worth costs. They are not intended to be used for budgetary purposes. The present-worth costs for each alternative was assumed to be 30 years based on EPA guidance. Modifications and refinements made during the RD phase are likely to affect the final cost of implementation of the remedial alternatives. A summary table comparing estimated costs for the remedial alternatives evaluated as part of the FS is provided in Table 6 from the OU2 FS report (see Appendix II).

Besides Alternative 1 (No Action), the lowest capital costs are the alternatives that include POETS (Alternatives 2a and 3a). The capital costs are higher for Alternatives 2b and 3b due to the capital cost for providing a public water supply within the OU2 Study Area. Annual O&M costs for the alternatives with POETS (Alternatives 2a and 3a) are higher than alternatives with public water supply connections (Alternatives 2b and 3b) due to the need for continued maintenance. There are no on-going operation and long-term maintenance costs associated with Alternatives 2b and 3b, because the water purveyor, and not EPA, will be providing maintenance of the water supply system once it has been installed.

Modifying Criteria - The final two evaluation criteria, criteria 8 and 9, are called "modifying criteria" because new information or comments from the state or the community on the Proposed Plan may modify the preferred response measure or cause another response measure to be considered.

8. State acceptance

Indicates whether based on its review of the RI/FS reports and the Proposed Plan, the state supports, opposes, and/or has identified any reservations with the selected response measure.

The State of New Jersey concurs with EPA's selected remedy, Alternative 2b.

9. Community acceptance

Summarizes the public's general response to the response measures described in the Proposed Plan and the RI/FS reports. This assessment includes determining which of the response measures the community supports, opposes, and/or has reservations about.

EPA solicited input from the community on the alternatives developed and proposed for the Site. The Proposed Plan for the Site was released for public comment on April 16, 2009. The comment period closed on May 17, 2010. A public meeting was

held on April 29, 2010 to present the preferred alternative discussed in the Proposed Plan. Oral comments were recorded from attendees of the public meeting. The community did not express objections to the preferred remedy during the meeting. The Responsiveness Summary located in Appendix IV includes all comments and EPA's responses to those comments received during the public comment period.

PRINCIPAL THREAT WASTE

Principal threat wastes are considered source materials, i.e., materials that include or contain hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or as a source for direct exposure. Contaminated groundwater is generally not considered to be source material; however, Non-Aqueous Phase Liquids (NAPLs) in groundwater may be viewed as source material. The results of both the OU1 and the OU2 RIs did not identify any "principal threat wastes" in Site groundwater. At this Site, principal threat waste consists of source material. TCE source areas and principal threat wastes will be addressed as part of OU3.

SELECTED REMEDY

Based upon consideration of the results of Site investigations, the requirements of CERCLA, the detailed analysis of the remedial alternatives and public comments, EPA has determined that Alternative 2b is the appropriate remedy for the OU2 Study Area of the Site. This remedy best satisfies the requirements of CERCLA Section 121 and the NCP's nine evaluation criteria for remedial alternatives, 40 CFR § 300.430 (e) (9). This remedy includes the following components:

- Provision of potable water to impacted and threatened properties through the construction of a water line and connections;
- Monitored natural attenuation for the remediation of the OU2 Study Area groundwater until cleanup goals are met;
- The establishment of a CEA, which is an institutional control, to minimize the potential for exposure to contaminated groundwater until the aquifer meets the cleanup goals; and

- The abandonment of private potable wells.

Alternative 2b was selected over the other alternatives because it will provide the best overall protection of human health and will eliminate risks from consumption of and contact with contaminated drinking water. The groundwater plume that originates within the OU1 Study Area and has migrated into the OU2 Study Area has impacted private potable wells.

Prior to implementation of the remedy, a remedial design will be performed which may include the collection of data and other information necessary to complete the engineering design of the remedy.

Alternative 2b will provide an alternate potable water supply to the residences and businesses within the OU2 Study Area via the delivery of water from a nearby existing public water supply. Two existing public water supply companies will be considered for providing water to the OU2 Study Area: Aqua New Jersey Water Company, in Philipsburg, which currently provides water service near the southern end of the OU2 Study Area, to parts of Philipsburg, Greenwich, Lopatcong, and Pohatcong Townships; and New Jersey American Water Company, which currently provides water service to the northern end of the OU2 Study Area, as well as to the OU1 Study Area. Both Aqua New Jersey Water Company and New Jersey American Water Company undergo regular testing to ensure that the quality of the water they supply is in compliance with New Jersey State regulations.

Based on current groundwater use, it is estimated that approximately 320 properties will be connected to the public water supply. However, a survey will be conducted during the design phase to provide an accurate number of properties requiring public water. After properties are connected to the public water supply, private potable wells within the OU2 Study Area will be abandoned in accordance with applicable requirements. Properties connected to the public water supply will be responsible for payment of water bills once the connections are complete.

Existing POETS will continue to be operated and maintained by the NJDEP until individual residences and businesses are switched over to the public water supply. EPA will periodically monitor residential wells within the OU2 Study Area that are currently not impacted above the cleanup goal for TCE. If these wells become impacted above that criteria, NJDEP will install and maintain POETS at these locations until the remedy is implemented and public water is available. Additionally, private

potable wells at remote locations within the OU2 Study Area, where connection to a public water supply is not practicable will be treated using POETS and monitored regularly.

For the MNA portion of this remedy, an appropriate number of wells will be regularly sampled to document the contaminant levels in groundwater over time, as well as other parameters. Sampling will include determination of the presence of breakdown products of TCE, the primary Site contaminant. Existing monitoring wells will be used and new monitoring wells may be installed to achieve a sufficient monitoring program. Based on preliminary modeling of the TCE groundwater plume in the OU2 Study Area, it is estimated that it will take approximately 67 years for the groundwater contamination to naturally attenuate to levels below 1 µg/l for TCE.

The selected remedy also includes a CEA. The CEA will minimize the potential for exposure to contaminated groundwater until the groundwater quality standards in the OU2 Study Area are achieved.

The estimated cost of the selected remedy for the OU2 groundwater is $15,040,000.

Note that no remedial action is required for soils, sediment or surface water within the OU2 Study Area, as no unacceptable risks are posed by these media.

Additional monitoring of vapor intrusion within the OU2 Study Area will be conducted as appropriate, and based on the results, additional vapor intrusion remediation may be implemented.

Based on all available information, EPA and the State of New Jersey believe the selected remedy provides the best balance of trade-offs among the response measures with respect to the nine evaluation criteria. EPA believes that the selected remedy will be protective of human health and the environment, will comply with ARARs, will be cost effective, and will utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. During the implementation of the Monitored Natural Attenuation portion of the remedy, EPA will analyze the results of the groundwater sampling events. If EPA determines that contaminants have not attenuated as anticipated, additional actions may be taken.

Consistent with EPA Region 2's Clean and Green policy, EPA will evaluate the use of sustainable technologies and practices with respect to the remedy selected at the Site.

STATUTORY DETERMINATIONS

As was previously noted, CERCLA § 121(b)(1) mandates that a remedial action must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity or mobility of the hazardous substances, pollutants, or contaminants at a site. CERCLA § 121(d) further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA § 121(d)(4).

Protection of Human Health and the Environment

The selected remedy, Alternative 2b, will be protective of human health and the environment by providing an alternate source of potable water to residences and businesses within the OU2 Study Area of the Site that are impacted or threatened by groundwater contamination. In addition, the remedy provides for the restoration of the aquifer to meet drinking water standards in the OU2 Study Area, which is contaminated with TCE, through natural attenuation processes. Implementation of the selected remedy will not present unacceptable short-term risks or adverse cross-media impacts.

Compliance with ARARs

The selected remedy will be designed to meet Federal and State ARARs for groundwater. Groundwater underlying the OU2 Study Area is a usable aquifer and is classified by NJDEP as a Class IIA resource. The cleanup of the groundwater must meet the New Jersey standards for such aquifers, or the Federal MCLs, whichever is more stringent.

Cost Effectiveness

EPA has determined that the selected remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." (NCP §300.430(f)(1)(ii)(D)). EPA evaluated the "overall effectiveness" of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five

balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, or volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of the selected remedy was determined to be proportional to costs and hence, the selected alternative represents a reasonable value for the money to be spent. The selected remedy is cost-effective as it has been determined to provide the greatest overall protectiveness for its present worth costs.

Utilization of Permanent Solutions and Alternative Treatment Technologies

EPA has determined that the selected remedy utilizes permanent solutions and treatment technologies to the maximum extent that is practicable. The selected remedy will address the OU2 Study Area of groundwater contamination, through implementation of the permanent provision of potable water to impacted and threatened properties through the construction of a water line and connections to public water. This will provide a source of potable water that meets all drinking water standards to assure protection of public health, while natural attenuation processes are used to address groundwater contamination in the OU2 Study Area over time.

Preference for Treatment as a Principal Element

Treatment is not an element in the OU2 selected remedy; however, treatment was selected as a component of the Site's OU1 remedy for the more highly contaminated areas of the Site's contaminated groundwater, as outlined in the OU1 ROD. The extraction and treatment of identified areas of highly elevated groundwater contamination in the OU1 Study Area, located upgradient to the OU2 Study Area, will have a positive impact on the OU2 remedy. Upon implementation of the OU1 remedy, the most highly contaminated OU1 groundwater will not continue to migrate downgradient into the OU2 area, eventually allowing for natural attenuation within the OU2 Study Area to occur at a higher rate.

Five-Year Review Requirements

The selected remedy will not result in contaminated groundwater remaining on-site above levels that allow for unlimited use and unrestricted exposure, though the selected remedy will take more than five years to attain cleanup levels. Therefore, a policy review will be conducted within five years of construction

completion for the Site to ensure that the remedy is, or will be, protective of human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the Site was released for public comment on April 16, 2010. The comment period closed on May 17, 2010. At the time of the public comment period, EPA proposed its preferred alternative for groundwater contamination. Public comments were provided in oral form during the April 29, 2010, Public Meeting, and in written form during the Public Comment Period. The Proposed Plan identified Alternative 2b as the preferred alternative to address groundwater contamination at the Site. Upon review of all comments submitted, EPA has determined that no significant changes to the selected remedy, as it was presented in the Proposed Plan, are warranted.

REFERENCES

U.S. Environmental Protection Agency (EPA). 2006. Record of Decision - Operable Unit One, Groundwater, Pohatcong Valley Groundwater Contamination Superfund Site, Warren County, New Jersey. July 13, 2006.

U.S. Environmental Protection Agency. 1997a. Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments. Interim Final. EPA 540-R-97-006. Office of Solid Waste and Emergency Response. Washington, DC. (June 1997)

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GLOSSARY

ARARs: Applicable or Relevant and Appropriate Requirements. These are Federal or State environmental rules and regulations that may pertain to the Site or a particular alternative.

Carcinogenic Risk: Cancer risks are expressed as a number reflecting the increased chance that a person will develop cancer if exposed to chemicals or substances. For example, EPA's acceptable risk range for Superfund hazardous waste sites is 1 x 10^{-4} to 1 x 10^{-6}, meaning there is 1 additional chance in 10,000 (1 x 10^{-4}) to 1 additional chance in 1 million (1 x 10^{-6}) that a person will develop cancer if exposed to a Site contaminant that is not remediated.

CERCLA: Comprehensive Environmental Response, Compensation and Liability Act. A Federal law, commonly referred to as the "Superfund" Program, passed in 1980 that provides for response actions at sites found to be contaminated with hazardous substances, pollutants or contaminants that endanger public health and safety or the environment.

COPC: Chemicals of Potential Concern.

CVOCs: Chlorinated Volatile Organic Compounds.

Downgradient: in reference to the OU1 Study Area, the OU2 Study Area is hydraulically lower, along the lower part of a slope, compared to the adjacent OU1 area.

SLERA: Screening Level Ecological Risk Assessment. An evaluation of the potential risk posed to the environment if remedial activities are not performed at the Site.

FS: Feasibility Study. Analysis of the practicability of multiple remedial action options for the Site.

Groundwater: Subsurface water that occurs in soils and geologic formations that are fully saturated.

HHRA: Human Health Risk Assessment. An evaluation of the risk posed to human health should remedial activities not be implemented.

HI: Hazard Index. A number indicative of noncarcinogenic health effects that is the ratio of the existing level of exposure to an acceptable level of exposure. A value equal to or less than one indicates that the human population is not likely to

experience adverse effects.

HQ: Hazard Quotient. HQs are used to evaluate noncarcinogenic health effects and ecological risks. A value equal to or less than one indicates that the human or ecological population are not likely to experience adverse effects.

ICs: Institutional Controls. Administrative methods to prevent human exposure to contaminants, such as by restricting the use of groundwater for drinking water purposes.

Monitored Natural Attenuation (MNA): Natural attenuation is the process by which contaminant concentrations are reduced by various naturally occurring physical, chemical, and biological processes. The main processes include biodegradation, dispersion, dilution, sorption, volatilization, and chemical or biological stabilization, transformation, or destruction of contaminants, which occur to varying degrees at every site affected, especially at sites with chlorinated solvents. These processes occur naturally, in situ, and act to decrease the mass or concentration of contaminants in the subsurface. Only non-augmented natural processes are relied upon under this general response action. Augmentation through addition of electron acceptors or nutrients is considered an in situ treatment technology. The natural attenuation mechanisms in the OU2 Study Area were evaluated (EPA, 1998b).

Nine Evaluation Criteria: See description on Pages 29 - 37.

Noncarcinogenic Risk: Noncancer Hazards (or risk) are expressed as a quotient that compares the existing level of exposure to the acceptable level of exposure. There is a level of exposure (the reference dose) below which it is unlikely for even a sensitive population to experience adverse health effects. USEPA's threshold level for noncarcinogenic risk at Superfund sites is 1, meaning that if the exposure exceeds the threshold; there may be a concern for potential noncancer effects.

NPL: National Priorities List. A list developed by USEPA of uncontrolled hazardous substance release sites in the United States that are considered priorities for long-term remedial evaluation and response.

Operable Unit (OU): a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site can be

divided into a number of operable units, depending on the complexity of the problems associated with the site.

POETS: Point of Entry Treatment Systems - are small treatment systems that are connected to the residential water supply line to remove VOCs from groundwater using activated carbon. They have to be periodically sampled and the carbon replaced to remain effective.

Practical Quantitation Level (PQL): means the lowest concentration of a constituent that can be reliably achieved among laboratories within specified limits of precision and accuracy during routine laboratory operating conditions.

Present-Worth Cost: Total cost, in current dollars, of the remedial action. The present-worth cost includes capital costs required to implement the remedial action, as well as the cost of long-term operations, maintenance, and monitoring.

Proposed Plan: A document that presents the preferred remedial alternative and requests public input regarding the proposed cleanup alternative.

Public Comment Period: The time allowed for the members of a potentially affected community to express views and concerns regarding USEPA's preferred remedial alternative.

RAOs: Remedial Action Objectives. Objectives of remedial actions that are developed based on contaminated media, contaminants of concern, potential receptors and exposure scenarios, human health and ecological risk assessment, and attainment of regulatory cleanup levels.

Record of Decision (ROD): A legal document that describes the cleanup action or remedy selected for a site, the basis for choosing that remedy, and addresses public comments on the selected remedy.

Remedial Action: A cleanup to address hazardous substances at a site.

RI: Remedial Investigation. A study of a facility that supports the selection of a remedy where hazardous substances have been disposed or released. The RI identifies the nature and extent of contamination at the facility and analyzes risk associated with COPCs.

TBCs: "To-be-considereds," consists of non-promulgated

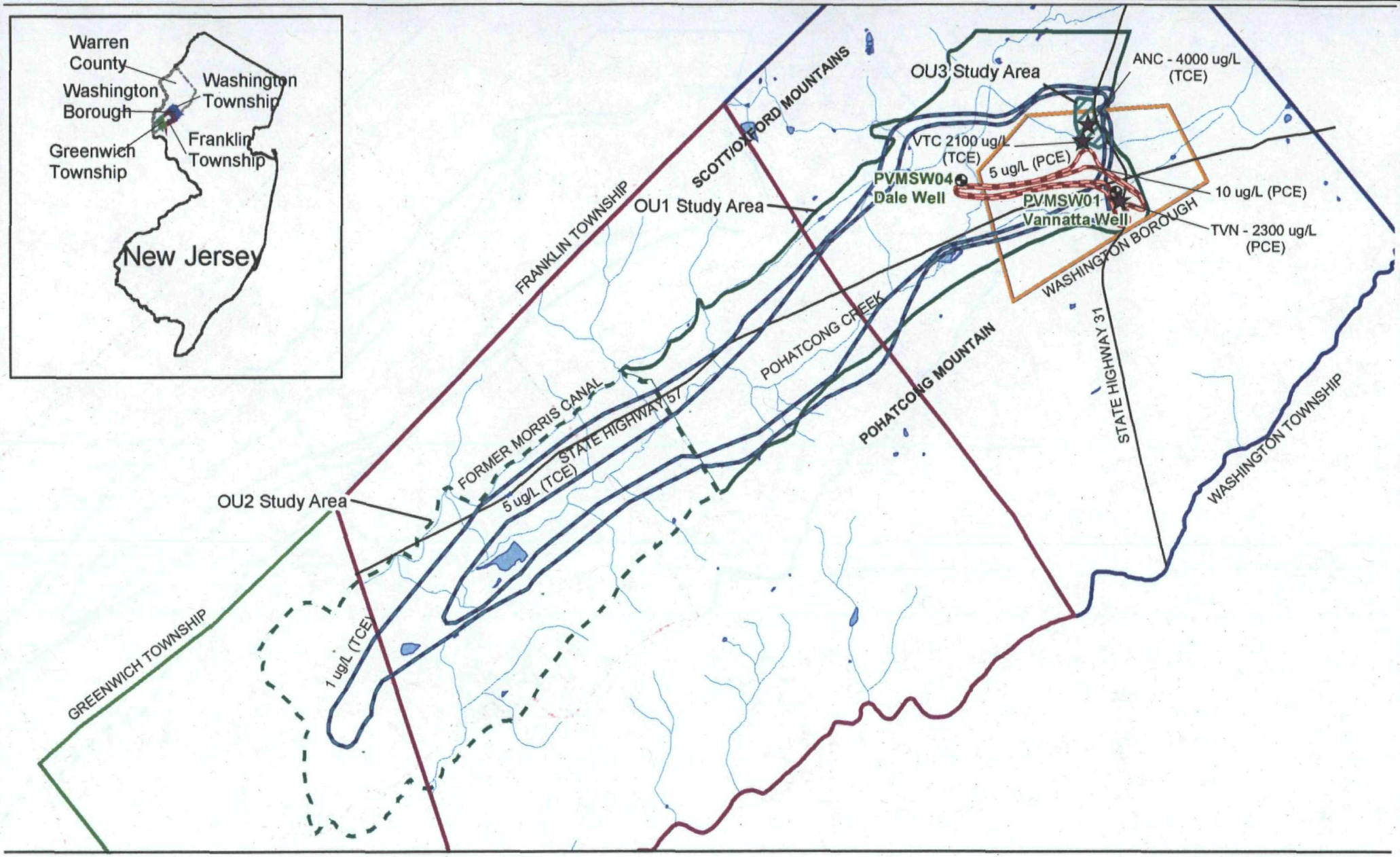
advisories and/or guidance that were developed by EPA, other federal agencies, or states that may be useful in developing CERCLA remedies.

USEPA: United States Environmental Protection Agency. The Federal agency responsible for administration and enforcement of CERCLA (and other environmental statutes and regulations), and final approval authority for the selected ROD.

VOC: Volatile Organic Compound. Type of chemical that readily vaporizes, often producing a distinguishable odor.

Water Table: The water table is an imaginary line marking the top of the water-saturated area within a rock column.

APPENDIX I Figures



Legend

- Phase 1 Well Locations
- PCE Isoconcentration (Approximate Location)
- TCE Isoconcentration (Approximate Location)
- Waterways
- Road Centerlines
- Pohatcong OU3 Study Area
- Franklin Township
- Washington Borough
- Washington Township
- Greenwich Township
- Pohatcong OU1 Study Area
- Pohatcong OU2 Study Area
- ★ Groundwater Sample Point

Note:

VTC = Vikon Tile Corporation
ANC = American National Can (PPPI)
TVN = Tung Sol Tubing

N

0 0.5 1 2 Miles

ROD FIGURE 1

Distribution of TCE and PCE Plumes
OU2 Record of Decision
Pohatcong Valley Groundwater Contamination
Superfund Site
Warren County, NJ
(RI Figure 5-4)

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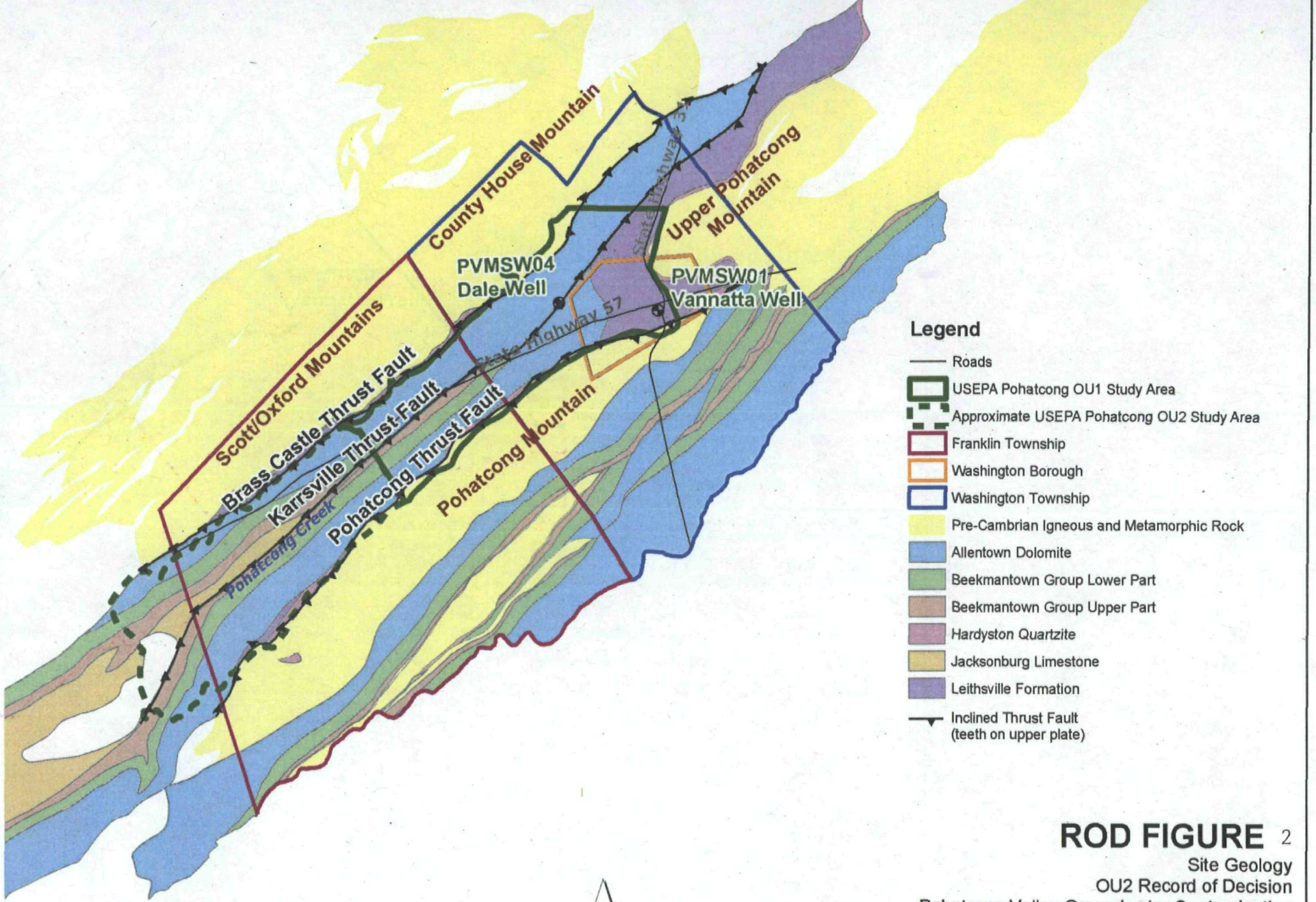

Source: Drake et. al., 1996.
Bedrock Geological Map of
Northern New Jersey.

ROD FIGURE 2

Site Geology
OU2 Record of Decision
Pohatcong Valley Groundwater Contamination
Superfund Site
Warren County, NJ
(RI Figure 2-1)

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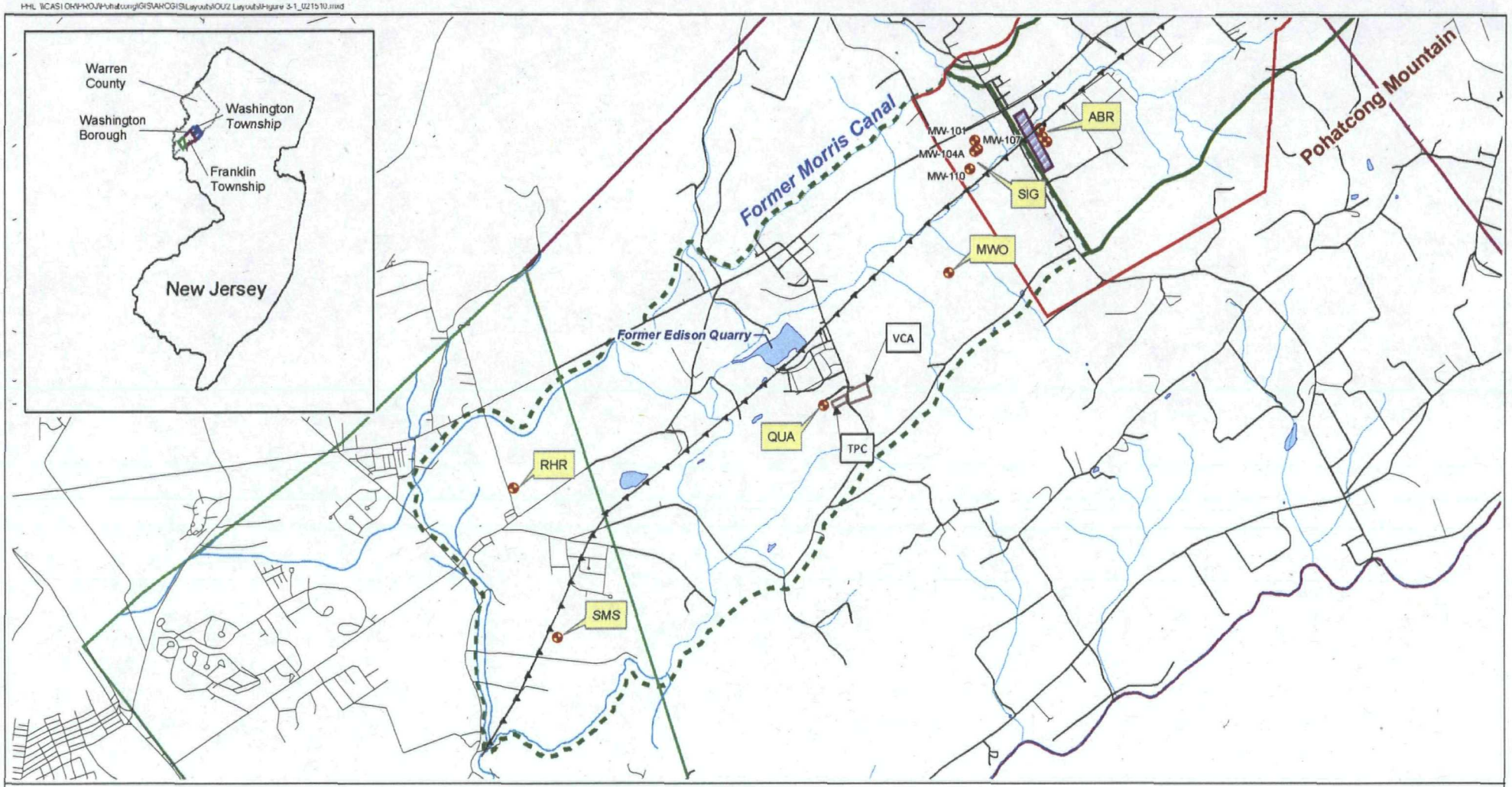

ROD Figure 3
OU2 Study Area
OU2 Record of Decision
Pohatcong Valley Groundwater Contamination
Superfund Site
Warren County, NJ
(RI Figure 3-1)

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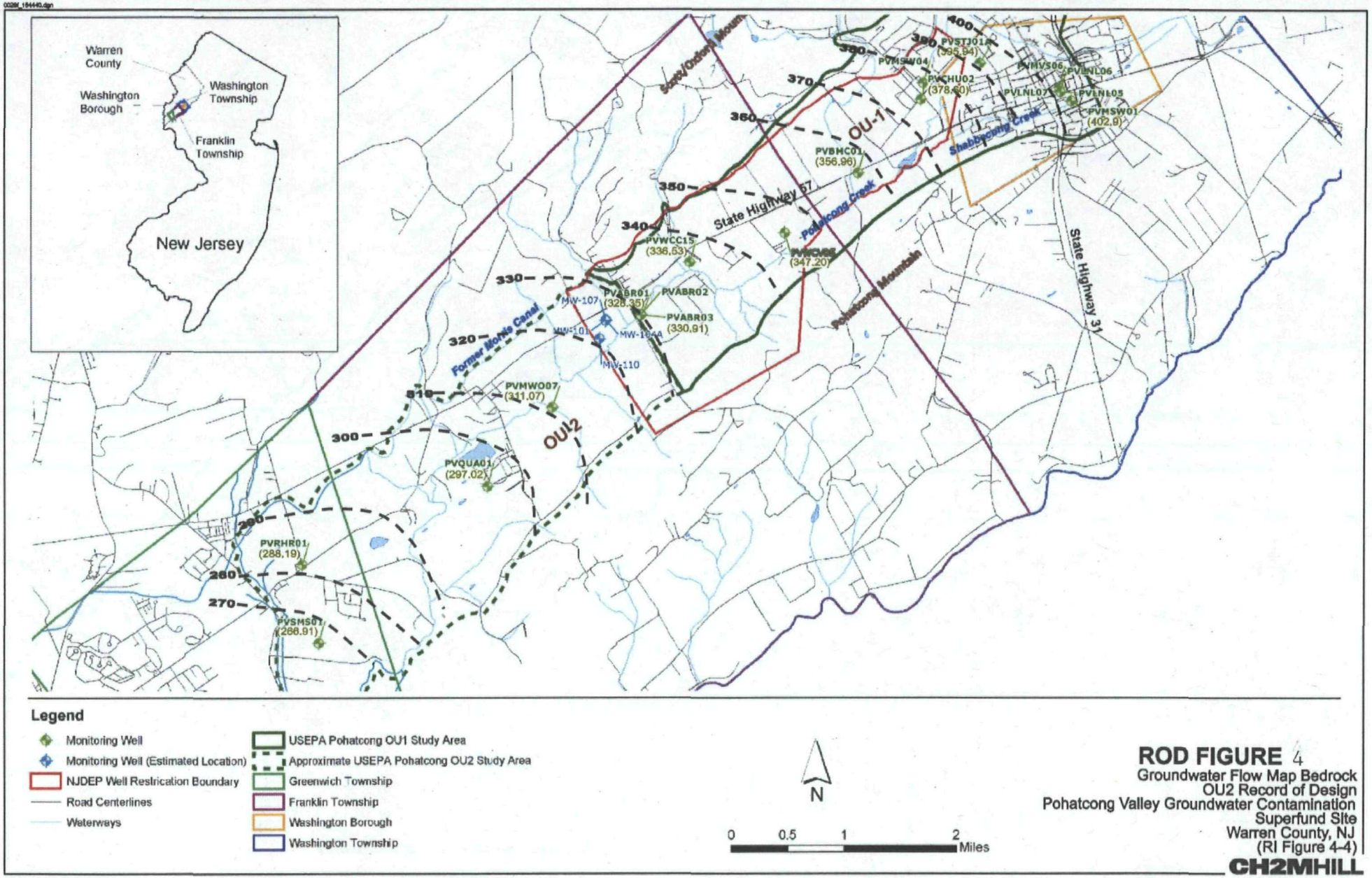

ROD FIGURE 4
Groundwater Flow Map Bedrock
OU2 Record of Design
Pohatcong Valley Groundwater Contamination
Superfund Site
Warren County, NJ
(RI Figure 4-4)

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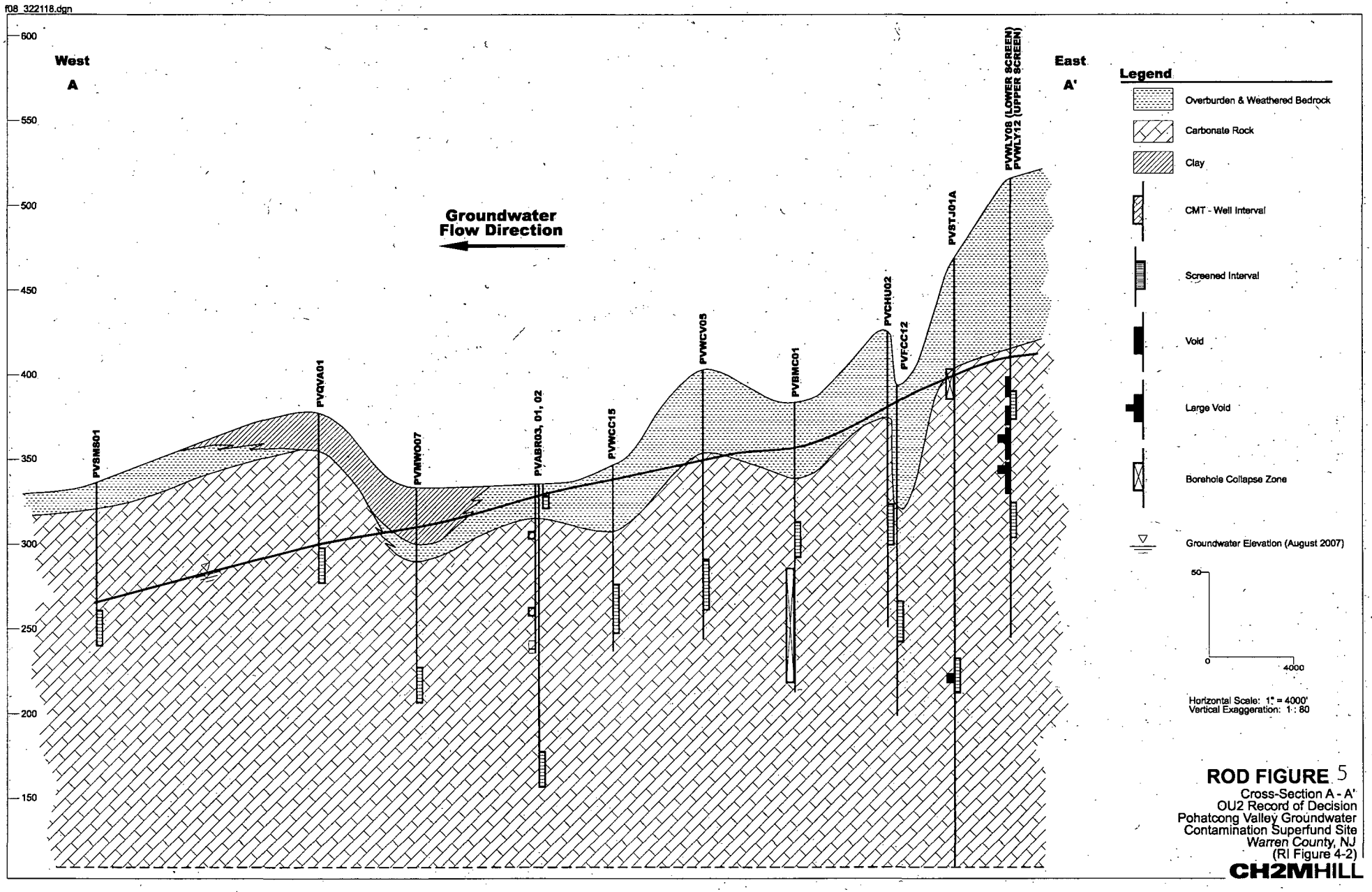

ROD FIGURE 5
Cross-Section A - A'
OU2 Record of Decision
Pohatcong Valley Groundwater
Contamination Superfund Site
Warren County, NJ
(RI Figure 4-2)

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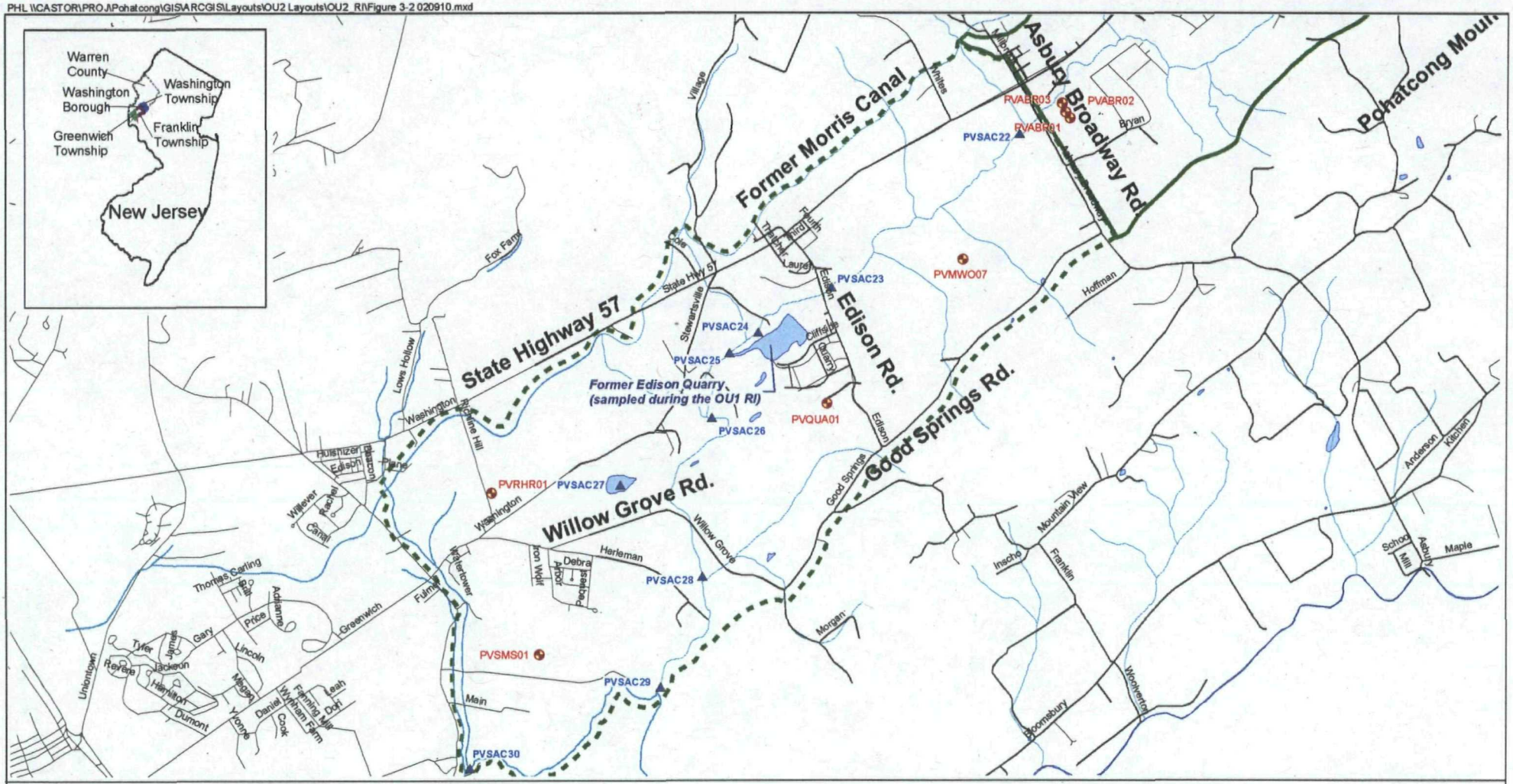

ROD FIGURE 6

Sediment and Surface Water Sample Locations
OU2 Record of Decision
Pohatcong Valley Groundwater Contamination
Superfund Site
Warren County, NJ
(RI Figure 3-2)

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APPENDIX II Technical Tables

ROD TABLE 1
Summary of OU2 Remedial Investigation Activities Completed

Monitoring Wells Installed	7
Overburden Drilling	105 feet
Bedrock Drilling	906 feet
Packer Test Zones	12
Borehole Geophysical Logging	735 feet
Seismic Geophysical Survey	2640 feet
Investigation derived waste (IDW) Disposal (Drums)	35
IDW Disposal (Fluids)	70,000 gal
Groundwater Monitoring Wells Samples	29
Residential Wells Samples (DOH/NJDEP)	667
Temporary Well Points	5
Residential Wells Sampled (EPA)	March 2008 - 22 Residential Well Samples March 2009 - 112 Residential Well Samples May 2009 - 61 Residential Well Samples August 2009 - 9 Residential Well Samples 204 Residential Wells Sampled
Vapor Intrusion Locations	9 Residences, 2 Public Buildings
Vapor Intrusion Samples	23 Sub-slab and 37 Indoor Air (Summa)
Two Removal Actions	Taken at one school and one residence
Surface Water Samples	9
Sediment Samples	6

ROD TABLE 2

OU2 Remedial Investigation
EPA Monitoring Well Groundwater Sampling Event Summary
August and December 2007
Organic Compound Exceedances
Pohatcong Valley Groundwater Contamination Site

Sample ID	Study Area Operable Unit	Sample Date	Well Depth (ft bgs)	Sample Depth (ft bgs)		Tetrachloroethylene	Trichloroethylene	Naphthalene	Aroclor 1221
					NJDEP Criteria (a)	1	1	3	0.04
					EPA Criteria (b)	5	5	6	-
PVABR01-MW1	OU2	8/21/2007	175	165		0.55	21 E[a,b]	5 U[a]	0.05 U[a]
PVABR02-MW1	OU2	8/21/2007	15	10		0.49 J	21 E[a,b]	5 U[a]	0.05 UJ[a]
PVABR03-100-MW1	OU2	8/22/2007	100	100		0.5 U	0.5 U	5 U[a]	0.057 UJ[a]
PVABR03-30-MW1	OU2	8/23/2007	30	30		0.5 U	0.5 U	5 U[a]	0.05 UJ[a]
PVABR03-75-MW1	OU2	8/23/2007	75	75		0.5 U	0.5 U	5 U[a]	0.1 J[a]
PVABR03-95-MW1	OU2	8/24/2007	95	95		0.5 UJ	0.5 UJ	1.5 J	0.05 UJ[a]
PVBMC01-MW2	OU1	8/16/2007	92	80		0.26 J	7.1[a,b]	5 U[a]	0.05 UJ[a]
DUP-081707	OU1	8/17/2007	131	112		16[a,b]	66 E[a,b]	5 U[a]	0.05 UJ[a]
PVCHU02-MW3	OU1	8/17/2007	131	112		17[a,b]	62 E[a,b]	5 U[a]	0.05 UJ[a]
DUP-081507	OU1	8/15/2007	145	136		0.5 U	0.95	5 U[a]	0.05 UJ[a]
PVLNL05-MW2	OU1	8/15/2007	145	136		0.054 J	1	5 U[a]	0.05 UJ[a]
PVLNL06-MW2	OU1	8/15/2007	87	82		13[a,b]	34 E[a,b]	5 U[a]	0.05 UJ[a]
PVLNL07-MW2	OU1	8/15/2007	72.3	67		2.6[a]	2.7[a]	5 U[a]	0.05 UJ[a]
DUP-081607	OU1	8/16/2007	345			35 E[a,b]	0.63	5 U[a]	0.05 UJ[a]
PVMVSW01-MW4	OU1	8/16/2007	345			32 E[a,b]	0.65	5 U[a]	0.05 UJ[a]
PVMSW04-MW5	OU1	8/16/2007	184			0.59	44 E[a,b]	5 U[a]	0.05 UJ[a]
PVMVS06-MW2	OU1	8/17/2007	81	73		100 J[a,b]	1.4[a]	5 U[a]	0.05 U[a]
PVMWO07	OU2	12/5/2007	160	150		5 U[a]	5 U[a]	--	--
PVMWO07	OU2	12/5/2007	160	150		--	--	20 U[a,b]	0.05 U[a]
PVQUA01-MW1	OU2	8/20/2007	100	87		0.5 U	0.5 U	7.8[a,b]	0.05 UJ[a]
PVRHR01-MW1	OU2	8/22/2007	153	139		0.5 U	0.5 U	10 U[a,b]	0.05 U[a]
MW-101	OU2	12/5/2007	42.8	35		5 U[a]	5 U[a]	--	--
DUP-120507	OU2	12/5/2007	42.8	35		5 U[a]	5 U[a]	--	--
MW-101	OU2	12/5/2007	42.8	35		--	--	5 U[a]	0.05 UJ[a]
DUP-120507	OU2	12/5/2007	42.8	35		--	--	5 U[a]	0.05 UJ[a]
MW-104A	OU2	12/3/2007	97	87		5 U[a]	5 U[a]	--	--
MW-104A	OU2	12/3/2007	97	87		--	--	0.54 J	0.05 U[a]
MW-107	OU2	12/3/2007	52	45		5 U[a]	5 U[a]	--	--
MW-107	OU2	12/3/2007	52	45		--	--	0.56 J	0.05 UJ[a]
MW-110	OU2	12/4/2007	91	81		5 U[a]	5 U[a]	--	--
MW-110	OU2	12/4/2007	91	81		--	--	0.78 J	0.05 U[a]
PVSMS01-MW1	OU2	8/20/2007	92	82		0.055 J	0.5 U	5 U[a]	0.05 UJ[a]
PVSTJ03-MW2	OU1	8/16/2007	260	250		0.69	79 E[a,b]	0.51 J	0.013 J
PVWCC15-MW3	OU1	8/14/2007	98	88		0.058 J	0.5 U	5 U[a]	0.05 UJ[a]
PVWCV05-MW3-B	OU1	8/17/2007	144	130		0.5 J	17[a,b]	5 U[a]	0.05 U[a]

B-Analyte detected in associated blank
D-Concentration reported from secondary dilution
J-Value est. in qty.

U-Analyte not detected above reporting limit
E-estimated above the highest calibration standard
A,B-Exceeds criteria

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ROD TABLE 2
OU2 Remedial Investigation
EPA Monitoring Well
August and December 2007 Groundwater Sampling Summary
Inorganic Compound Exceedances
Pohatcong Valley Groundwater Contamination Site

Sample ID	Study Area Operable Unit	Sample Date	Well Depth (ft bgs)	Sample Depth (ft bgs)		Total or Filtered Sample	Aluminum	Arsenic	Iron	Lead	Manganese	Sodium	Thallium
					NJDEP Criteria (a)		200	3	300	5	50	50000	2
					EPA Criteria (b)		-	10	-	15	-	-	2
PVABR01-MW1	*OU2*	*8/21/2007*	*175*	*165*		*TOTAL*	468 R	10 U[a]	1100 R	3.2 J	108[a]	15000	3.8 J[ab]
PVABR01-MW1	*OU2*	*8/21/2007*	*175*	*165*		*FILTERED*	10.4 J	10 U[a]	9.6 J	10 U[a]	15 U	14100	25 U[ab]
PVABR02-MW1	*OU2*	*8/21/2007*	*15*	*10*		*TOTAL*	1090 J[a]	10 U[a]	1850 R	10 U[a]	30.5	15700	25 U[ab]
PVABR02-MW1	*OU2*	*8/21/2007*	*15*	*10*		*FILTERED*	39.7 J	10 U[a]	39.6 J	10 U[a]	15 U	15300	25 U[ab]
PVABR03-100-MW1	*OU2*	*8/22/2007*	*100*	*100*		*TOTAL*	22400 J[a]	6.7 J[a]	28900 R	24.4[ab]	939[a]	17000	25 U[ab]
PVABR03-100-MW1	*OU2*	*8/22/2007*	*100*	*100*		*FILTERED*	131 J	10 U[a]	30.2 J	10 U[a]	22.5	16100	25 U[ab]
PVABR03-30-MW1	*OU2*	*8/23/2007*	*30*	*30*		*TOTAL*	1240 J[a]	10 U[a]	1330 R	2.3 J	124[a]	89400[a]	25 U[ab]
PVABR03-75-MW1	*OU2*	*8/23/2007*	*75*	*75*		*TOTAL*	5980 J[a]	10 U[a]	7100 R	8 J[a]	212[a]	56900[a]	25 U[ab]
PVABR03-30-MW1	*OU2*	*8/23/2007*	*30*	*30*		*FILTERED*	29.3 J	10 U[a]	75.3 J	10 U[a]	120[a]	78300[a]	2.6 J[ab]
PVABR03-75-MW1	*OU2*	*8/23/2007*	*75*	*75*		*FILTERED*	69.1 J	10 U[a]	16 J	10 U[a]	25.3	57200[a]	25 U[ab]
PVABR03-95-MW1	*OU2*	*8/24/2007*	*95*	*95*		*TOTAL*	2540 J[a]	10 U[a]	2750 R	2.6 J	105[a]	32600	25 U[ab]
PVABR03-95-MW1	*OU2*	*8/24/2007*	*95*	*95*		*FILTERED*	139 J	10 U[a]	117	10 U[a]	38.2	29900	25 U[ab]
PVBMC01-MW2	*OU1*	*8/16/2007*	*92*	*80*		*TOTAL*	691[a]	10 U[a]	788[a]	10 U[a]	25.3	49000	25 U[ab]
PVBMC01-MW2	*OU1*	*8/16/2007*	*92*	*80*		*FILTERED*	6.4 J	10 U[a]	100 U	10 U[a]	10.3 J	45300	25 U[ab]
PVCHU02-MW3	*OU1*	*8/17/2007*	*131*	*112*		*TOTAL*	50.9 J	10 UJ[a]	53.9 J	10 UJ[a]	3.9 J	17000 J	25 UJ[ab]
DUP-081707	*OU1*	*8/17/2007*	*131*	*112*		*TOTAL*	58.5 J	10 UJ[a]	57.9 J	10 UJ[a]	4 J	17300 J	25 UJ[ab]
PVCHU02-MW3	*OU1*	*8/17/2007*	*131*	*112*		*FILTERED*	200 UJ	10 UJ[a]	100 UJ	10 UJ[a]	15 UJ	16800 J	25 UJ[ab]
PVLNL05-MW2	*OU1*	*8/15/2007*	*145*	*136*		*TOTAL*	22.2 J	10 U[a]	100 U	10 U[a]	15 U	5920	25 U[ab]
DUP-081507	*OU1*	*8/15/2007*	*145*	*136*		*TOTAL*	20.4 J	10 U[a]	100 U	10 U[a]	15 U	5890	25 U[ab]
PVLNL05-MW2	*OU1*	*8/15/2007*	*145*	*136*		*FILTERED*	8.4 J	10 U[a]	100 U	10 U[a]	15 U	5420	25 U[ab]
DUP-081507	*OU1*	*8/15/2007*	*145*	*136*		*FILTERED*	6.3 J	10 U[a]	100 U	10 U[a]	15 U	5390	25 U[ab]
PVLNL06-MW2	*OU1*	*8/15/2007*	*87*	*82*		*TOTAL*	773[a]	10 U[a]	1740[a]	1.6 J	145[a]	43300	25 U[ab]
PVLNL06-MW2	*OU1*	*8/15/2007*	*87*	*82*		*FILTERED*	200 U	10 U[a]	100 U	10 U[a]	15 U	39400	25 U[ab]
PVLNL07-MW2	*OU1*	*8/15/2007*	*72.3*	*67*		*TOTAL*	11.9 J	10 U[a]	100 U	1.9 J	0.59 J	7600	25 U[ab]
PVLNL07-MW2	*OU1*	*8/15/2007*	*72.3*	*67*		*FILTERED*	5.4 J	10 U[a]	100 U	10 U[a]	15 U	6830	25 U[ab]
PVMVSW01-MW4	*OU1*	*8/16/2007*	*345*			*TOTAL*	200 U	10 U[a]	100 U	14[a]	15 U	38900	25 J[ab]
DUP-081607	*OU1*	*8/16/2007*	*345*			*TOTAL*	200 U	10 U[a]	100 U	20.3[ab]	15 U	38200	25 U[ab]
PVMVSW01-MW4	*OU1*	*8/16/2007*	*345*			*FILTERED*	200 U	10 U[a]	100 U	10 U[a]	15 U	35200	25 U[ab]
DUP-081607	*OU1*	*8/16/2007*	*345*			*FILTERED*	200 U	10 U[a]	100 U	10 U[a]	15 U	34900	25 U[ab]
PVMSW04-MW5	*OU1*	*8/16/2007*	*184*			*TOTAL*	200 U	10 U[a]	100 U	3.9 J	15 U	17000	25 U[ab]
PVMSW04-MW5	*OU1*	*8/16/2007*	*184*			*FILTERED*	200 U	10 U[a]	100 U	10 U[a]	15 U	16800	25 U[ab]

U-Analyte not detected above reporting limit
A,B-Exceeds criteria

GWQS-Groundwater Quality Standards
MCL-Maximum Contaminant Level

ROD TABLE 2
OU2 Remedial Investigation
EPA Monitoring Well
August and December 2007 Groundwater Sampling Summary
Inorganic Compound Exceedances
Pohatcong Valley Groundwater Contamination Site

PVMVS06-MW2	*OU1*	*8/17/2007*	*81*	*73*		*TOTAL*	28.3 J	10 UJ[a]	87.2 J	10 UJ[a]	9 J	31800 J	25 UJ[ab]
PVMVS06-MW2	*OU1*	*8/17/2007*	*81*	*73*		*FILTERED*	200 UJ	10 UJ[a]	100 UJ	10 UJ[a]	0.92 J	31900 J	25 UJ[ab]
PVMWO07	*OU2*	*12/5/2007*	*160*	*150*		*TOTAL*	200 U	10 U[a]	885 J[a]	10 U[a]	29.1	4090 J	25 U[ab]
PVMWO07	*OU2*	*12/5/2007*	*160*	*150*		*FILTERED*	200 U	10 U[a]	100 U	10 U[a]	1.2 J	3790 J	25 U[ab]
PVQUA01-MW1	*OU2*	*8/20/2007*	*100*	*87*		*TOTAL*	20.8 J	10 U[a]	100 U	10 U[a]	16.9	36600	25 U[ab]
PVQUA01-MW1	*OU2*	*8/20/2007*	*100*	*87*		*FILTERED*	4.9 J	10 U[a]	100 U	10 U[a]	14.8 J	34700	25 U[ab]
PVRHR01-MW1	*OU2*	*8/22/2007*	*153*	*139*		*TOTAL*	200 R	10 U[a]	215 R	10 U[a]	15 U	39000	25 U[ab]
PVRHR01-MW1	*OU2*	*8/22/2007*	*153*	*139*		*FILTERED*	200 U	10 U[a]	100 U	10 U[a]	4.3 J	37300	25 U[ab]
MW-101	*OU2*	*12/5/2007*	*42.8*	*35*		*TOTAL*	812[a]	10 U[a]	1660 J[a]	10 U[a]	65.9[a]	24500	25 J[ab]
DUP-120507	*OU2*	*12/5/2007*	*42.8*	*35*		*TOTAL*	444[a]	10 U[a]	936 J[a]	10 U[a]	33.9	12300	25 U[ab]
MW-101	*OU2*	*12/5/2007*	*42.8*	*35*		*FILTERED*	200 U	10 U[a]	16.3 J	10 U[a]	4.4 J	27100	28.6[ab]
DUP-120507	*OU2*	*12/5/2007*	*42.8*	*35*		*FILTERED*	200 U	10 U[a]	100 U	10 U[a]	3.1 J	12800	25 U[ab]
MW-104A	*OU2*	*12/3/2007*	*97*	*87*		*TOTAL*	220[a]	10 U[a]	642 J[a]	10 U[a]	44.7	5000 U	25 U[ab]
MW-104A	*OU2*	*12/3/2007*	*97*	*87*		*FILTERED*	200 U	10 U[a]	100 U	10 U[a]	26.8	5000 U	25 U[ab]
MW-107	*OU2*	*12/3/2007*	*52*	*45*		*TOTAL*	4850[a]	10 U[a]	10500 J[a]	10 U[a]	443[a]	10200	25 U[ab]
MW-107	*OU2*	*12/3/2007*	*52*	*45*		*FILTERED*	200 U	10 U[a]	100 U	10 U[a]	3.1 J	11100	25 U[ab]
MW-110	*OU2*	*12/4/2007*	*91*	*81*		*TOTAL*	200 U	10 U[a]	1510 J[a]	10 U[a]	17	5000 U	25 U[ab]
MW-110	*OU2*	*12/4/2007*	*91*	*81*		*FILTERED*	200 U	10 U[a]	100 U	10 U[a]	1.8 J	9240	12.5 J[ab]
PVSMS01-MW1	*OU2*	*8/20/2007*	*92*	*82*		*TOTAL*	7660[a]	9.9 J[a]	17000[a]	12.1[a]	466[a]	2930 J	25 U[ab]
PVSMS01-MW1	*OU2*	*8/20/2007*	*92*	*82*		*FILTERED*	24.5 J	10 U[a]	100 U	10 U[a]	15 U	2790 J	25 U[ab]
PVSTJ03-MW2	*OU1*	*8/16/2007*	*260*	*250*		*TOTAL*	317[a]	10 U[a]	583[a]	10 U[a]	5.3 J	15500	25 U[ab]
PVSTJ03-MW2	*OU1*	*8/16/2007*	*260*	*250*		*FILTERED*	5.2 J	10 U[a]	100 U	10 U[a]	15 U	15300	25 U[ab]
PVWCC15-MW3	*OU1*	*8/14/2007*	*98*	*88*		*TOTAL*	200 U	10 U[a]	100 U	10 U[a]	15 U	25800	25 U[ab]
PVWCC15-MW3	*OU1*	*8/14/2007*	*98*	*88*		*FILTERED*	200 U	10 U[a]	100 U	10 U[a]	15 U	25100	25 U[ab]
PVWCV05-MW3-B	*OU1*	*8/17/2007*	*144*	*130*		*TOTAL*	23.9 J	10 UJ[a]	28.8 J	10 UJ[a]	2.1 J	17500 J	25 UJ[ab]
PVWCV05-MW3-B	*OU1*	*8/17/2007*	*144*	*130*		*FILTERED*	200 UJ	10 UJ[a]	100 UJ	10 UJ[a]	15 UJ	16900 J	25 UJ[ab]

B-Analyte detected in associated blank
D-Concentration reported from secondary dilution
J-Reported value estimated in quantity
E-estimated concentration above the highest calibration standard

U-Analyte not detected above reporting limit
A,B-Exceeds criteria

GWQS-Groundwater Quality Standards
MCL-Maximum Contaminant Level

ROD TABLE 3

OU2 Study Area Remedial Investigation
EPA Residential Well Sampling Event
March 2008
Exceedance Summary

Pohatcong Valley Groundwater Contamination Site

Sample ID	Sample Date		Trichloroethylene
		NJDEP Criteria (a)	1
		EPA Criteria (b)	5
1LAUR-POST	*3/26/2008*		0.5 U
1LAUR-PRE	*3/26/2008*		0.5 U
11QUARR-POST	*3/28/2008*		0.5 U
11QUARR-PRE	*3/28/2008*		0.5 U
121IRON-POST	*3/28/2008*		0.5 U
121IRON-PRE	*3/28/2008*		**2.4**[a]
122IRON	*3/26/2008*		0.5 U
124IRON-POST	*3/24/2008*		0.5 U
124IRON-PRE	*3/24/2008*		**2.1**[a]
19STEWART	*3/26/2008*		0.5 U
203ARB-POST	*3/27/2008*		0.5 U
203ARB-PRE	*3/27/2008*		**3.9**[a]
207ARB-POST	*3/28/2008*		0.5 U
207ARB-PRE	*3/28/2008*		**3.4**[a]
22-QUARR	*3/24/2008*		**4.3**[a]
23STEWART	*3/25/2008*		0.5 U
3CLIFF-POST	*3/25/2008*		0.5 U
3CLIFF-PRE	*3/25/2008*		**1.9**[a]
31STEWART	*3/27/2008*		0.5 U
44ED	*3/25/2008*		0.5 U
5CLIFF-POST	*3/26/2008*		0.5 U
5CLIFF-PRE	*3/26/2008*		0.5 U
51STEWART	*3/25/2008*		**4.4**[a]
603DEB-POST	*3/24/2008*		0.5 U
603DEB-PRE	*3/24/2008*		**2.6**[a]
62ED-PRE	*3/24/2008*		0.5 U
7CLIFF-POST	*3/27/2008*		0.5 U
7CLIFF-PRE	*3/27/2008*		**1.7**[a]
70STEWART	*3/25/2008*		**1.1**[a]
8LAUR-POST	*3/24/2008*		0.5 U
8LAUR-PRE	*3/24/2008*		**4.9**[a]
9LAUR-POST	*3/24/2008*		0.5 U
9LAUR-PRE	*3/24/2008*		**12**[ab]
9STEWART-POST	*3/28/2008*		0.5 U
9STEWART-PRE	*3/28/2008*		0.5 U
108LAUR-PRE (duplicate)	*3/24/2008*		**4.7**[a]
2203ARB-PRE (duplicate)	*3/27/2008*		**4.1**[a]

B-Analyte in associated blank
D-Concentration from secondary dilution
J-Reported value est. in qty.

U-Analyte not detected above reporting limit
A,B-Exceeds criteria
E-estimated above the highest calibration standard

TABLE 3
ORGANIC ANALYTICAL RESULTS
EPA Residential Groundwater Sampling
March 09, May 09, August 09

Sample ID	PARAMETERS				Remark
	CAS Number	Analyte Name	Result (ug/L)	Qual	
PHASE I (MARCH 09)					
HOUSE 005	79-01-6	TRICHLOROETHENE	1.6		ST
HOUSE 007A	79-01-6	TRICHLOROETHENE	0.74		
HOUSE 007B	79-01-6	TRICHLOROETHENE	0.68		
HOUSE 008	79-01-6	TRICHLOROETHENE	1.1		ST
HOUSE 009	79-01-6	TRICHLOROETHENE	2.1		ST
HOUSE 012A	79-01-6	TRICHLOROETHENE	8.3		MCL & ST
HOUSE 012B	79-01-6	TRICHLOROETHENE	10		MCL & ST
HOUSE 013A	78-87-5	1,2-DICHLOROPROPANE	13		MCL & ST
HOUSE 013A	67-66-3	CHLOROFORM	0.92		
HOUSE 013A	79-01-6	TRICHLOROETHENE	4.1		ST
HOUSE 013B	67-66-3	CHLOROFORM	0.73		
HOUSE 013B	79-01-6	TRICHLOROETHENE	4.7		ST
HOUSE 014	79-01-6	TRICHLOROETHENE	2		ST
HOUSE 015	79-01-6	TRICHLOROETHENE	0.62		
HOUSE 015D	79-01-6	TRICHLOROETHENE	0.64		
HOUSE 018	79-01-6	TRICHLOROETHENE	0.55		
HOUSE 019	79-01-6	TRICHLOROETHENE	0.78		
HOUSE 020	79-01-6	TRICHLOROETHENE	0.56		
HOUSE 021	79-01-6	TRICHLOROETHENE	0.7		
HOUSE 022	67-66-3	CHLOROFORM	0.66		
HOUSE 024A	79-01-6	TRICHLOROETHENE	1.6		ST
HOUSE 024B	79-01-6	TRICHLOROETHENE	1.5		ST
HOUSE 026	79-01-6	TRICHLOROETHENE	0.73		
HOUSE 028A	79-01-6	TRICHLOROETHENE	0.71		
HOUSE 028B	79-01-6	TRICHLOROETHENE	0.69		
HOUSE 031B	79-01-6	TRICHLOROETHENE	1.4		ST
HOUSE 033	79-01-6	TRICHLOROETHENE	2		ST
HOUSE 035A	79-01-6	TRICHLOROETHENE	0.64		
HOUSE 035B	79-01-6	TRICHLOROETHENE	0.62		
HOUSE 037	79-01-6	TRICHLOROETHENE	0.64		
HOUSE 038	79-01-6	TRICHLOROETHENE	1.3		ST
HOUSE 041	79-01-6	TRICHLOROETHENE	0.9		
HOUSE 041D	79-01-6	TRICHLOROETHENE	0.89		
HOUSE 045	79-01-6	TRICHLOROETHENE	0.69		
HOUSE 046B	79-01-6	TRICHLOROETHENE	0.7		
HOUSE 048B	1634-04-4	METHYL TERT-BUTYL ETHER	0.7		
HOUSE 048B	79-01-6	TRICHLOROETHENE	0.68		
HOUSE 053	79-01-6	TRICHLOROETHENE	0.95		
HOUSE 054	79-01-6	TRICHLOROETHENE	2.8		ST

HOUSE 058A	79-01-6	TRICHLOROETHENE	1.4		ST
HOUSE 058B	79-01-6	TRICHLOROETHENE	1.5		ST
HOUSE 059A	1634-04-4	METHYL TERT-BUTYL ETHER	5.8		
HOUSE 059B	1634-04-4	METHYL TERT-BUTYL ETHER	5.5		
HOUSE 063B	79-01-6	TRICHLOROETHENE	2.7		ST
HOUSE 064	79-01-6	TRICHLOROETHENE	0.96		
HOUSE 065	79-01-6	TRICHLOROETHENE	0.85		
HOUSE 067B	79-01-6	TRICHLOROETHENE	0.6		
HOUSE 070A	79-01-6	TRICHLOROETHENE	0.95		
HOUSE 070B	79-01-6	TRICHLOROETHENE	1		ST
HOUSE 073B	79-01-6	TRICHLOROETHENE	1.1		ST
HOUSE 083	79-01-6	TRICHLOROETHENE	0.56		
HOUSE 086	79-01-6	TRICHLOROETHENE	2.8		ST
HOUSE 087	79-01-6	TRICHLOROETHENE	2.9		ST
HOUSE 090B	79-01-6	TRICHLOROETHENE	2.2		ST
HOUSE 091A	79-01-6	TRICHLOROETHENE	0.93		
HOUSE 091B	79-01-6	TRICHLOROETHENE	0.9		
HOUSE 092	79-01-6	TRICHLOROETHENE	1		ST
HOUSE 097A	79-01-6	TRICHLOROETHENE	0.68		
HOUSE 097B	79-01-6	TRICHLOROETHENE	0.71		
HOUSE 099A	79-01-6	TRICHLOROETHENE	0.99		
HOUSE 099B	79-01-6	TRICHLOROETHENE	0.98		
HOUSE 100	67-66-3	CHLOROFORM	1.3		
HOUSE 103	79-01-6	TRICHLOROETHENE	1.3		ST
HOUSE 106A		HYDROGEN CHLORIDE ; RT=2.46	0.87	NJ	
HOUSE 107A	1634-04-4	METHYL TERT-BUTYL ETHER	1.3		
HOUSE 107B	1634-04-4	METHYL TERT-BUTYL ETHER	2.3		
HOUSE 108B	74-87-3	CHLOROMETHANE	1	K	
HOUSE 108B	79-01-6	TRICHLOROETHENE	7.3		MCL & ST
HOUSE 111B	79-01-6	TRICHLOROETHENE	4.2		ST
PHASE II (MAY 09)					
HOUSE 113	67-64-1	ACETONE	18	L	
HOUSE 116	67-66-3	CHLOROFORM	1.3		
HOUSE 119B	79-01-6	TRICHLOROETHENE	3.4		ST
HOUSE 120B	67-64-1	ACETONE	5.6		
HOUSE 120B	79-01-6	TRICHLOROETHENE	1.9		ST
HOUSE 121	79-01-6	TRICHLOROETHENE	2.3		ST
HOUSE 124	79-01-6	TRICHLOROETHENE	1.3		ST
HOUSE 129	67-66-3	CHLOROFORM	1.7	K	
HOUSE 130	79-01-6	TRICHLOROETHENE	0.62		
HOUSE 130D	79-01-6	TRICHLOROETHENE	0.67		
HOUSE 132	79-01-6	TRICHLOROETHENE	0.95		
HOUSE 134A	79-01-6	TRICHLOROETHENE	0.75		
HOUSE 134B	67-66-3	CHLOROFORM	1.3		
HOUSE 142	79-01-6	TRICHLOROETHENE	0.85		
HOUSE 148		FURAN, TETRAHYDRO; RT=5.028	1.6	NJ	
HOUSE 150	67-66-3	CHLOROFORM	0.76		
HOUSE 151	79-01-6	TRICHLOROETHENE	8.1		MCL & ST

HOUSE 153	67-66-3	CHLOROFORM	0.8		
HOUSE 155	79-01-6	TRICHLOROETHENE	1.2		ST
HOUSE 155D	79-01-6	TRICHLOROETHENE	1.2		ST
HOUSE 159B	79-01-6	TRICHLOROETHENE	1.2		ST
HOUSE 160	79-01-6	TRICHLOROETHENE	0.61		
HOUSE 166	67-64-1	ACETONE	7.7		
HOUSE 166	79-01-6	TRICHLOROETHENE	1.1		ST
HOUSE 170A	79-01-6	TRICHLOROETHENE	0.96		
HOUSE 170B	67-64-1	ACETONE	5.5		
HOUSE 170B	79-01-6	TRICHLOROETHENE	0.85		
HOUSE 172	79-01-6	TRICHLOROETHENE	1.1		ST
HOUSE 175	79-01-6	TRICHLOROETHENE	1.3		ST
PHASE III(AUG 09)					
HOUSE 178	79-01-6	TRICHLOROETHENE	0.62		
HOUSE 178D	79-01-6	TRICHLOROETHENE	0.59		
HOUSE 180	74-83-9	BROMOMETHANE	0.56		
HOUSE 181	79-01-6	TRICHLOROETHENE	1.4		ST
HOUSE 183	79-01-6	TRICHLOROETHENE	0.93		

Those organics not listed above were not detected. J: Value is an estimate; K: Value may be biased high; L: Value may be biased low; N: Presumptive evidence that the analyte is present and is tentative identified; MCL: Above Federal MCLs, ST: Above State Drinking Water Standards.

ROD TABLE
Sediment Sample Results Exceedances
Phase 2 OU2 Remedial Investigation Report
Pohatcong Valley Groundwater Contamination Site
(RI Appendix L)

Sample ID	Sample Date	Analyte	Results	Units	Analyte	Results	Units
PVSAC22-SD1	1/23/08	Tetrachloroethene	6.5 U	µg/L	Trichloroethene	6.5 U	µg/L
PVSAC23-SD1	1/22/08	Tetrachloroethene	6.3 U	µg/L	Trichloroethene	6.3 U	µg/L
PVSAC24-SD1	1/24/08	Tetrachloroethene	6.2 U	µg/L	Trichloroethene	6.2 U	µg/L
PVSAC25-SD1	1/24/08	Tetrachloroethene	4.2 U	µg/L	Trichloroethene	4.2 U	µg/L
PVSAC29-SD1	1/23/08	Tetrachloroethene	6.8 U	µg/L	Trichloroethene	6.8 U	µg/L
PVSAC30-SD1	1/22/08	Tetrachloroethene	8.5 U	µg/L	Trichloroethene	8.5 U	µg/L

Notes:
U - Not Detected
J - Estimated Concentration
µg/L - micrograms per Liter

ROD TABLE
Surface Water Sample Results Exceedances
Phase 2 OU2 Remedial Investigation Report
Pohatcong Valley Groundwater Contamination Site
(RI Appendix L)

Sample ID	Sample Date	Analyte	Results	Units	Analyte	Results	Units
PVSAC29-SW1	1/23/08	Tetrachloroethene	5U	µg/L	Trichloroethene	5U	µg/L
PVSAC22-SW1	1/23/08	Tetrachloroethene	5U	µg/L	Trichloroethene	5U	µg/L
PVSAC28-SW1	1/23/08	Tetrachloroethene	5U	µg/L	Trichloroethene	5U	µg/L
PVSAC24-SW1	1/24/08	Tetrachloroethene	5U	µg/L	Trichloroethene	5U	µg/L
PVSAC25-SW1	1/24/08	Tetrachloroethene	5U	µg/L	Trichloroethene	1.2J	µg/L
PVSAC27-SW1	1/25/08	Tetrachloroethene	5U	µg/L	Trichloroethene	5U	µg/L
PVSAC26-SW1	1/25/08	Tetrachloroethene	5U	µg/L	Trichloroethene	5U	µg/L
PVSAC30-SW1	1/22/08	Tetrachloroethene	5U	µg/L	Trichloroethene	5U	µg/L
PVSAC23-SW1	1/22/08	Tetrachloroethene	5U	µg/L	Trichloroethene	5U	µg/L

Notes:
U - Not Detected
J - Estimated Concentration
µg/L - micrograms per Liter

COMPARISON OF TOTAL COST OF REMEDIAL ALTERNATIVES

Site: PVGCS OU2 Study Area
Location: Groundwater Media
Phase: Feasibility Study
Base Year: 2009
Date: Dec-09

	Groundwater Alternative 1	Groundwater Alternative 2a	Groundwater Alternative 2b	Groundwater Alternative 3a	Groundwater Alternative 3b
	No Action	Monitored Natural Attenuation, Institutional Controls, and Private Well Head Treatment	Monitored Natural Attenuation, Institutional Controls, and Public Water Supply Connection	Insitu Upgradient Treatment, Private Well Head Treatment, and MNA	Insitu Upgradient Treatment, Public Water Supply Connection, and MNA
Total Project Duration (Years)	67	67	67	67	67
Capital Cost	$0	$2,344,000	$13,992,000	$3,644,000	$15,292,000
Annual O&M Cost	$0	$339,000	$77,000	$615,000	$352,000
Total Periodic Cost	$0	$15,000	$15,000	$15,000	$15,000
Total Present Value of Alternative	$0	$6,640,000	$15,040,000	$8,200,000	$16,590,000

Notes: While time of remediation for most alternatives are above 30 years, present worth costs were prepared for 30 years.
* Groundwater Alternative 4 was not retained for detailed evaluation and the costs were rough order of magnitude only. They were included here for comparison purposes only.

Disclaimer: The information in this cost estimate is based on the best available information regarding the anticipated scope of the remedial alternatives. Changes in the cost estimates are likely to occur as a result of new information and data collected during the engineering design of the remedial alternatives. This is an order-of-magnitude cost estimate that is expected to be within -30 to +50 percent of the actual project costs.

Alternative:	**Groundwater Alternative 1**	**COST ESTIMATE SUMMARY**
Name:	**No Action**	

Site:	PVGCS OU1 Study Area	**Description:**	No action taken.
Location:	Groundwater Media		
Phase:	Feasibility Study		
Base Year:	2009		
Date:	12/1/2009		

CAPITAL COSTS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
None					
TOTAL CAPITAL COST				**$0**	

OPERATIONS AND MAINTENANCE COST

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
None	0	LS	$5,000	$0	
TOTAL ANNUAL O&M COST				**$0**	

PERIODIC COSTS

DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
None		0	LS	$0	$0	
TOTAL PERIODIC COST					**$0**	

PRESENT VALUE ANALYSIS Discount Rate = 7.0% http://www.whitehouse.gov/omb/circulars/a094/a94_appx-c.html

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (7%)	PRESENT VALUE	NOTES
CAPITAL COST	0	$0	$0	1.000	$0	
ANNUAL O&M COST	1 to 30	$0	$0	12.41	$0	
		$0			$0	
TOTAL PRESENT VALUE OF ALTERNATIVE					**$0**	

SOURCE INFORMATION

1. United States Environmental Protection Agency. July 2000. A Guide to Preparing and Documenting Cost Estimates During the Feasibility Study. EPA 540-R-00-002. (USEPA, 2000).

Alternative: Groundwater Alternative 2a — **COST ESTIMATE SUMMARY**
Name: Monitored Natural Attenuation, Institutional Controls, and Private Well Head Treatment

Site: PVGCS OU2 Study Area
Location: Groundwater Media
Phase: Feasibility Study
Base Year: 2009
Date: 12/1/2009

Description:
Installation of Point of entry treatment (POETS) for private wells throughout OU2

CAPITAL COSTS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Groundwater Use Restrictions	1	LS	$15,000	**$15,000**	
Pre-Design Investigations					
Install New Monitoring Wells					
Mobilization/Demobilization	1	LS	$25,000	$25,000	
Soil Borings	1,750	FT	$47	$82,250	Miller Drilling Quote.
2" Well Casing	1,750	FT	$15	$26,250	33-23-0101
2" Well Screen	1,750	FT	$25	$43,750	33-23-0256
Installation Oversight Labor	160	HR	$80	$12,800	CH2M HILL Estimate
SUBTOTAL				$190,050	
Contingency	30%			$57,015	10% Scope + 20% Bid
SUBTOTAL				**$247,065**	
Sample Existing and New Wells					
Groundwater Samples	21	LS	$110	$2,310	Contractor Estimate
QC Samples	4	LS	$110	$451	Contractor Estimate
Samping Labor	48	HRS	$80	$3,840	CH2M HILL Estimate - 2 persons
Equipment - meters	1	LS	$2,000	$2,000	CH2M HILL Estimate
Consumables	1	LS	$400	$400	CH2M HILL Estimate
Data Validation	13	HRS	$80	$1,004	CH2M HILL Estimate
Reporting	16	HRS	$80	$1,280	CH2M HILL Estimate
SUBTOTAL				$11,285	
Allowance for Misc. Items	20%			$2,257	
SUBTOTAL				$13,542	
Contingency	30%			$4,063	10% Scope + 20% Bid
SUBTOTAL				**$17,605**	
General Work for Existing Private Wells					
Door-to-Door Survey	420	HR	$80	$33,600	
SUBTOTAL				**$33,600**	
POET Installation					
Private homes	320	EA	$3,464	$1,108,480	Vendor's Quote
Installation Cost	320	EA	$640	$204,800	
SUBTOTAL				$1,313,280	
Contingency	25%			$328,320	10% Scope + 15% Bid
SUBTOTAL				**$1,641,600**	
SUBTOTAL - CAPITAL COSTS				**$1,954,870**	
Project Management	5%			$97,743	USEPA 2000, p. 5-13, $2MM-$10MM
Engineering Design and Planning	8%			$156,390	USEPA 2000, p. 5-13, $2MM-$10MM
Construction Management	6%			$117,292	USEPA 2000, p. 5-13, $2MM-$10MM
Operations and Maintenance Manual	1	LS	$7,500	$7,500	CH2M HILL Estimate
Procurement	1	LS	$2,500	$2,500	CH2M HILL Estimate
Construction Completion and QA/QC Report	1	LS	$8,000	$8,000	CH2M HILL Estimate
TOTAL CAPITAL COST				**$2,344,000**	

OPERATIONS AND MAINTENANCE COST

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Groundwater Monitoring (20 Outlying Homes)					
Groundwater Samples	20	LS	$110	$2,200	Contractor Estimate
QC Samples	4	LS	$110	$440	Contractor Estimate
Labor	48	HRS	$80	$3,840	CH2M HILL Estimate - 2 persons
Equipment - meters	1	LS	$500	$500	CH2M HILL Estimate
Consumables	1	LS	$200	$200	CH2M HILL Estimate
Data Validation	12	HRS	$80	$960	CH2M HILL Estimate
Reporting	16	HRS	$80	$1,280	CH2M HILL Estimate
SUBTOTAL				$9,420	
Allowance for Misc. Items	20%			$1,884	
SUBTOTAL				**$11,304**	
POETS System Maintenance					
O&M Staff (labor, overheads, vehicles, etc)	1	LS	$35,000	$35,000	
Carbon Usage	400	EA	$732	$292,800	1 change-out/yr (including existing)
SUBTOTAL				**$327,800**	
ANNUAL O&M COST				**$339,000**	

PERIODIC COSTS

DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Groundwater Sampling Every 2 years	2					
Groundwater Samples		21	LS	$110	$2,310	Contractor Estimate
QC Samples		4	LS	$110	$451	Contractor Estimate
Groundwater Sampling, Level D						
Labor		48	HRS	$80	$3,840	CH2M HILL Estimate - 2 persons
Equipment - meters		1	LS	$500	$500	CH2M HILL Estimate
Consumables		1	LS	$200	$200	CH2M HILL Estimate
Data Validation		13	HRS	$80	$1,004	CH2M HILL Estimate
Reporting		16	HRS	$80	$1,280	CH2M HILL Estimate
SUBTOTAL					$9,585	
Allowance for Misc. Items		20%			$1,917	
SUBTOTAL					$11,502	
Contingency		30%			$3,451	10% Scope + 20% Bid
SUBTOTAL (ANNUAL)					**$15,000**	

Alternative: **Groundwater Alternative 2a** — **COST ESTIMATE SUMMARY**

Name: **Monitored Natural Attenuation, Institutional Controls, and Private Well Head Treatment**

PRESENT VALUE ANALYSIS Discount Rate = 7.0%

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (7%)	PRESENT VALUE	NOTES
CAPITAL COST	0	$2,344,000	$2,344,000	1.000	$2,344,000	
O&M COST						
GW MONITOR (20 OUTLYING HOMES) COST	1 to 30	$339,120	$11,304	12.409	$140,272	
POETS O&M COST.	1 to 30		$327,800	12.409	$4,067,684	
PERIODIC COST	2	$15,000	$15,000	0.87	$13,102	
PERIODIC COST	4	$15,000	$15,000	0.76	$11,443	
PERIODIC COST	6	$15,000	$15,000	0.67	$9,995	
PERIODIC COST	8	$15,000	$15,000	0.58	$8,730	
PERIODIC COST	10	$15,000	$15,000	0.51	$7,625	
PERIODIC COST	12	$15,000	$15,000	0.44	$6,660	
PERIODIC COST	14	$15,000	$15,000	0.39	$5,817	
PERIODIC COST	16	$15,000	$15,000	0.34	$5,081	
PERIODIC COST	18	$15,000	$15,000	0.30	$4,438	
PERIODIC COST	20	$15,000	$15,000	0.26	$3,876	
PERIODIC COST	22	$15,000	$15,000	0.23	$3,386	
PERIODIC COST	24	$15,000	$15,000	0.20	$2,957	
PERIODIC COST	26	$15,000	$15,000	0.17	$2,583	
PERIODIC COST	28	$15,000	$15,000	0.15	$2,256	
PERIODIC COST	30	$15,000	$15,000	0.13	$1,971	
		$2,908,120			$6,641,876	

TOTAL PRESENT VALUE OF ALTERNATIVE **$6,640,000**

SOURCE INFORMATION

1. United States Environmental Protection Agency. July 2000. A Guide to Preparing and Documenting Cost Estimates During the Feasibility Study. EPA 540-R-00-002. (USEPA, 2000).

Alternative: **Groundwater Alternative 2b** — **COST ESTIMATE SUMMARY**

Name: **Monitored Natural Attenuation, Institutional Controls, and Public Water Supply Connection**

Site: PVGCS OU2 Study Area
Location: Groundwater Media
Phase: Feasibility Study
Base Year: 2009
Date: 12/1/2009

Description:
Installation of Point of entry treatment (POETS) for private wells in the outlying areas
Connection to Public Water Supply for homes in the interior of OU-2

CAPITAL COSTS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Groundwater Use Restrictions	1	LS	$15,000	**$15,000**	
Pre-Design Investigations					
Install New Monitoring Wells					
Mobilization/Demobilization	1	LS	$25,000	$25,000	
Soil Borings	1,750	FT	$47	$82,250	Miller Drilling Quote.
2" Well Casing	1,750	FT	$15	$26,250	33-23-0101
2" Well Screen	1,750	FT	$25	$43,750	33-23-0256
Installation Oversight Labor	160	HR	$80	$12,800	CH2M HILL Estimate
SUBTOTAL				$190,050	
Contingency	30%			$57,015	10% Scope + 20% Bid
SUBTOTAL				**$247,065**	
Sample Existing and New Wells					
Groundwater Samples	21	LS	$110	$2,310	Contractor Estimate
QC Samples	4	LS	$110	$451	Contractor Estimate
Samping Labor	48	HRS	$80	$3,840	CH2M HILL Estimate - 2 persons
Equipment - meters	1	LS	$2,000	$2,000	CH2M HILL Estimate
Consumables	1	LS	$400	$400	CH2M HILL Estimate
Data Validation	13	HRS	$80	$1,004	CH2M HILL Estimate
Reporting	16	HRS	$80	$1,280	CH2M HILL Estimate
SUBTOTAL				$11,285	
Allowance for Misc. Items	20%			$2,257	
SUBTOTAL				$13,542	
Contingency	30%			$4,063	10% Scope + 20% Bid
SUBTOTAL				**$17,605**	
General Work for Replacement of Existing Private Wells					
Door-to-Door Survey	420	HR	$80	$33,600	
Home Well Abandonment	25,000	LF	$10	$250,000	Contractor Estimate
SUBTOTAL				**$283,600**	
Water Supply Connection					
New Water Main Pipeline	52,800	LF	$150	$7,920,000	10 miles
Connection to Municipal Supply System(100')	320	EA	$3,000	$960,000	Connection home to water main
Water Meter Installation	320	EA	$200	$64,000	Unit cost from Aqua
SUBTOTAL				$8,944,000	
Contingency	25%			$2,236,000	10% Scope + 15% Bid
SUBTOTAL				**$11,180,000**	
SUBTOTAL - CAPITAL COSTS				**$11,743,270**	
Project Management	5%			$587,163	USEPA 2000, p. 5-13, $2MM-$10MM
Engineering Design and Planning	8%			$939,462	USEPA 2000, p. 5-13, $2MM-$10MM
Construction Management	6%			$704,596	USEPA 2000, p. 5-13, $2MM-$10MM
Operations and Maintenance Manual	1	LS	$7,500	$7,500	CH2M HILL Estimate
Procurement	1	LS	$2,500	$2,500	CH2M HILL Estimate
Construction Completion and QA/QC Report	1	LS	$8,000	$8,000	CH2M HILL Estimate
TOTAL CAPITAL COST				**$13,992,000**	

OPERATIONS AND MAINTENANCE COST

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Groundwater Monitoring (20 Outlying Homes)					
Groundwater Samples	20	LS	$110	$2,200	Contractor Estimate
QC Samples	4	LS	$110	$440	Contractor Estimate
Labor	48	HRS	$80	$3,840	CH2M HILL Estimate - 2 persons
Equipment - meters	1	LS	$500	$500	CH2M HILL Estimate
Consumables	1	LS	$200	$200	CH2M HILL Estimate
Data Validation	12	HRS	$80	$960	CH2M HILL Estimate
Reporting	16	HRS	$80	$1,280	CH2M HILL Estimate
SUBTOTAL				$9,420	
Allowance for Misc. Items	20%			$1,884	
SUBTOTAL				$11,304	
POETS System Maintenance					
O&M Staff (labor, overheads, vehicles, etc)	1	LS	$7,000	$7,000	
Carbon Usage	80	EA	$732	$58,560	1 change-out/yr (including existing)
SUBTOTAL				$65,560	
ANNUAL O&M COST				**$77,000**	

PERIODIC COSTS

DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Groundwater Sampling Every 2 years	2					
Groundwater Samples		21	LS	$110	$2,310	Contractor Estimate
QC Samples		4	LS	$110	$440	Contractor Estimate
Groundwater Sampling, Level D						
Labor		48	HRS	$80	$3,840	CH2M HILL Estimate - 2 persons
Equipment - meters		1	LS	$500	$500	CH2M HILL Estimate
Consumables		1	LS	$200	$200	CH2M HILL Estimate
Data Validation		13	HRS	$80	$1,000	CH2M HILL Estimate
Reporting		16	HRS	$80	$1,280	CH2M HILL Estimate
SUBTOTAL					$9,570	
Allowance for Misc. Items		20%			$1,914	
SUBTOTAL					$11,484	
Contingency		30%			$3,445	10% Scope + 20% Bid
SUBTOTAL (ANNUAL)					**$15,000**	

Alternative: Groundwater Alternative 2b — **COST ESTIMATE SUMMARY**

Name: Monitored Natural Attenuation, Institutional Controls, and Public Water Supply Connection

PRESENT VALUE ANALYSIS — Discount Rate = 7.0%

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (7%)	PRESENT VALUE	NOTES
CAPITAL COST	0	$13,992,000	$13,992,000	1.000	$13,992,000	
O&M COST						
GW MONITOR (20 OUTLYING HOMES) COST	1 to 30	$339,120	$11,304	12.409	$140,272	
POETS O&M COST	1 to 30	$1,966,800	$65,560	12.409	$813,537	
PERIODIC COST	2	$15,000	$15,000	0.87	$13,102	
PERIODIC COST	4	$15,000	$15,000	0.76	$11,443	
PERIODIC COST	6	$15,000	$15,000	0.67	$9,995	
PERIODIC COST	8	$15,000	$15,000	0.58	$8,730	
PERIODIC COST	10	$15,000	$15,000	0.51	$7,625	
PERIODIC COST	12	$15,000	$15,000	0.44	$6,660	
PERIODIC COST	14	$15,000	$15,000	0.39	$5,817	
PERIODIC COST	16	$15,000	$15,000	0.34	$5,081	
PERIODIC COST	18	$15,000	$15,000	0.30	$4,438	
PERIODIC COST	20	$15,000	$15,000	0.26	$3,876	
PERIODIC COST	22	$15,000	$15,000	0.23	$3,386	
PERIODIC COST	24	$15,000	$15,000	0.20	$2,957	
PERIODIC COST	26	$15,000	$15,000	0.17	$2,583	
PERIODIC COST	28	$15,000	$15,000	0.15	$2,256	
PERIODIC COST	30	$15,000	$15,000	0.13	$1,971	
		$16,522,920			$15,035,729	

TOTAL PRESENT VALUE OF ALTERNATIVE **$15,040,000**

SOURCE INFORMATION

1. United States Environmental Protection Agency. July 2000. A Guide to Preparing and Documenting Cost Estimates During the Feasibility Study. EPA 540-R-00-002. (USEPA, 2000).

Alternative: **Groundwater Alternative 3a** — **COST ESTIMATE SUMMARY**
Name: **Insitu Upgradient Treatment, Private Well Head Treatment, and MNA**

Site: PVGCS OU2 Study Area
Location: Groundwater Media
Phase: Feasibility Study
Base Year: 2009
Date: 12/1/2009

Description:
Insitu Oxidation of Upgradient Hotspot
Installation of Point of entry treatment (POETS) for private wells throughout OU2

CAPITAL COSTS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Groundwater Use Restrictions	1	LS	$15,000	**$15,000**	
Pre-Design Investigations					
Install New Monitoring Wells					
Mobilization/Demobilization	1	LS	$25,000	$25,000	
Soil Borings	1,750	FT	$47	$82,250	Miller Drilling Quote.
2" Well Casing	1,750	FT	$15	$26,250	33-23-0101
2" Well Screen	1,750	FT	$25	$43,750	33-23-0256
Installation Oversight Labor	160	HR	$80	$12,800	CH2M HILL Estimate
SUBTOTAL				$190,050	
Contingency	30%			$57,015	10% Scope + 20% Bid
SUBTOTAL				**$247,065**	
Sample Existing and New Wells					
Groundwater Samples	21	LS	$110	$2,310	Contractor Estimate
QC Samples	4	LS	$110	$451	Contractor Estimate
Samping Labor	48	HRS	$80	$3,840	CH2M HILL Estimate - 2 persons
Equipment - meters	1	LS	$2,000	$2,000	CH2M HILL Estimate
Consumables	1	LS	$400	$400	CH2M HILL Estimate
Data Validation	13	HRS	$80	$1,004	CH2M HILL Estimate
Reporting	16	HRS	$80	$1,280	CH2M HILL Estimate
SUBTOTAL				$11,285	
Allowance for Misc. Items	20%			$2,257	
SUBTOTAL				$13,542	
Contingency	30%			$4,063	10% Scope + 20% Bid
SUBTOTAL				**$17,605**	
General Work for Existing Private Wells					
Door-to-Door Survey	420	HR	$80	$33,600	
SUBTOTAL				**$33,600**	
POET Installation					
Private homes	320	EA	$3,464	$1,108,480	Vendor's Quote
Installation Cost	320	EA	$640	$204,800	
SUBTOTAL				$1,313,280	
Contingency	25%			$328,320	10% Scope + 15% Bid
SUBTOTAL				**$1,641,600**	
Site Preparation					
Site Preparation	1	LS	$10,000	$10,000	
Silt Fencing and Erosion Controls (Temp.)	1	LS	$500	$500	
Surveying	1	LS	$1,000	$1,000	
SUBTOTAL				*$11,500*	
Injection Wells					
Mobilization	1	LS	$25,000	$25,000	
12-inch Borehole	900	LF	$70	$63,000	
8-inch Well Casing	900	LF	$35	$31,500	
Well Grout Seal	900	LF	$20	$18,000	
Well Development	224	HR	$250	$56,000	
Wellhead Piping, Vault, etc.	6	EA	$15,000	$90,000	
Installation Oversight Labor	160	HR	$80	$12,800	CH2M HILL Estimate
SUBTOTAL				*$296,300*	
Groundwater Treatment Systems					
Excavation for Building Foundation	1	LS	$20,000	$20,000	Contractor Estimate
Concrete Building Foundation	1	LS	$30,000	$30,000	Contractor Estimate
Concrete Footer	1	LS	$30,000	$30,000	Contractor Estimate
GW Treatment Building	1	LS	$70,000	$70,000	Contractor Estimate
Miscellaneous (Construction)	1	LS	$5,000	$5,000	CH2M HILL Estimate
Paved Access Road	125	TONS	$130	$16,250	CH2M HILL Estimate
Underground Utilities	1	LS	$50,000	$50,000	
Utility Tie-ins	1	LS	$20,000	$20,000	
Yard Piping	1	LS	$40,000	$40,000	
10,000 gal EqualizationTank	2	EA	$8,726	$17,452	33-10-9662
4" Venturi Flow Meter	4	EA	$4,000	$16,000	CH2M HILL Estimate
4" Steel Pipe (Exposed)	4,000	LF	$13	$50,320	33-26-0104
4" Steel Fittings (Exposed)	20	EA	$119	$2,380	33-27-0534/0552/0562
4" Check Valve	10	EA	$292	$2,920	33-27-0404
4" Butterfly Valve	10	EA	$544	$5,437	33-27-0424
Misc Plant Piping	1	LS	$35,000	$35,000	Allowance
Instumentation	1	LS	$20,000	$20,000	Allowance
Electrical	1	LS	$50,000	$50,000	Allowance
Pressure Gauge Assembly	4	EA	$276	$1,104	Grainger Estimate
Misc. (pipe stands, brackets, etc.)	1	LS	$50,000	$50,000	CH2M HILL Estimate
SUBTOTAL				*$531,863*	
Oxidant Materials					
Oxidant	1200	LBS	3.2	*$3,780*	Regenisis - includes materials and shipping
Electrical Service (GW Treatment Systems and Wells)					
Electrical service	1	LS	$10,000	$10,000	CH2M HILL Estimate
SUBTOTAL				*$10,000*	
SUBTOTAL (In Situ System)				$653,443	
Contingency	25%			$213,361	10% Scope + 15% Bid
SUBTOTAL (System)				**$1,066,803**	
SUBTOTAL - CAPITAL COSTS				**$3,021,673**	
Project Management	5%			$151,084	USEPA 2000, p. 5-13, $2MM-$10MM
Engineering Design and Planning	8%			$241,734	USEPA 2000, p. 5-13, $2MM-$10MM
Construction Management	6%			$181,300	USEPA 2000, p. 5-13, $2MM-$10MM
Permitting (Injection)	1	LS	$30,000	$30,000	CH2M HILL Estimate
Operations and Maintenance Manual	1	LS	$7,500	$7,500	CH2M HILL Estimate
Procurement	1	LS	$2,500	$2,500	CH2M HILL Estimate
Construction Completion and QA/QC Report	1	LS	$8,000	$8,000	CH2M HILL Estimate
TOTAL CAPITAL COST				**$3,644,000**	

Alternative: Groundwater Alternative 3a — **COST ESTIMATE SUMMARY**

Name: Insitu Upgradient Treatment, Private Well Head Treatment, and MNA

OPERATIONS AND MAINTENANCE COST

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Groundwater Monitoring (20 Outlying Homes)					
Groundwater Samples	20	LS	$110	$2,200	Contractor Estimate
QC Samples	4	LS	$110	$440	Contractor Estimate
Labor	48	HRS	$80	$3,840	CH2M HILL Estimate - 2 persons
Equipment - meters	1	LS	$500	$500	CH2M HILL Estimate
Consumables	1	LS	$200	$200	CH2M HILL Estimate
Data Validation	12	HRS	$80	$960	CH2M HILL Estimate
Reporting	16	HRS	$80	$1,280	CH2M HILL Estimate
SUBTOTAL				$9,420	
Allowance for Misc. Items	20%			$1,884	
SUBTOTAL				$11,304	
POETS System Maintenance					
O&M Staff (labor, overheads, vehicles, etc)	1	LS	$35,000	$35,000	
Carbon Usage	400	EA	$732	$292,800	1 change-out/yr (including existing)
SUBTOTAL				$327,800	
Treatment Building Property Leasing					
Property Leasing for TCE Treatment Building	30,000	SF	$7	$210,000	Estimate from OMI
Inspection and Monitoring					
Monthly Site Visits					
Labor for Visit/Compliance Sampling	96	HR	$80	$7,680	CH2M HILL Estimate - 1 person/mth
Effluent Sampling (GW)	12	LS	$110	$1,320	Contractor Estimate
Reporting (Quarterly)	4	LS	$8,000	$32,000	CH2M HILL Estimate
Other Expenses (Shipping, supplies, etc.)	1	LS	$1,000	$1,000	CH2M HILL Estimate
SUBTOTAL				$42,000	
Allowance for Misc. Items	20%			$8,400	
SUBTOTAL				$50,400	
Contingency	30%			$15,120	
SUBTOTAL				**$65,520**	
ANNUAL O&M COST				**$615,000**	

PERIODIC COSTS

DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Groundwater Sampling Every 5 years	5					
Groundwater Samples		21	LS	$110	$2,310	Contractor Estimate
QC Samples		4	LS	$110	$440	Contractor Estimate
Groundwater Sampling, Level D						
Labor		48	HRS	$80	$3,840	CH2M HILL Estimate - 2 persons
Equipment - meters		1	LS	$500	$500	CH2M HILL Estimate
Consumables		1	LS	$200	$200	CH2M HILL Estimate
Data Validation		13	HRS	$80	$1,000	CH2M HILL Estimate
Reporting		16	HRS	$80	$1,280	CH2M HILL Estimate
SUBTOTAL					$9,570	
Allowance for Misc. Items		20%			$1,914	
SUBTOTAL					$11,484	
Contingency		30%			$3,445	10% Scope + 20% Bid
SUBTOTAL (ANNUAL)					**$15,000**	

PRESENT VALUE ANALYSIS

Discount Rate = 7.0%

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (7%)	PRESENT VALUE	NOTES
CAPITAL COST	0	$3,644,000	$3,644,000	1.000	$3,644,000	
O&M COST						
PROPERTY LEASING	1	$210,000	$210,000	0.935	$196,262	
GW MONITOR (20 OUTLYING HOMES) COST	1 to 30	$339,120	$11,304	12.409	$140,272	
POETS O&M COST	1 to 30	$9,834,000	$327,800	12.409	$4,067,684	
SYSTEM Monitoring O&M COSTS	1	$65,520	$65,520	0.935	$61,234	
PERIODIC COST	2	$15,000	$15,000	0.87	$13,102	
PERIODIC COST	4	$15,000	$15,000	0.76	$11,443	
PERIODIC COST	6	$15,000	$15,000	0.67	$9,995	
PERIODIC COST	8	$15,000	$15,000	0.58	$8,730	
PERIODIC COST	10	$15,000	$15,000	0.51	$7,625	
PERIODIC COST	12	$15,000	$15,000	0.44	$6,660	
PERIODIC COST	14	$15,000	$15,000	0.39	$5,817	
PERIODIC COST	16	$15,000	$15,000	0.34	$5,081	
PERIODIC COST	18	$15,000	$15,000	0.30	$4,438	
PERIODIC COST	20	$15,000	$15,000	0.26	$3,876	
PERIODIC COST	22	$15,000	$15,000	0.23	$3,386	
PERIODIC COST	24	$15,000	$15,000	0.20	$2,957	
PERIODIC COST	26	$15,000	$15,000	0.17	$2,583	
PERIODIC COST	28	$15,000	$15,000	0.15	$2,256	
PERIODIC COST	30	$15,000	$15,000	0.13	$1,971	
		#########			$8,199,371	
TOTAL PRESENT VALUE OF ALTERNATIVE					**$8,200,000**	

SOURCE INFORMATION

1. United States Environmental Protection Agency. July 2000. A Guide to Preparing and Documenting Cost Estimates During the Feasibility Study. EPA 540-R-00-002. (USEPA, 2000).

Alternative: **Groundwater Alternative 3b** — **COST ESTIMATE SUMMARY**
Name: **Insitu Upgradient Treatment, Public Water Supply Connection, and MNA**

Site: PVGCS OU2 Study Area
Location: Groundwater Media
Phase: Feasibility Study
Base Year: 2009
Date: 12/1/2009

Description:
Insitu Oxidation of Upgradient Area
Installation of Point of entry treatment (POETS) for private wells in the outlying areas
Connection to Public Water Supply for homes in the interior of OU-2

CAPITAL COSTS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Groundwater Use Restrictions	1	LS	$15,000	**$15,000**	
Pre-Design Investigations					
Install New Monitoring Wells					
Mobilization/Demobilization	1	LS	$25,000	$25,000	
Soil Borings	1,750	FT	$47	$82,250	Miller Drilling Quote.
2" Well Casing	1,750	FT	$15	$26,250	33-23-0101
2" Well Screen	1,750	FT	$25	$43,750	33-23-0256
Installation Oversight Labor	160	HR	$80	$12,800	CH2M HILL Estimate
SUBTOTAL				$190,050	
Contingency	30%			$57,015	10% Scope + 20% Bid
SUBTOTAL				**$247,065**	
Sample Existing and New Wells					
Groundwater Samples	21	LS	$110	$2,310	Contractor Estimate
QC Samples	4	LS	$110	$451	Contractor Estimate
Samping Labor	48	HRS	$80	$3,840	CH2M HILL Estimate - 2 persons
Equipment - meters	1	LS	$2,000	$2,000	CH2M HILL Estimate
Consumables	1	LS	$400	$400	CH2M HILL Estimate
Data Validation	13	HRS	$80	$1,004	CH2M HILL Estimate
Reporting	16	HRS	$80	$1,280	CH2M HILL Estimate
SUBTOTAL				$11,285	
Allowance for Misc. Items	20%			$2,257	
SUBTOTAL				$13,542	
Contingency	30%			$4,063	10% Scope + 20% Bid
SUBTOTAL				**$17,605**	
General Work for Replacement of Existing Private Wells					
Door-to-Door Survey	420	HR	$80	$33,600	
Home Well Abandonment	25,000	LF	$10	$250,000	Contractor Estimate
SUBTOTAL				**$283,600**	
Water Supply Connection					
New Water Main Pipeline	52,800	LF	$150	$7,920,000	10 miles
Connection to Municipal Supply System(100')	320	EA	$3,000	$960,000	
Water Meter Installation	320	EA	$200	$64,000	Unit cost from Aqua
SUBTOTAL				$8,944,000	
Contingency	25%			$2,236,000	10% Scope + 15% Bid
SUBTOTAL				**$11,180,000**	
Site Preparation					
Site Preparation	1	LS	$10,000	$10,000	
Silt Fencing and Erosion Controls (Temp.)	1	LS	$500	$500	
Surveying	1	LS	$1,000	$1,000	
SUBTOTAL				*$11,500*	
Injection Wells					
Mobilization	1	LS	$25,000	$25,000	
12-inch Borehole	900	LF	$70	$63,000	
8-inch Well Casing	900	LF	$35	$31,500	
Well Grout Seal	900	LF	$20	$18,000	
Well Development	224	HR	$250	$56,000	
Wellhead Piping, Vault, etc.	6	EA	$15,000	$90,000	
Installation Oversight Labor	160	HR	$80	$12,800	CH2M HILL Estimate
SUBTOTAL				*$296,300*	
Groundwater Treatment Systems					
Excavation for Building Foundation	1	LS	$20,000	$20,000	Contractor Estimate
Concrete Building Foundation	1	LS	$30,000	$30,000	Contractor Estimate
Concrete Footer	1	LS	$30,000	$30,000	Contractor Estimate
GW Treatment Building	1	LS	$70,000	$70,000	Contractor Estimate
Miscellaneous (Construction)	1	LS	$5,000	$5,000	CH2M HILL Estimate
Paved Access Road	125	TONS	$130	$16,250	CH2M HILL Estimate
Underground Utilities	1	LS	$50,000	$50,000	
Utility Tie-ins	1	LS	$20,000	$20,000	
Yard Piping	1	LS	$40,000	$40,000	
10,000 gal EqualizationTank	2	EA	$8,726	$17,452	33-10-9662
4" Venturi Flow Meter	4	EA	$4,000	$16,000	CH2M HILL Estimate
4" Steel Pipe (Exposed)	4,000	LF	$13	$50,320	33-26-0104
4" Steel Fittings (Exposed)	20	EA	$119	$2,380	33-27-0534/0552/0562
4" Check Valve	10	EA	$292	$2,920	33-27-0404
4" Butterfly Valve	10	EA	$544	$5,437	33-27-0424
Misc Plant Piping	1	LS	$35,000	$35,000	Allowance
Instumentation	1	LS	$20,000	$20,000	Allowance
Electrical	1	LS	$50,000	$50,000	Allowance
Pressure Gauge Assembly	4	EA	$276	$1,104	Grainger Estimate
Misc. (pipe stands, brackets, etc.)	1	LS	$50,000	$50,000	CH2M HILL Estimate
SUBTOTAL				*$531,863*	
Oxidant Materials					
Oxidant	1200	LBS	3.2	*$3,840*	Regenisis - includes materials and shipping
Electrical Service (GW Treatment Systems and Wells)					
Electrical service	1	LS	$10,000	$10,000	CH2M HILL Estimate
SUBTOTAL				*$10,000*	
SUBTOTAL (In Situ System)				$853,503	
Contingency	25%			$213,376	10% Scope + 15% Bid
SUBTOTAL (System)				**$1,066,878**	
SUBTOTAL - CAPITAL COSTS				**$12,810,148**	
Project Management	5%			$640,507	USEPA 2000, p. 5-13, $2MM-$10MM
Engineering Design and Planning	8%			$1,024,812	USEPA 2000, p. 5-13, $2MM-$10MM
Construction Management	6%			$768,609	USEPA 2000, p. 5-13, $2MM-$10MM
Permitting (Injection)	1	LS	$30,000	$30,000	CH2M HILL Estimate
Operations and Maintenance Manual	1	LS	$7,500	$7,500	CH2M HILL Estimate
Procurement	1	LS	$2,500	$2,500	CH2M HILL Estimate
Construction Completion and QA/QC Report	1	LS	$8,000	$8,000	CH2M HILL Estimate
TOTAL CAPITAL COST				**$15,292,000**	

Alternative: Groundwater Alternative 3b — **COST ESTIMATE SUMMARY**
Name: Insitu Upgradient Treatment, Public Water Supply Connection, and MNA

OPERATIONS AND MAINTENANCE COST

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Groundwater Monitoring (20 Outlying Homes)					
Groundwater Samples	20	LS	$110	$2,200	Contractor Estimate
QC Samples	4	LS	$110	$440	Contractor Estimate
Labor	48	HRS	$80	$3,840	CH2M HILL Estimate - 2 persons
Equipment - meters	1	LS	$500	$500	CH2M HILL Estimate
Consumables	1	LS	$200	$200	CH2M HILL Estimate
Data Validation	12	HRS	$80	$960	CH2M HILL Estimate
Reporting	16	HRS	$80	$1,280	CH2M HILL Estimate
SUBTOTAL				$9,420	
Allowance for Misc. Items	20%			$1,884	
SUBTOTAL				$11,304	
POETS System Maintenance					
O&M Staff (labor, overheads, vehicles, etc)	1	LS	$7,000	$7,000	
Carbon Usage	80	EA	$732	$58,560	1 change-out/yr (including existing)
SUBTOTAL				$65,560	
Treatment Building Property Leasing					
Property Leasing for TCE Treatment Building	30,000	SF	$7	$210,000	Estimate from OMI
Inspection and Monitoring					
Monthly Site Visits					
Labor for Visit/Compliance Sampling	96	HR	$80	$7,680	CH2M HILL Estimate - 1 person/mth
Effluent Sampling (GW)	12	LS	$110	$1,320	Contractor Estimate
Reporting (Quarterly)	4	LS	$8,000	$32,000	CH2M HILL Estimate
Other Expenses (Shipping, supplies, etc.)	1	LS	$1,000	$1,000	CH2M HILL Estimate
SUBTOTAL				$42,000	
Allowance for Misc. Items	20%			$8,400	
SUBTOTAL				$50,400	
Contingency	30%			$15,120	
SUBTOTAL (SYSTEM O&M)				**$65,520**	
ANNUAL O&M COST				**$352,000**	

PERIODIC COSTS

DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Groundwater Sampling Every 5 years	5					
Groundwater Samples		21	LS	$110	$2,310	Contractor Estimate
QC Samples		4	LS	$110	$440	Contractor Estimate
Groundwater Sampling, Level D						
Labor		48	HRS	$80	$3,840	CH2M HILL Estimate - 2 persons
Equipment - meters		1	LS	$500	$500	CH2M HILL Estimate
Consumables		1	LS	$200	$200	CH2M HILL Estimate
Data Validation		13	HRS	$80	$1,000	CH2M HILL Estimate
Reporting		16	HRS	$80	$1,280	CH2M HILL Estimate
SUBTOTAL					$9,570	
Allowance for Misc. Items		20%			$1,914	
SUBTOTAL					$11,484	
Contingency		30%			$3,445	10% Scope + 20% Bid
SUBTOTAL (ANNUAL)					**$15,000**	

PRESENT VALUE ANALYSIS

Discount Rate = 7.0%

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (7%)	PRESENT VALUE	NOTES
CAPITAL COST	0	$15,292,000	$15,292,000	1.000	$15,292,000	
O&M COST						
PROPERTY LEASING	1	$210,000	$210,000	0.935	$196,262	
GW MONITOR (20 OUTLYING HOMES) COST	1 to 30	$339,120	$11,304	12.409	$140,272	
POETS O&M COST	1 to 30	$1,966,800	$65,560	12.409	$813,537	
SYSTEM Monitoring O&M COSTS	1	$65,520	$65,520	0.935	$61,234	
PERIODIC COST	2	$15,000	$15,000	0.87	$13,102	
PERIODIC COST	4	$15,000	$15,000	0.76	$11,443	
PERIODIC COST	6	$15,000	$15,000	0.67	$9,995	
PERIODIC COST	8	$15,000	$15,000	0.58	$8,730	
PERIODIC COST	10	$15,000	$15,000	0.51	$7,625	
PERIODIC COST	12	$15,000	$15,000	0.44	$6,660	
PERIODIC COST	14	$15,000	$15,000	0.39	$5,817	
PERIODIC COST	16	$15,000	$15,000	0.34	$5,081	
PERIODIC COST	18	$15,000	$15,000	0.30	$4,438	
PERIODIC COST	20	$15,000	$15,000	0.26	$3,876	
PERIODIC COST	22	$15,000	$15,000	0.23	$3,386	
PERIODIC COST	24	$15,000	$15,000	0.20	$2,957	
PERIODIC COST	26	$15,000	$15,000	0.17	$2,583	
PERIODIC COST	28	$15,000	$15,000	0.15	$2,256	
PERIODIC COST	30	$15,000	$15,000	0.13	$1,971	
		$18,098,440			$16,593,224	
TOTAL PRESENT VALUE OF ALTERNATIVE					**$16,590,000**	

SOURCE INFORMATION

1. United States Environmental Protection Agency. July 2000. A Guide to Preparing and Documenting Cost Estimates During the Feasibility Study. EPA 540-R-00-002. (USEPA, 2000).

ROD TABLE 6
Appendix A
Potential Chemical-Specific Applicable or Relevant and Appropriate Requirements
PVGCS Feasibility Study

Act/Authority	Criteria/Issues	Citation	Brief Description	Applicability
Resource Conservation and Recovery Act	Identification and Listing of Hazardous Waste	40 CFR 261	Defines those solid wastes which are subject to regulation as hazardous wastes under 40 CFR Parts 262-265 and 270.	ARAR for wastes or treatment residues which are hazardous as defined by RCRA and are to be disposed of off-site.
Federal Safe Drinking Water Act	National Primary Drinking Water Standards - Maximum Contaminant Level Goals (MCLGs) and Maximum Contaminant Levels (MCLs)	40 CFR 141	Establishes health-based standards for public drinking water systems. Also establishes drinking water quality goals set at levels at which no adverse health effects are anticipated, with an adequate margin of safety. The NCP specifically states that MCLs will be used as ARARs for useable aquifers rather than the more stringent MCLGs.	ARAR because the site groundwater aquifer is classified as a Class IIA Source of Drinking Water. The MCLs have been applied to the remediation of groundwater.
Federal Safe Drinking Water Act	National Secondary Drinking Water Standards-Secondary MCLs	40 CFR 143	Establishes standards for public drinking water systems for those contaminants which impact the aesthetic qualities of drinking water (secondary MCL).	To Be Considered (TBC). Secondary MCLs are based on aesthetic criteria and do not reflect public health concerns. They are considered TBC and will be attained where possible.
Federal Resource Conservation and Recovery Act	Groundwater Protection Standards and Maximum Concentration Limits	40 CFR 264, Subpart F	Establishes standards for groundwater protection for several metals and pesticides.	ARAR. These maximum concentration limits are applicable to RCRA regulated units and are considered relevant and appropriate.
State of New Jersey Statutes and Rules	Groundwater Quality Standards	N.J.A.C. 7:9-6 Groundwater Quality Standards	Establishes standards for the protection of ambient groundwater quality. Used as the primary basis for setting numerical criteria for groundwater cleanups.	ARAR for Class IIA aquifers.
Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs)	Maximum Contaminant Levels	A-280 Amendments	Establishes State criteria for drinking water.	ARAR.

ROD TABLE 6
Appendix A
Potential Chemical-Specific Applicable or Relevant and Appropriate Requirements
PVGCS Feasibility Study

Act/Authority	Criteria/Issues	Citation	Brief Description	Applicability
State of New Jersey Statutes and Rules	Drinking Water Standards-Maximum Contaminant Levels (MCLs)	N.J.A.C. 7:10 Safe Drinking Water Act	Establishes MCLs that are generally equal to or more stringent the SDWA MCLs.	ARAR. The Site aquifer is a drinking water supply source.
State of New Jersey Statutes and Rules	National Secondary Drinking Water Standards-Secondary MCLs	N.J.A.C. 7:10-7 Safe Drinking Water Act	Establishes standards for public drinking water systems for those contaminants which impact the aesthetic qualities of drinking water.	TBC. Secondary MCLs are based on aesthetic criteria and do not reflect public health concerns. They are considered TBCs in that they will be attained where possible.
N.J.D.E.P. Division of Water Supply	Water Supply Allocation Rules	N.J.A.C. 7:19	Regulates new water supply connections and extensions, responsible for managing New Jersey's water supply	Potential ARAR for Alternate Public Water Supply/Municipal Well Connection

ROD TABLE 6
Appendix A
Potential Action-Specific Applicable or Relevant and Appropiate Requirements
PVGCS Feasibility Study

Act/Authority	Criteria/Issues	Citation	Brief Description	Applicability
Discharge of Groundwater or Wastewater				
Water Pollution Control Act	Protection of water	33 U.S.C. 1251	Protects and maintains the chemical, physical, and biological integrity of the nation's water.	Potential ARAR for remedial actions which may affect water quality.
Worker and Community Right to Know Act	Protects workers and community	P.L. 1983c.315 P.L. 1985c.543 Executive Order #161	Notification of presence of hazardous substances to State Emergency Planning Commissions and to local Emergency Planning Committees.	ARAR. Applies to all on-site treatment alternatives.
Safe Drinking Water Act	Protects public water supply wells	N.J.S.A. 58:12A	Regulates periodic testing of Public Community Water Systems.	ARAR. Periodic water supply monitoring may be part of the remediation alternatives.
Interim Safe Drinking Water Testing Schedule	Protects public water supply wells	N.J.A.C. 7:10-14.1 et.seq.	Requires periodic testing, analysis, and reporting for Public Community Water Systems.	ARAR. Periodic water supply monitoring may be part of the remediation alternatives.
New Jersey Safe Drinking Water Act	Protects public water supply wells	N.J.A.C. 7:10	Sets standards for drinking water including MCLs, disinfecting requirements, secondary drinking water regulations, and monitoring requirements.	Potential ARAR if criteria are more stringent than the Federal MCLs.
General Remediation				
Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and Superfund Amendments and Reauthorization Act of 1986 (SARA)	National Contingency Plan	40 CFR 300, Subpart E	Outlines procedures for remedial actions and for planning and implementing off-site removal actions.	ARAR.
State of New Jersey Statutes and Rules	Technical Requirements for Site Remediation	N.J.A.C. 7:26E	Established minimum regulatory requirements for investigation and remediation of contaminated sites in New Jersey.	ARAR.

ROD TABLE 6
Appendix A
Potential Action-Specific Applicable or Relevant and Appropiate Requirements
PVGCS Feasibility Study

Act/Authority	Criteria/Issues	Citation	Brief Description	Applicability
Federal Occupational Safety and Health Act	Worker Protection	29 CFR 1904	Requirements for recording and reporting occupation injuries and illnesses	ARAR. Under 40 CFR 300.38, requirements of OSHA apply to all activities which fall under jurisdiction of the National Contingency Plan.
Water Pollution Control	Notification of Spills	NJAC 7:21(E)	Immediate notification of any spill of hazardous substances.	Potential ARAR for remedial alternatives having potential for a spill of a hazardous substance.
Noise Control Act	Restrictions of Noise	NJSA 13:1G-1 et.seq.	Prohibits and restricts noise which unnecessarily degrades the quality of life.	Potential ARAR for all remedial action.
Disposition of Material Generated During Site Investigations (NJDEP)	Investigation derived waste (IDW) management	NJDEP's Guidance Document	Provides guidance on the disposition of IDW.	Potential ARAR. To be considered during investigation.
Noise Pollution	Restrictions of Noise	NJAC 7:29-1	Sets maximum limits of sound from any industrial, commercial, public service or community service facility.	Potential ARAR for all remedial actions.
Federal Occupational Safety and Health Act	Worker Protection	29 CFR 1904	Worker Protection	ARAR. Under 40 CFR 300.38, requirements of OSHA apply to all activities which fall under jurisdiction of the National Contingency Plan.
General Requirements for Permitting Wells	Well Permitting	NJAC 7:9-7	Regulates permit procedures, general requirements for drilling and installation of wells, licensing of well driller and pump installer, construction specification, and well casing.	Potential ARAR when installing new wells or if existing wells should require modification.
Sealing of Abandoned Wells	Well Abandonment Procedures	NJAC 7:9-9	General requirements for sealing of all wells (e.g., single cased, multiple cased, hand dug, test wells, boreholes and monitoring wells, abandoned wells).	Potential ARAR if any existing wells need to be abandoned and sealed.
Well Drillers and Pump Installers Act	Drilling Contractor Requirements	NJSA 58:4A-5 et.seq.	Well drillers licensing, supervision, inspection and sampling.	Potential ARAR when additional wells are installed.

ROD TABLE 6
Appendix A
Potential Action-Specific Applicable or Relevant and Appropiate Requirements
PVGCS Feasibility Study

Act/Authority	Criteria/Issues	Citation	Brief Description	Applicability
Requirement for Groundwater Monitoring	Groundwater Monitoring	N.J.A.C. 7:26-9	Groundwater monitoring system requirements.	Potential ARAR for any remedial alternative requiring groundwater monitoring.
Establishment of New Water Supply				
State of New Jersey Division of Water Supply	Water Supply Allocation Rules	N.J.A.C. 7:19	Regulates new water supply connections and extensions, responsible for managing New Jersey's water supply	Potential ARAR for Alternate Public Water Supply/Municipal Well Connection

ROD TABLE 6
Appendix A
Potential Location-Specific Applicable or Relevant and Appropriate Requirements
PVGCS Feasibility Study

Act/Authority	Criteria/Issues	Citation	Brief Description	Applicability
Executive Order Floodplain Management	Floodplain Management	Exec. Order No. 11988 40 CFR 2 6:302(b) and Appendix A	Requires federal agencies to evaluate the potential effects of actions they may take in a floodplain to avoid, to the maximum extent possible, the adverse impacts associated with direct and indirect development of a floodplain.	Potential ARAR if remedial activities take place in or near a 100-year or 500-year floodplain.
Federal Flood Plains Regulatory Requirements	Regulatory Requirements	(RCRA Location Standards (40 CFR 264.18)	This regulation outlines the requirements for constructing a RCRA facility on a 100-year flood plain.	Potential ARAR if remedial alternatives include construction in or near a 100-year floodplain.
New Jersey Department of Environmental Protection Division of Land Use Program	Permitting Requirements	N.J.A.C. 7:7A and N.J.A.C. 7:13	Regulates the soil disturbance activities within wetlands, wetland transition zones and flood hazard zones	Potential ARAR if investigation activities will be completed within wetlands, wetland transition areas or flood hazard zones.
National Wildlife System	Protects national wildlife	16 U.S.C. 668 50 CFR 27	Restricts activities within a National Wildlife Refuge.	Potential ARAR if site is on or adjacent to a wildlife refuge.
Clean Water Act	Prohibits discharge of dredged or fill material into wetlands	33 U.S.C. 1251 Section 404, 40 CFR 230, 231	Prohibits discharge of dredged or fill material into wetlands without a permit. Preserves and enhances wetlands.	Potential ARAR for remedial alternatives which involve disturbance to wetlands.
Endangered Species Act	Protects endangered species	16 U.S.C. 1531	Restricts activities where endangered species may be present.	Potential ARAR if endangered species are observed at the site during ecological site assessments.
Policy Floodplains/Wetlands Assessment	Floodplain assessment	EPA 1985 Statement	Provides federal policy for the assessment of floodplains and wetlands	Potential ARAR for remedial alternatives that affect wetlands and floodplains.

ROD TABLE 6
Appendix A
Potential Location-Specific Applicable or Relevant and Appropriate Requirements
PVGCS Feasibility Study

Act/Authority	Criteria/Issues	Citation	Brief Description	Applicability
Farmland Protection Policy Act (FPPA) of 1980 and 1995	Protects farmland from nonagricultural uses	7 U.S.C. 4201 et seq	Instructs the Department of Agriculture, in cooperation with other agencies and other units of the Federal government, to develop criteria for identifying the effects of Federal programs on the conversion of farmland to nonagricultural uses. It does not provide a basis for any action.	Potential ARAR for remedial alternatives that affect farmlands within the site.
National Historic Preservation Act	Protects historic places	16 U.S.C. 470	Requires federal agencies to take into account the effect of any federally-assisted undertaking or licensing on any district, site, building, structure, or object that is included in or is eligible for inclusion in the National Register of Historic Places.	Potential ARAR. If remedial alternatives affect areas on the National Register of Historic Places.
U.S. Army Corps of Engineers Nationwide Permit Program	Army Corp. of Engineers Permit Program	33 CFR 330	Prohibits activity that adversely affects a wetland if a practical alternative that has less effect is available.	Potential ARAR for remedial alternatives which have the potential to affect wetlands.
Historic Sites, Buildings and Antiquities Act	Protects national landmarks	16 U.S.C. ss 461-457	Requires federal agencies to consider the existence and location of landmarks on the National Registry of Natural Landmarks to avoid undesirable impacts on such landmarks.	Potential ARAR if remediation will impact areas included on the National Registry of Natural Landmarks.
Executive Order Protecting Wetlands	Protection of Wetlands	Executive Order No. 11990	Requires Federal agencies to minimize the destruction, loss, or degradation of all wetlands affected by Federal activities.	Potential ARAR for remedial alternatives which have the potential to affect wetlands.
Fish and Wildlife Coordination Act	Requires approval for modification of water body	16 U.S.C. 661 40 CFR 2 6:302(g)	Requires consultation with the U.S. Fish and Wildlife Services when a Federal department or agency proposes or authorizes any modification of any stream or other water body, and adequate provision for protection of fish and wildlife resources.	Potential ARAR since any disturbance and restoration or replacement of wetlands must be coordinated with the Fish and Wildlife Service.
Federal Endangered and Non-Game Species Act	Protection of threatened and endangered species	N.J.S.A. 23:2A-1	Standards for the protection of threatened and endangered species.	Not an ARAR because no listed species identified at the site.

ROD TABLE 6
Appendix A
Potential Location-Specific Applicable or Relevant and Appropriate Requirements
PVGCS Feasibility Study

Act/Authority	Criteria/Issues	Citation	Brief Description	Applicability
Flood Hazard Area Regulations	Protection of floodplains	N.J.A.C. 7:13	Protects floodplains through permitting requirements for construction and development activities	Potential ARAR if remedial activities are located in or near a 100- or 500-year floodplain.
Flood Hazard Area Control Act	Delineates flood hazard areas	N.J.S.A. 58: 16A-50	Delineates flood hazard areas and regulates use.	Potential ARAR if remedial activities are in or near a 100- or 500-year floodplain.
Wetland Act of 1970	Establishes wetland regulated activities	N.J.S.A. 13:9A-1 et. seq.	Establishes listing and permitting requirements for regulated activities	Potential ARAR. Establishes listing and permitting requirements for regulated activities
Freshwater Wetlands Protection Act	Establishes freshwater wetlands regulated activities	N.J.S.A. 13:9B	Establishes listings and permitting requirements for regulated activities in state freshwater wetlands	Potential ARAR. Establishes listings and permitting requirements for regulated activities in state freshwater wetlands
Open Lands Management	Considers recreational projects during remediation	N.J.A.C. 7:2-12.1 et. seq.	Considers impact of remedial actions on recreational projects funded by Open Lands Management Grants.	Potential ARAR for remedial actions on recreational projects funded by Open Lands Management Grants.
Natural Areas System	Protects natural area sites	N.J.A.C. 7:2-11	Protects natural area sites listed under the Natural Areas Register.	Potential ARAR if remedial actions occur on natural area sites listed under the Natural Areas Register.
State Trails System	Protects state trails	N.J.S.A. 13:8-30 et. seq.	Requires that use of trail does not interfere with nature; maintains natural and scenic qualities.	Potential ARAR. Requires that use of trail does not interfere with nature; maintains natural and scenic qualities.
New Jersey Wild and Scenic Rivers System	Protects Scenic River systems	N.J.S.A. 13:8-45 et. seq.	Governs component river area, flood hazard area, or part of state park, wildlife refuge or similar area.	Potential ARAR. Governs component river area, flood hazard area, or part of state park, wildlife refuge or similar area.

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ROD TABLE 6
Appendix A
Potential Location-Specific Applicable or Relevant and Appropriate Requirements
PVGCS Feasibility Study

Act/Authority	Criteria/Issues	Citation	Brief Description	Applicability
New Jersey Threatened Plant Species	Lists threatened plant species.	New Jersey's Threatened Plan Species	Lists threatened plant species.	Potential ARAR if remedial actions impact threatened plant species.
Endangered Plant/Animal Species Habitats	Lists threatened habitats where endangered species occur.	New Jersey's Endangered Species Act	Lists threatened habitats where endangered species occur.	Potential ARAR. Lists threatened habitats where endangered species occur.

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APPENDIX III Risk Tables

RISK TABLE 1
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

Scenario Timeframe: Current/Future
Medium: Regional Groundwater
Exposure Medium: Regional Groundwater

Exposure Point	Chemical of Concern	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration (EPC)	EPC Units	Statistical Measure
		Min	Max					
Tap Water	Trichloroethene	4	21	µg/l	2/14	21	µg/l	Max.

Max. – Maximum Detected Concentration

* Note that in addition to the monitoring well data represented in the table, 20 private wells that had concentrations detected exceeding the State drinking water standard of 1 ug/l and the Federal drinking water standard of 5 ug/l, were evaluated as part of the HHRA, which is represented as Regional Groundwater. These 20 private wells were sampled as part of the RI and all 20 exceeded the State and Federal drinking water standards with concentrations ranging from 5.9 to 35 ug/l.

In addition, as described in the OU2 RI Section 5, EPA conducted four groundwater sampling events from March 2008 through August 2009 at a total of 204 residential wells. During the initial event in March 2008, 22 residential wells were sampled. Of the 22 wells sampled, TCE was identified in 14 of the wells at concentrations above the NJDEP groundwater quality standard of 1 ug/L. At one of the 14 locations, the TCE concentration also exceeded the Federal MCL of 5 ug/L. These analytical results are tabulated in RI Appendix I.

The three remaining groundwater sampling events were conducted by EPA in March, May, and August 2009 at 182 residential wells. Based on the report prepared by EPA's Division of Environmental Science and Assessment (DESA), dated November 4, 2009 and contained in RI Appendix I, TCE contamination was identified above the NJDEP groundwater quality standard of 1 ug/L in 33 of the residential wells. At 3 of these 33 locations, the TCE concentration also exceeded the Federal MCL of 5 ug/L.

In summary, EPA's analytical results from 204 residential groundwater samples identified the presence of TCE contamination above the NJDEP groundwater quality standard in 47 residential wells, and above both the NJDEP standard and Federal MCL in 4 of the residential wells.

Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

This table presents the chemicals of concern (COCs) and exposure point concentrations (EPCs) for each of the COCs detected in groundwater (i.e., the concentration that will be used to estimate the exposure and risk from each COC). The table includes the range of concentrations detected for each COC, as well as the frequency of detection (i.e., the number of times the chemical was detected in the samples collected at the site), the EPC and how it was derived.

RISK TABLE 2
SELECTION OF EXPOSURE PATHWAYS

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current/ Future	Groundwater	Groundwater	OU2 Regional Groundwater Aquifer	Residents	Adult	Ingestion/Dermal/ Inhalation	Off-site	Quant	Current and future residents may use groundwater as a potable supply of water.
					Child	Ingestion/Dermal/ Inhalation	Off-site	Quant	Current and future residents may use groundwater as a potable supply of water.
					Adult/Child	Ingestion/Dermal/ Inhalation	Off-site	Quant	Current and future residents may use groundwater as a potable supply of water.
				Industrial Worker	Adult	Ingestion	On-site	Quant	Industrial workers may use groundwater as a potable supply of water.
			OU2 Regional Groundwater Aquifer – Water Vapors at Showerhead	Residents	Adult	Ingestion/Dermal/ Inhalation	Off-site	Quant	Current and future residents may use groundwater as a potable supply of water.
					Child	Ingestion/Dermal/ Inhalation	Off-site	Quant	Current and future residents may use groundwater as a potable supply of water.
					Adult/Child	Ingestion/Dermal/ Inhalation	Off-site	Quant	Current and future residents may use groundwater as a potable supply of water.
				Industrial Worker	Adult	Ingestion	On-site	Quant	Industrial workers may use groundwater as a potable supply of water.

Quant = Quantitative risk analysis performed.

Summary of Selection of Exposure Pathways

The table describes the exposure pathways associated with the groundwater that were evaluated for the risk assessment, and the rationale for the inclusion of each pathway. Exposure media, exposure points, and characteristics of receptor populations are included.

RISK TABLE 3

Non-Cancer Toxicity Data Summary

Pathway: Oral/Dermal

Chemical of Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Absorp. Efficiency (Dermal)	Adjusted RfD (Dermal)	Adj. Dermal RfD Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfD: Target Organ	Dates of RfD:
Trichloroethene	Chronic	-----	-----	-----	-----	-----	-----	-----	-----	-----

Pathway: Inhalation

Chemical of Concern	Chronic/ Subchronic	Inhalation RfC	Inhalation RfC Units	Inhalation RfD	Inhalation RfD Units	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfD: Target Organ	Dates:
Trichloroethene	Chronic	-----	-----	-----	-----	-----	-----	-----	-----

Key

na: No information available
IRIS: Integrated Risk Information System, U.S. EPA
NCEA: National Center for Environmental Assessment
HEAST: Health Effects Assessment Summary Tables
EPA: Environmental Protection Agency
CNS: Central Nervous System

Summary of Toxicity Assessment

This table provides non-carcinogenic risk information which is relevant to the contaminants of concern in groundwater. When available, the chronic toxicity data have been used to develop oral reference doses (RfDs) and inhalation reference doses (RfDi).

RISK TABLE 4

Cancer Toxicity Data Summary

Pathway: Oral/Dermal

Chemical of Concern	Oral Cancer Slope Factor	Units	Adjusted Cancer Slope Factor (for Dermal)	Slope Factor Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
Trichloroethene	1.3E-02	$(mg/kg/day)^{-1}$	1.3E-02	$(mg/kg/day)^{-1}$	2A	CalEPA	2008

Pathway: Inhalation

Chemical of Concern	Unit Risk	Units	Inhalation Slope Factor	Slope Factor Units	Weight of Evidence/ Cancer Guideline Description	Source	Date
Trichloroethene	2E-06	$(\mu g/m3)^{-1}$	7E-03	$(mg/kg/day)^{-1}$	2A	CalEPA	2002

Key:

CalEPA – California Environmental Protection Agency
EPA – U.S. Environmental Protection Agency
IRIS: Integrated Risk Information System. U.S. EPA
na: No information available

EPA Weight of Evidence:

A - Human carcinogen
B1 - Probable Human Carcinogen-Indicates that limited human data are available
B2 - Probable Human Carcinogen-Indicates sufficient evidence in animals associated with the site and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E- Evidence of noncarcinogenicity
2A - Probable human carcinogen
2B - Possible human carcinogen

Summary of Toxicity Assessment

This table provides carcinogenic risk information which is relevant to the contaminants of concern in groundwater. Toxicity data are provided for both the oral and inhalation routes of exposure.

RISK TABLE 5

Risk Characterization Summary - Noncarcinogens

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Risk			
					Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	OU2 Regional Groundwater Aquifer	Trichloroethene	N/A	N/A	N/A	N/A	N/A
							Hazard Index Total	N/A

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Risk			
					Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	OU2 Regional Groundwater Aquifer – Shower Head	Trichloroethene	N/A	N/A	N/A	N/A	N/A
							Hazard Index Total	N/A

N/A – not available at this time due to no reference dose being available – non-cancer hazards are underestimated
Inhalation – Inhalation at showerhead

Summary of Risk Characterization - Non-Carcinogens

The table presents hazard quotients (HQs) for each route of exposure and the hazard index (sum of hazard quotients) for all routes of exposure for groundwater. The Risk Assessment Guidance for Superfund states that, generally, a hazard index (HI) greater than 1 indicates the potential for adverse non-cancer effects.

RISK TABLE 6

Risk Characterization Summary - Carcinogens

Scenario Timeframe: Current/Future
Receptor Population: Resident
Receptor Age: Adult/Child

Medium	Exposure Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
				Ingestion	Dermal	Inhalation	Exposure Routes Total
Groundwater	Groundwater	OU2 Regional Groundwater Aquifer	Trichloroethene	4.1E-06	6.7E-07	3.1E-05	3.6E-05
						Total Risk =	3.6E-05

Inhalation – Inhalation at showerhead

Summary of Risk Characterization - Carcinogens

The table presents cancer risks for groundwater exposure for all routes of exposure combined. As stated in the National Contingency Plan, the point of departure is 10^{-6} and the acceptable risk range for site-related exposure is 10^{-6} to 10^{-4}.

APPENDIX IV Responsiveness Summary

APPENDIX IV

RESPONSIVENESS SUMMARY
POHATCONG VALLEY GROUNDWATER CONTAMINATION
SUPERFUND SITE
OPERABLE UNIT 2

INTRODUCTION

This Responsiveness Summary provides a summary of the public's comments and concerns regarding the Proposed Plan for the Operable Unit 2 portion for the Pohatcong Valley Groundwater Contamination Superfund Site (Site), and EPA's responses to those comments, in accordance with the requirements set forth in 40 CFR 300.430 (f) (3). At the time of the public comment period, EPA proposed its preferred alternative for groundwater contamination. Public comments were provided in oral form during the April 29, 2010 Public Meeting, and in written form during the Public Comment Period of April 16, 2010 through May 17, 2010.

PUBLIC MEETING AND COMMENTS

EPA established a public comment period to solicit community input in the remedy selection process. EPA's Proposed Plan for OU2 was released to the public on April 16, 2010. A copy of the Proposed Plan was placed in the Administrative Record and was made available in the information repository at the Warren County Health Department Offices, in Oxford, Warren County, New Jersey. A public notice published on April 16, 2010, in the Express Times, advised the public of the availability of the Proposed Plan. The notice also announced the opening of a public comment period, invited all interested parties to attend the upcoming public meeting, and provided a link to the Region 2 website containing additional information. The public comment period extended from April 16, 2010 through May 17, 2010. The oral comments and written comments received by EPA and associated responses are presented below.

A public meeting was held on April 29, 2010, by EPA at the Washington Borough Municipal Building Courtroom in Washington Borough, New Jersey. The attendance list is provided as Attachment 1. The meeting consisted of a brief presentation of the Pohatcong Valley OU2 Remedial Investigation (RI) findings, the OU2 Feasibility Study (FS) results, and the proposed selected remedial alternative in the Proposed Plan, followed by an open question and answer period. A number of people in the audience provided oral comments and questions and these comments and associated responses were summarized into major categories to facilitate presentation in written format.

After reviewing all public comments, EPA determined that the preferred alternative presented in the Proposed Plan, Alternative 2b, will become the selected remedy for the OU2 portion of the Site, as described in the attached OU2 Record of Decision (ROD).

This Responsiveness Summary is divided into the following sections:

I. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS: This section provides the history of community involvement and interests regarding the Pohatcong Valley Groundwater Contamination Superfund Site;

II. PUBLIC MEETING OVERVIEW: This section briefly describes the public meeting held on April 29, 2010 and includes historical information about the Pohatcong Valley Groundwater Contamination Superfund Site; and

III. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS, AND RESPONSES: This section describes written and verbal comments received from various people or organizations during the public comment period, and provides EPA's responses.

The last section of this Responsiveness Summary includes attachments, which document public participation in the remedy selection process for this Site. They are as follows:

ATTACHMENT A contains the Proposed Plan that was distributed to the public for review and comment;

ATTACHMENT B contains the public notice that appeared in the Express Times;

ATTACHMENT C contains the transcript of the public meeting; and

ATTACHMENT D contains the written comments received by EPA during the public comment period.

I. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

The level of community involvement and concern with the Site has been high. Local officials and residents first learned of contamination that later became known as the Pohatcong Valley Groundwater Contamination Superfund Site in the late 1970's when two public water supply wells became contaminated with Trichloroethylene and Tetrachloroethylene (TCE and PCE), and the State and Warren County Health Department became involved, investigating the extent of the groundwater contamination. The State and local health officials continued studying the Site, and recommended that it be placed on the National Priorities List (NPL) in 1989. After subsequent investigations, the State installed public water supply connections throughout parts of Washington and Franklin Township.

The Site was included on the NPL on March 30, 1989. Since then, EPA has conducted two extensive Remedial Investigations and Feasibility Studies (RI/FSs) which were completed in 2005 and 2010, for OU1 and OU2, respectively. A third RI/FS for OU3 is ongoing. Concurrently, as per the July 2006 OU1 Record of Decision, EPA has been

conducting two Remedial Designs for the OU1 ROD remedy to address the TCE and PCE-contaminated groundwater source areas. EPA has also been conducting a community relations program to meet the community's need for information and to support community participation in seeking remedies for the Site. Since 1990, EPA has held several public meetings and public availability sessions, and met with local officials regarding various Site-related matters, in an effort to keep residents and local officials informed of the Site-related activities. In addition to the public participation responsibilities associated with the Site, EPA continues to have regular communications with various local and state officials regarding the Site. In 2005 and 2006, EPA met with township officials and interested parties to address concerns and to assure that future development will not have a negative impact on planned cleanup activities at the Site. EPA met on-site with Congressman Scott Garrett of the 5th District of NJ, to discuss site status and to discuss EPA's vapor intrusion studies. In 2007, EPA met local citizens and Franklin Township School officials to discuss a planned vapor intrusion remediation for a local elementary school in Franklin Township. EPA also held a public availability session at the Washington Borough Court Room, in Washington Borough, to discuss the status of EPA's vapor intrusion investigation and to answer site-related questions and concerns. Since the OU1 remedy was selected in July 2006, EPA has also mailed out hundreds of information flyers in the form of community updates, to provide information to the public on various aspects of site activities. EPA continues to brief officials and representatives of the Warren County Health Department, the New Jersey Department of Health and NJDEP to disseminate information, coordinate activities, and to discuss various aspects of site activities. Community interest in the cleanup of the Site remains high and EPA remains responsive to addressing issues and concerns raised by local officials and the community.

II. PUBLIC MEETING OVERVIEW

The public meeting for the Pohatcong Valley Groundwater Contamination Superfund Site began at approximately 6:00 p.m. on April 29, 2010 with presentations by EPA, and its contractor, CH2MHill Corporation. Approximately 60 residents and state and local officials attended the meeting. EPA representatives at the meeting were Kim O'Connell, Section Chief; Stephen Cipot, Remedial Project Manager for the Site; Charles Nace, Risk Assessor; Robert Alvey, Geologist; and Wanda Ayala, Community Relations Coordinator. In addition, CH2MHill Corporation representative John Mason, Project Manager, attended.

Ms. Ayala introduced each of the speakers and explained that the purpose of the meeting was to present EPA's Proposed Plan for the cleanup of contaminated OU2 groundwater at the Site. Ms. Ayala presented a brief overview of how the Superfund process works. She described how a site may be placed onto the National Priorities List and how a remedy is selected. She indicated that sites such as the Pohatcong Valley Groundwater Contamination Superfund Site are often complex and are frequently addressed in stages called operable units. She mentioned that the studies conducted to characterize contamination and evaluate the risks to human health and the environment are reported in the RI and the results of studies to identify and evaluate remedial alternatives to address

the site contamination are reported in the FS. Once the FS is completed she said, EPA develops a Proposed Plan and presents EPA's preferred cleanup alternative to the public.

Ms. Ayala informed the public that copies of the Proposed Plan are available at the entrance to the meeting room, and that the OU2 RI and FS Reports and other site-related documents are available at the local information repositories listed in the Proposed Plan. Ms. Ayala stated that EPA would accept comments throughout the remainder of the public comment period, and that after considering public comments, EPA will document the selected cleanup alternative in the ROD. Once the ROD is final, the remedial design process begins and the specifications and engineering plans for the selected remedy are developed. She concluded by saying that Remedial Action is initiated after the design is completed and is the stage where construction and cleanup activity occur at a site. Ms. Ayala then introduced Mr. Cipot.

Mr. Cipot presented an update of the status of activities that EPA has been involved with at the Site. These included the June 2005 Remedial Investigation (RI) and the Feasibility Study Report (FS) Reports, the OU1 Remedial Design and Remedial Action (RD/RA) activities, and the initiation of OU3 RI/FS work plan activities. He then presented a summary of the OU2 RI/FS findings. Mr. Cipot discussed the risks posed by these findings, as described in the OU2 RI. Mr. Cipot described the Remedial Alternatives that were developed to address OU2 groundwater, and the Preferred Alternative. Each alternative is summarized in the Proposed Plan along with the rationale EPA developed for selection of a preferred alternative for the OU2 groundwater.

Ms. Ayala then invited the stakeholders present at the meeting to offer comments and ask questions. EPA staff and EPA's contractor, CH2MHill, responded to questions and comments.

III. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS, AND RESPONSES: This section describes written and verbal comments received from various people or organizations during the public comment period, including those made at the public meeting, and are summarized below.

Comments Received at the Public Meeting

Issues and comments raised during the public meeting regarding the OU2 remedy for the Site are summarized below and are organized into the following categories:

Residential Wells
Groundwater Contamination Plume
Sources of Groundwater Contamination
Schools
Roles of the Municipalities and Private Water Companies
Proposed Remedy
Health Concerns

Residential Wells

Comment 1. What are the outliers?

EPA Response: Outliers or "outlying areas" refers to a term used in the FS to describe properties in the OU2 Study Area that may be located some distance from major water line routes. For these properties, connection to water mains may not be feasible and instead, point of entry treatment systems (POETS) would be provided. For costing purposes, for Alternative 2a, the FS estimated that 320 POETS will be installed in the OU2 Study Area, existing NJDEP POETS would be maintained, and 20 homes located in outlying areas that would be treated by POETS, if needed. "Outliers" refers to an estimate of 20 or so residences which could potentially be serviced by POETS during implementation of the remedy, if Alternative 2b were selected. This estimate was developed for FS costing purposes. The actual number of such residences could be different, and will be identified during the remedial design and remedial action (RD/RA) phases of the remedy. Alternative 2b differs from Alternative 2a, in that most properties within the OU2 Study Area of the valley will be connected to the public water supply, and private wells at outlying locations will be treated by POETS (if needed).

Comment 2. Regarding the water connection aspect of the remedy proposed as Alternative 2b – what is the cost to the homeowner? How will property restoration be handled?

EPA Response: EPA or the potentially responsible party(s) will cover the cost of hooking up homes to the public water lines, once the lines are installed, and EPA will also pay to close the current residential wells. EPA or the potentially responsible party(s) will perform and pay for all property restoration activities related to the private well hook-ups and well closures. Homeowners would be responsible for the payment of the water bill afterward. Mr. Hadley, of the New Jersey American Water Company, indicated that the typical cost of water provided to homeowners is approximately six dollars per thousand gallons of water.

Comment 3. Will I have a choice to accept public water, but still use my own well if it is not contaminated?

EPA Response: In order to protect public health in the long-term, it is EPA's preference to close wells that are impacted or threatened by the contaminant plume at the Site. While EPA is not currently planning to mandate the sealing of the wells or to take private wells, we will be speaking with individuals impacted by this remedy as the project moves on to try to address any individual concerns they may have. It is also possible that local municipalities, many of which have well closure ordinances, may enforce and/or pass restrictions on the use of private wells. However, this is a local issue and EPA does not enforce local ordinances.

Comment 4. What is the cost of buying water versus having a POET in one's home?

EPA Response: A POETS that is installed, sampled, and maintained by the government or potentially responsible party(s) will have no costs passed onto the homeowner. For the alternative involving the public waterline, the homeowner would assume the cost of a monthly rate bill once the line is installed and operating. This cost can vary based on individual water usage.

Comment 5. I have several koi ponds on my property and am concerned that public water may harm my fish. Can I use my private well to refill the pond, while using public water in my home?

EPA Response: EPA's preference is to expand the public water supply lines and connect homes and businesses impacted or threatened by the Site's groundwater contaminant plume to the public water supply, and close open wells. We will talk to individual residents about their particular concerns during the remedial design phase, but our goal will be to prevent anyone from coming into contact with contaminated groundwater by sealing all impacted and threatened wells in the area.

Comment 6. Will public water go to Stewartsville Road in New Village? I would hate to lose my well.

EPA Response: Yes, under the proposed remedy, public water would go to that area.

Comment 7. I live in Franklin Township and have had my well tested and have had low levels, below 1 ppb of TCE, in my well. I am waiting for results of this years sampling event. If the TCE levels are above 1 part per billion, will EPA or the state install a POET at my residence or will I have to wait?

EPA Response: It is EPA's understanding that the state will install a POETS if the TCE levels in your well are at or exceed 1 part per billion, and that the POETS would be sampled and maintained by the State of New Jersey until the OU2 remedy is implemented for the Site.

Comment 8. Are there certain companies that do the water testing that are related to your study? How would one get information about getting their water tested?

EPA Response: EPA has been using its own laboratory in Edison, New Jersey, to analyze water samples collected from residential wells. If residents would like to have their water tested, they can contact the Warren County Health Officer, Kevin Cavotta, for information.

Comment 9. If there is VOC contamination in the municipal wells and I have a well with no VOCs in it, then if I am hooked up to public water, I will be getting water from a well that has VOC contamination.

EPA Response: Some, but not all, of the area public supply wells treat groundwater to remove VOCs before distributing the water. However, the water companies must sample regularly and assure that the water is meeting all State standards prior to distribution.

Groundwater Contamination Plume

Comment 10. What is the potential for the plume to grow over time? Is the plume stable?

EPA Response: The plume is roughly in a steady-state condition. The plume is not spreading in an appreciable manner, and we do not expect the plume to spread much beyond the area it has impacted within the OU2 area. However, EPA has found that over time, there can be local change and variability within the plume. We can expect that there are and will continue to be variable levels of contaminants found at wells within the plume. Contaminant levels vary on the local level within the plume area, and it is impossible to accurately make predictions for individual wells. The finding that there is variation on the local scale is to be expected, and is due to the complex groundwater and contaminant flow through fractured rock.

Comment 11. Where is the main area of contamination?

EPA Response: The OU2 groundwater contamination is centered in the valley, traveling from northeast to southwest, from the OU1 Study Area, into the OU2 Study Area. Within the OU2 Study Area, groundwater contaminant levels are generally higher near the OU1 boundary, as well as near the Karrsville Fault zone.

Comment 12. Will downgradient areas become increasingly contaminated over time?

EPA Response: Areas within the Operable Unit 2 Study Area could become more contaminated from groundwater contamination that is continuing to migrate from the Operable Unit 1 Study Area. However, once the Operable Unit 1 cleanup begins, contaminated groundwater within Operable Unit 1 "hot spots" will be extracted and treated. This in turn will help to cut off a source of contamination to Operable Unit 2, and help to diminish the migration of contaminated groundwater into the OU2 Study Area. There will also be monitoring of the groundwater throughout the period of the remedy to monitor its progress and effectiveness. See also EPA's response to Comment 10, above, which addresses steady state and groundwater fluctuations on the local level.

Comment 13. The groundwater pollution being discussed was detected all the way to Carpentersville in the 1980's. Carpentersville is along the Delaware River at the end of the fracture that you are talking about.

EPA Response: The groundwater contaminant plume related to the Pohatcong Valley Site does not extend as far as Carpentersville, although it is a very long plume at approximately 9 miles in length. EPA has installed wells in the downgradient part of the Site and has determined the extent of the plume.

Comment 14. Could floating lily pads be used in the big quarries in the area to aerate the water and eliminate some contamination, or is that not practical?

EPA Response: This question is believed to concern the Edison Quarry. The Edison Quarry is large and the water within the quarry is naturally aerated. The levels of contamination in the quarry water are low and do not require action.

Sources of Groundwater Contamination

Comment 15. Has the source of groundwater contamination been contained? Are there any additional sources?

EPA Response: The source of TCE groundwater contamination has not yet been contained. We are presently working to address areas of very contaminated groundwater (so-called "hot spot" areas) in the OU1 Study Area as part of the OU1 groundwater cleanup remedy. Contaminants in soils on and in the vicinity of the former American National Can (ANC) facility are being investigated as part of an ongoing OU3 remedial investigation, and will be the subject of a future remedy.

Comment 16. Is there any connection to the High Point Landfill?

EPA Response: No. The High Point Landfill is being addressed by the State of New Jersey. There are a number of contaminants detected at High Point Landfill that have not been found at the Pohatcong Site. Also, the High Point Landfill is located in a geologically different area from the Pohatcong Site and the aquifer in that area is distinct and not connected to the aquifer underlying the Site.

Comment 17. Has the ground at the American Can Company facility been capped? What work was done there? Is there contamination under the buildings on that property?

EPA Response: No, there is no cap at the former ANC. Yes, there has been contamination detected under the building at this facility in the area that is believed to be a former manufacturing part of the building. This is being further studied as part of the OU3 investigation.

Comment 18. Was the Edison Quarry tested and if so, what was found? Were harmful vapors detected?

EPA Response: EPA collected water samples at various depths from the Edison quarry during the OU1 RI. EPA ran a dispersion model based on the low concentrations of TCE detected in the quarry water, and the results were below EPA's action levels. The results can be found in the OU1 and OU2 RI reports. Also see EPA's response to Comment 14, above.

Comment 19. Has the source of groundwater contamination been removed? Five years ago, EPA was here talking about source removal and there is still no funding for it. Will the cleanup happen over the next few years, or will it be delayed due to funding issues? Who will fund the cleanup, the state or the federal government?

EPA Response: No, groundwater sources have not yet been addressed. EPA is presently in the remedial design process for the OU1 groundwater cleanup remedy which will actively address the most contaminated areas of groundwater contamination, and progress is being made. The design phase for OU1 is expected to be completed in the next few years. The project will then enter the construction phase. EPA is also currently determining the extent of TCE in the source areas. EPA cannot guarantee that funds will be available when needed for cleanups, however, there is a process for securing funds. EPA will first try to get private funding from Potentially Responsible Party(s) (PRPs), to implement a remedy, so that public monies are not spent unless necessary. If the project is Federally funded, the project will be evaluated with other EPA projects, and different factors are weighed in the process of funding. If the project is Federally funded, the state contributes ten percent, as well.

Comment 20. Since the groundwater plume is still migrating steadily and slowly, wouldn't it be sensible to cap the source at the American Can Company facility? The source of contamination was known 20 years ago. Other sites were capped, such as the Belvedere Landfill and the High Point Landfill for the purpose of protecting groundwater.

EPA Response: EPA is presently in the remedial investigation phase to determine the full extent of the TCE source area at this facility. This is being addressed as the third operable unit (OU3) of the Site cleanup. Once the OU3 RI/FS is complete, EPA will propose a preferred alternative which will be presented to the public before a remedy is selected. While a remedy has not been selected for OU3, there are several factors that make capping problematic. Landfill contamination is different than the type of contamination present at this Site. Capping may not be entirely suitable for this facility, and other engineering controls might be more effective than capping. A cap works best when contamination is found in the upper parts of the soil, as at a landfill, and it helps keep rain-water from infiltrating through the contamination and percolating into the groundwater. Here, since some of the contamination is already in contact with

groundwater, a cap may not be effective because contamination is continuing to get into the groundwater over time. In addition, the present source area of groundwater contamination is also an operating facility. All these factors will have to be carefully evaluated.

Comment 21. There is also a facility thought to be a large contributor to groundwater contamination known as Tung-Sol.

***EPA Response*:** Yes, the former Tung-Sol facility in the OU1 area is believed to be the main historical source of the PCE site-related groundwater contamination. This facility is the present subject of remedial design investigations. Two dry cleaning operations are also believed to be minor historical sources of the PCE groundwater contamination, as well, although the OU1 RI concluded that these facilities no longer appeared to be contributing sources of PCE groundwater contamination.

Comment 22. Now realizing that there is contamination under the American Can building, I realize why the EPA did not dig up the barrel dump site and be finished. I didn't realize that the drainage system inside the building was being used to eliminate degreasers.

***EPA Response*:** EPA will have to check its records regarding information pertaining to a barrel dump at the former ANC facility. It should be noted, however, that historical information on file does indicate that the former ANC facility did have an internal drainage system within the building, located in the manufacturing part of the facility. A final determination will be made when the data from EPA's OU3 RI is available.

Comment 23. Regarding Brass Castle Fault area, there was reported to be dumping in the creek.

***EPA Response*:** EPA was not aware of any information about possible dumping in the OU1 area along the Brass Castle Fault, and EPA did not sample along the fault. This fault is not known to be near the historic TCE contamination toward the center of the Pohatcong Valley. EPA did follow-up on information provided during the OU1 remedial investigation about possible historical dumping in an area of the former Morris Canal, at the locations designated as BEA and SFE in the OU1 RI, which was based on a local source of information, but EPA did not find any sources of contamination at these locations. The former Morris Canal is located less a half mile from the trace of the Brass Castle Fault.

Schools

Comment 24. Will the remedy connect schools to public water?

***EPA Response*:** Yes, schools located within the impacted and threatened area would be hooked up to public water under Alternative 2b, if not already connected.

Comment 25. What school was impacted by vapors? What were the findings? How is the school currently monitored and maintained?

EPA Response: The Franklin School, located on Asbury-Broadway Road, was sampled for vapors and a remedial action was taken where vapor mitigation systems were installed. A vapor mitigation system consists of piping installed through the slab of a building to intercept vapors under the slabs and vent them outside using fans before the vapors can enter the building. Elevated TCE levels were detected underneath the building slab, and concentrations in the low risk range were detected in a limited portion of the air inside the building. EPA met with school officials and concerned citizens at the time to discuss its findings. The vapor mitigation system was installed and is being maintained by the school.

Roles of the Municipalities and Private Water Companies

Comment 26. Will local officials decide if there will be mandatory hookups? Could there be a local ordinance requiring a hookup?

EPA Response: A local ordinance requiring hookups to waterlines is possible. Many of the local municipalities already have such ordinances. Because this is a local issue, EPA would not be involved in the enforcement of such ordinances.

Comment 27. Will new homes built in the Operable Unit 2 area be allowed to connect to public water? Do the area water companies have adequate supply to provide for the new connections?

EPA Response: Yes. If subsequent to the construction of water lines, new construction and new development were to be constructed, connection to the public water lines would be required. In this case, the developer would have to provide the water hooks to the new development. EPA would try to work with developers to ensure that a water line will be available somewhere nearby, but EPA would not provide hook ups for newly constructed developments to public water. For the second part of the question regarding water companies having adequate water supply to provide for new connections, there are two water companies that can service the OU2 area. New Jersey American Water, which services the Washington Area, and at the other end of the Site, Aqua New Jersey, which services the Phillipsburg Area. Aqua New Jersey water reports that it likely has extra capacity. A representative from New Jersey American Water, Alan Sleeper, stated at the meeting that New Jersey American Water has applied to NJDEP and the Highlands Commission for permits to drill new water supply wells. If these applications and permits are approved, then extra water capacity should not be a problem. These issues would be clarified during the design phase.

Comment 28. I was the mayor of Greenwich for several years. We went through a cost-benefit analysis with the water company, Aqua New Jersey, and estimated

a cost to bring water into the Pace Setter development of 115 homes back in 2000 due to the fact that we thought the plume would reach Pace Setter. For the record, that was 12 years ago. We worked with the water company in order to be proactive, but at the time, the residents did not want to hook up to public water.

EPA Response: In this instance, if a property is located within the OU2 threatened or impacted area, the installation of water lines would be provided as part of EPA's remedy. There would be no cost to residences or owners for installation, connection to public water, or for associated restoration work. Homeowners would be responsible for the payment of water bills afterwards.

Comment 29. Were the Freeholders made aware of the meeting tonight?

EPA Response: The Freeholders were not specifically notified of the meeting. EPA published a public notice in the local Express Times, and the EPA remedial project manager also notified a number of individuals, including the Warren County Health Officer, Washington Borough Manager, representatives of NJDEP and NJDOH, and several other concerned individuals. EPA also emailed the Proposed Plan and links to the EPA website for Pohatcong to a number of concerned individuals, and asked that the information be passed around to anyone who may be interested.

Comment 30. Are the municipal supply wells free of volatile organic compounds contamination? Are PCE and TCE filtered out of the Washington water system?

EPA Response: Impacted public water supply wells at the Site are the Vannatta Street Well and the Dale Avenue Well, which are impacted primarily with PCE and TCE, respectively. Mr. Hadley of New Jersey American Water indicated that one of these wells is being treated using carbon, and the other utilizes an air stripping tower which aerates the water to remove contamination. Mr. Hadley indicated that the water company tests the water every two weeks for volatile organic compounds (VOCs), and meets state and federal drinking water standards.

Comment 31. If chlorine is present in the public water supply, how does this effect a septic system?

EPA Response: Mr. Hadley, of New Jersey American Water, indicated that small amounts of chlorine are added by all New Jersey water companies as a disinfectant. The levels of chlorine that are added are not enough to affect septic systems.

Proposed Remedy

Comment 32. What is the cleanup timeframe?

EPA Response: Once the ROD is final, the remedial process progresses in phases. First, EPA will attempt to have the potentially responsible parties conduct the design and

cleanup. The remedial design phase will then begin, during which specifications and plans for the selected remedy are developed. A remedial action phase is initiated after the design is completed, and is the stage where construction and cleanup activity occur. For EPA's preferred alternative, Alternative 2b, the process of remedial design and remedial action is expected to take approximately 3 years.

Comment 33. Will the money for the remedy be there when EPA is ready to proceed; how is the funding handled, and will federal or state money be involved in construction of the remedy?

EPA Response: The cost for construction of this proposed remedy is estimated to be approximately 14 million dollars. Please refer to EPA's response to Comment 19.

Comment 34. How would it be determined who gets a hookup to public water first?

EPA Response: Who is hooked up first would be determined during the remedial design phase. While the entire remedial design process is quite involved and time consuming, this does not mean, however, that people within the OU2 Study Area will be exposed to contaminated water due to the length of time it takes to design and construct the remedy. NJDEP will be providing and servicing POETS to impacted residences that are sampled and found to have detections of Site contaminants at or above the cleanup standard for TCE, while the OU2 remedy is being implemented.

Comment 35. Why are the federal and state cleanup standards for TCE different? Will the standards be changing, and becoming more stringent?

EPA Response: The NJ standard for TCE is 1 µg/l, which is more stringent than the federal maximum contaminant level (MCL) for TCE of 5 µg/l. When EPA takes an action it must meet the more stringent standard, in this case, the NJ standard of 1 µg/l. The reason there are different federal and state standards is because they are both developed in different ways. Although both are similarly based on risk, the method the state uses may rely solely on risk calculations, whereas the federal standard also takes into account engineering controls and the cost of attempting to achieve a given number. In other words, the federal number involves a cost-benefit analysis in addition to risk. This is because some states have more difficulty treating water depending on their geographic location and local water sources, and these factors are taken into account in the development of the federal standards. States may develop their own standards or defer to the federal number.

On the question of changing to more stringent standards, while it is possible that the standards for TCE could be lower in the future, we are not presently aware of any EPA action pending to lower the federal standard. Regardless, please note that EPA, as well as municipal water companies, have to meet the more stringent of the state and federal standards.

Comment 36. For the record, I am happy about the preferred alternative.

***EPA Response*:** EPA acknowledges the comment.

Comment 37. Who are the people getting well testing? Before you do a final design, will additional people be asked to have their well tested for that design? I assume that your design is going to be based on where the existing water line comes from.

EPA Response: EPA tested all private wells in the OU2 Study Area where EPA was granted access. So far, 204 residential wells have been sampled by EPA as part of the OU2 investigation, and additional wells were also sampled at various times by both the Warren County Health Department and NJDEP. The state is also sampling and servicing wells that have state-supplied POETS. Some of these wells that are on state POETS or on privately obtained treatment systems were also sampled. Initially, EPA sent out 650 letters to residents within OU2, enclosing information about the site and asking to sample their wells. Based on the responses received, 204 residential wells have been sampled by EPA to date. This program is ongoing and more sampling is being planned. For the second part of the question, regarding where water lines will come from, as stated previously, there are two water companies that can service the OU2 area. New Jersey American Water, which services the Washington Area, and Aqua New Jersey. The specifics will be developed during the design phase. Also see EPA's response to Comment 27, above.

Comment 38. I agree with the EPA that Alternative 2b is the way to go. However, the Site was put on the National Priorities List in 1988 and the cleanup has been taking a long time.

EPA Response: EPA acknowledges the comment. The Site was placed on the NPL in March 1989. As outlined in the Proposed Plan and discussed during the public meeting, this is a large and complex Site. The groundwater plume is approximately 9 miles long, and EPA has a number of response actions currently in progress to address site contamination.

Health Concerns

Comment 39. Are you planning to provide public water to the community to address elevated TCE concentrations? What are the risks?

EPA Response: Yes, EPA's proposed plan provides for public water to the community to address the threat posed by exposure to elevated TCE concentrations, as well as the potential threat of exposure. As stated in the Proposed Plan, the carcinogenic risk to the lifetime resident who uses the regional aquifer (3.3×10^{-4}) exceeds EPA's target risk range of 10^{-6} to 10^{-4}. This is the risk calculated for all contaminants, including TCE. This is because from a risk perspective, EPA is concerned with evaluating the chemicals to

which an individual is exposed. With this data, we can then evaluate the risks to make a remedial decision. The portion of this risk related to TCE, the site-related compound, is 3.5×10^{-5}. This value exceeds 10^{-6}, EPA's point of departure. The non-carcinogenic hazards to adults and children (Hazard Ranking Indexes (HI) of 10 and 24, respectively) who use groundwater from the regional aquifer without treatment exceeds the EPA target HI of 1.0.

Comment 40. If we go to public water, how often will the land and vapors be monitored? Is my soil safe for gardening?

EPA Response: EPA cannot state whether the soil is safe for gardening because EPA did not collect soil samples at your property, and there are other possible contaminants that are not site-related contaminants that could be present in the soil. Based on the results of EPA's sampling of Site groundwater and its vapors within the plume area, EPA does not anticipate health issues from Site contaminants related to gardening over the groundwater plume. This is because based on present data, the concentrations of site-related volatile contaminants in groundwater within the OU2 Study Area are low, and it is anticipated that vapors emanating from Site groundwater would quickly dissipate in outside air. However, vapor intrusion is a potential exposure pathway for inside air. Based on previous data collected, the higher vapor levels were closest to the Karrsville thrust fault zone near the center of the valley and adjacent to the OU1/OU2 border, which in this area is approximately parallel to the Pohatcong Creek. In the OU2 Study Area, levels consistently decrease away from both the fault zone and the OU1/OU2 border. The preferred remedy will include monitoring of groundwater and vapors. The frequency and the monitoring locations will be determined during the remedial design phase of the project. EPA will continue to monitor indoor air periodically as the remedy is being developed and implemented.

Comment 41. Has there been any cancer studies done in the area? If so, how were they done? How do any studies done relate to the Toms River Cancer Cluster study? Would there be any types of cancer expected from exposure to the chemicals at the Site?

***EPA Response*:** The NJ Department of Health (NJDOH), and the Agency for Toxic Substances and Disease Registry (ATSDR), are presently updating the Public Health Assessment (PHA) for the Site. EPA does not conduct these studies. The ATSDR is under the Centers of Disease Control (CDC). The Public Health Assessment report is in draft, and the NJDOH will provide a public comment period and public meeting when it is released. The NJDOH reviewed the Site data provided by EPA, in addition to data compiled from the NJDEP, the local health department, and data from the private well testing act. After the PHA is released and made final, an additional assessment, called a cancer incidence report may be determined to be necessary, as well as a study of the incidence of any cancer clusters. The first step is to present the findings in a PHA and to receive public comments. As for the Site chemicals of primary concern, PCE and TCE, based on studies conducted, typically kidney, liver, and lung cancers are associated with these compounds.

Comment 42. Is it safe to eat fish from Pohatcong Creek?

EPA Response: For chemicals such as TCE, EPA has not detected levels in surface water that would accumulate in fish. There is a state advisory for mercury-contaminated fish in all freshwater systems. It is recommended to contact the state to obtain specific details on the fish advisories for local water bodies. As pointed out in the Proposed Plan, a screening-level ecological risk assessment was conducted to evaluate the potential for ecological effects from exposure to groundwater discharging to sediment and surface water, specifically in Pohatcong Creek, Merrill Creek, and the Edison Quarry. Several VOCs were detected in groundwater monitoring wells at concentrations that were below the screening values. No TCE was identified in sediment samples collected. One detection of TCE was identified in the surface water in Pohatcong Creek immediately downgradient from the Edison Quarry discharge outlet, at 1.2 µg/l. None of the surface water samples exceeded ecological risk screening criteria. No other VOCs were detected and the hazard quotients (HQs) based on comparisons of the maximum reporting limits to screening values remained below 1.0 for all VOCs. Based on the isolated detections in the OU2 Study Area, and because of dilution, dispersion, and volatilization effects, EPA has concluded that VOCs in groundwater do not represent a potential risk to aquatic life should they discharge to surface water. The results of the sediment and surface water screening, which indicates no potential for adverse effects to aquatic life from the presence of VOCs in these media, confirm these conclusions.

Comment 43. Is the Pechiney facility being monitored for vapor intrusion to protect the health of workers?

EPA Response: Not at the present time. Vapor intrusion is being considered as part of the proposed OU3 investigation activities.

OTHER WRITTEN AND VERBAL COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD

Written comments were received from various people or organizations during the public comment period and are summarized below, followed by EPA's responses.

The following written comments were received via email:

Comment 1. I totally disagree that Alternative 2B is a proper method to deal with the OU2 groundwater contamination issue. The expense of extending the water supply 10 miles to replace an estimated 320 private potable wells cannot be justified. It would place an additional financial burden on these remediated households in that they would be forced to pay water bills, even agricultural users, and the study clearly states that there is no risk from irrigation, yet these wells would also be destroyed.

The statistics are skewed to support spending Super Fund monies. A prime

example of this is the evaluation of Risks to Residents. This risk is stated as 3.3 x 10^{-4}, but the summary reveals that the risk from site-related compounds is only 3.5 x 10^{-5}. Note that the ultra-conservative risk assessment used here states that "Cancer risks that exceed 10^{-4} indicate that a remedial action should be taken. Cancer risks calculated between 10^{-4} and 10^{-6} indicate that a remedial action ***may be warranted under certain circumstances***." I don't see that type of circumstance is present.

Chlorinated public water carries its own risks. Chlorine reacts with naturally occurring materials to produce halogenated VOCs and other potentially harmful disinfection byproducts (DBP). These DBPs are often more toxic than the TCE being targeted here. EPA guidelines limit DBPs to 80 g/L at the testing sites. Supplemental chlorination stations are required for long runs of water distribution as would be the case in the proposed forced connection to public water. Therefore, the substitution of public water will very likely expose residents to even higher risk, given that **only** 3.5 x 10^{-5} of the 3.3 x 10^{-4} risk would **not** be present in public water, but additional risk associated with DBPs **will certainly be present**. The oversight of not including an assessment of total risk from public water in the study is only one component of the flawed logic used to recommend proposal 2B.

There are also quality of life issues that have not been addressed. Residents at the end of water supply lines usually experience inadequate water pressure and increased sediment. The entire community would be inconvenienced for the two years estimated to complete this installation.

Forcing residents to destroy properly functioning wells and infrastructure and join the public water system makes no scientific or economic sense. Flawed logic aimed at creating a case to grab funds that should be dedicated to improving, not degrading, quality of life should not be allowed to push through this proposal.

The only action that makes sense is a severely modified Alternative 2a, where ongoing monitoring is continued and POETS are voluntarily placed on private wells that exceed the federal guidelines of 5 µg/l. The study accurately reveals that the contamination originated in OU1, was found in the 1970s, has and is being remedied there, and will be self-correcting by the 2070s. Within the time involved in studying, approving, and destroying private infrastructure, the threat and risk will continue to decline naturally. These funds should be applied to a project of much higher risk and should be dedicated to improving, not degrading, quality of life.

EPA Response: EPA understands that there are four main issues raised, as follows:
(a) the expense involved with selecting preferred Alternative 2b;
(b) the lack of extenuating circumstances to take an action within the risk range;
(c) the potential risk from chlorinated by-products in the public well supply; and
(d) quality of life issues.

a) The cost associated with Alternative 2b is a little more than twice as much as Alternative 2a, $15,040,000 as compared to $6,640,000, however, cost is only one of nine criteria that are evaluated by EPA when selecting a remedy. A threshold criterion considered in remedy selection is the protection of public health and the environment. EPA has determined that the installation of a public water line is more protective of human health, because, among other things, a public water line has the ability to continually provide water that meets federal and state standards to the community through a centralized system. Although POETS are able to provide treatment at individual homes, the maintenance and testing associated with the POETS provide a less desirable long-term solution, and this alternative is not preferred given the long-term period of groundwater contamination, which is projected to last six decades, and the large number of impacted and potentially threatened wells throughout the OU2 area. These factors make this option unwieldy, and not as reliable a means of providing a safe potable supply of water.

b) The proposed plan does indicate that when cancer risks are between $1x10^{-4}$ and$1x10^{-6}$, remedial action may be warranted under certain circumstances. The Pohatcong Valley site does have unique circumstances associated with groundwater contamination, which covers a very large area within portions of two townships, and involves an aquifer that has a complex heterogeneous hydrogeology that can vary considerably over the local area. The risk calculated for groundwater exposure related to TCE is 3.5×10^{-5}, which exceeds the lower end of EPA's acceptable risk range of $1x10^{-4}$ and$1x10^{-6}$. In addition, the concentrations detected in groundwater exceed both the state and federal maximum contaminant levels (MCLs). This provides ample justification to proceed with a remedial action, namely providing an alternative water source, to ensure that the residents of the community are provided with water that meets state and federal standards. Unpredictable variations in groundwater contamination within the plume will also be addressed by the remedy.

c) Throughout history, a major cause of illness and health impacts from drinking water has been the presence of bacterial contamination. To remedy this problem, disinfectants, such as chlorine, have been added to private and public water systems to prevent potential bacterial illnesses and this is an established and standard method throughout the country. While the addition of chlorine to drinking water systems for disinfection may result in the formation of trihalomethanes, the water being supplied by a municipal water supply company must meet the standards established for trihalomethanes as regulated under the Safe Drinking Water Act, and the water is tested quarterly to ensure that the standards are being met. In addition, the water being supplied by the municipal water company must also meet the standards for all compounds that are regulated, not just site-related contaminants. This results in water being supplied to residents that will meet <u>all current state and federal standards</u>. Due to the potential for groundwater contamination to migrate and fluctuate, there cannot be

assurance that all residents in the community using private wells are using water that meet state and federal standards without implementing Alterative 2b.

d) EPA acknowledges that there are quality of life issues associated with implementing any of the proposed alternatives. However, after a careful evaluation of the nine criteria, as outlined in the Proposed Plan, EPA believes that the least intrusive alternative is Alternative 2b because there is only a short-term disruption during construction compared to long-term disruptions associated with ongoing maintenance and testing of POETS throughout the course of the remedial action, as well as long term operation and maintenance.

Comment 2. The plan relies too little on the risks of man-made CVOC contaminants as originally intended and too much on hypothetical risks of natural materials that can also be found in public water. It also fails to mention that higher levels of similarly-hazardous CVOCs will permanently exist in public water due to chlorination. Oxidants like chlorine not only disinfect, they can also react with natural materials to produce CVOCs, other halogenated organics, and inorganic halates. These recurring disinfection byproducts are often more hazardous than the declining CVOC groundwater contaminants.

Accordingly, I oppose the EPA-preferred mandatory Alternative 2B that seeks the wholesale destruction and replacement of an entire groundwater infrastructure with a public water system that has not been shown to be safer. Furthermore, its nearly $44,000 per well capital costs, maintenance charges and inconvenience far outweigh the small groundwater CVOC risk involved. I also reject the other mandatory alternatives except 'NO ACTION'. I might however support a limited voluntary program involving individual well treatments or public water connections to already-existing nearby mains but only if CVOC contaminants are shown to significantly exceed EPA's standard, preferably at or near its current public water haloform standard.

EPA Response: This comment raises many of the same points as the comment immediately above, and concerns raised have been addressed in EPA's Response. It must be stressed that the municipal water supply company must show through quarterly testing as required under the Safe Drinking Water Act, that the concentrations of trihalomethanes are below current state and federal standards. In addition, the water being supplied by the municipal water company must also meet the standards for all compounds that are regulated, not just Site-related contaminants. This results in water being supplied to residents that will consistently meet all current state and federal standards. Due to the potential for groundwater contamination migration and fluctuation there cannot be assurance that all residents in the community are being provided water that meets state and federal standards without implementing Alterative 2b.

Comment 3. I live on Lauren Drive in Franklin township, NJ (New Village). My understanding is that the EPA is planning to remediate the impact to homeowners by extending public water lines into our area and hooking up our homes. I am not opposed to this. However, I have had my well tested every year for the past 15 years and I have never had any VOC's detected. Will I be allowed to retain my well water along with the public water hookup? I do not see the benefit to capping a clean well. I would be happy to submit to ongoing water testing by the EPA, or I could just forward the EPA the yearly results that I obtain on my own.

EPA Response: As stated elsewhere in these responses, in order to protect public health in the long-term, it is EPA's preference to close wells that are impacted or threatened by the contaminant plume at the Site. Recent communications with the New Jersey Department of Environmental Protection (NJDEP) indicate that the state also considers this control necessary for the remedy to be protective. EPA will be speaking with individuals impacted by this remedy as the project moves on to try to address any individual concerns they may have. It is also possible that local authorities, many of which have well closure ordinances, may enforce and/or pass restrictions.

It should also be noted that while the plume is roughly at steady-state, we do not expect the plume to spread much beyond its current extent. However, there is variability on the local level, and it is impossible to accurately make predictions about future local impacts. We can expect that there are and will continue to be variable levels of contaminants found at wells within the plume. It is possible that sampling private well water once a year will not be sufficient because groundwater contamination remains in the general area, and it is possible that a well can become contaminated shortly after it was sampled and tested clean. There are many variables at the local level, including seasonal variability and pumping rates at nearby wells. Installing permanent water lines avoids these kinds of sampling, operation and maintenance difficulties, and the water lines provide a permanent solution compared to POETS.

Comment 4. I would like to thank you for a very informative presentation last night. I was there and should have introduced myself to you after the meeting but I had to leave right away. I was thinking about some things afterwards and I have few questions:

a) The Franklin School had vapor intrusion and two other residences. Why would the Franklin School have such a high level of intrusion that it needed to be remediated? Could there have been another source of contamination where the school was built?

b) Do you have another map showing the boundaries of OU2 that I can refer to so that I can see where exactly the OU2 boundaries and plumes are located?

c) Wouldn't the installation of the water lines be of highest priority? If I heard correctly, you said that if contamination exceeds the standard in a residence, a POETS would be installed and used until the public water line is installed. Wouldn't it be more cost effective to run the line immediately? $14 million is a drop in the bucket compared to the federal budget and it would be well spent to protect public health.

EPA Response

a) The school indoor air did not have high TCE levels. Screening levels that were considered high were detected underneath the building slab, and low concentrations were detected in a limited portion of the building's inside air (not in any classrooms) that were in the low risk range. EPA chose the conservative approach and installed a vapor mitigation system which is being maintained by the school. The higher levels of TCE were detected closest to the Karrsville Thrust Fault zone, which in this area lies approximately parallel to the Pohatcong Creek, and levels consistently decreased away from the fault zone. As explained in detail in the OU2 RI report, the Karrsville Thrust Fault zone, which emanates from the more contaminated OU1 portion of the Site, is a preferential flow path for the movement of groundwater contamination from the OU1 area into the OU2 area. Within OU1, the fault is believed to cross and intercept the groundwater plume flow path, approximately 1/5 mile from the TCE source area. When groundwater intercepts this fault zone, some of it is diverted and flows along the fault zone, which parallels the strike of the valley. The fault extends completely through OU2.

b) Yes. A copy of the figure showing the OU1 and OU2 combined plumes that was used at the public meeting was forwarded to the citizen via email, and is located in Appendix I to the attached ROD.

c) This comment is similar to comments raised during the public meeting. There is a process that EPA must follow before construction can begin. The process begins with a remedial design phase, where engineering details are worked out, and this is followed by a remedial action phase, where the actual remedy construction takes place. This is a complicated project covering a large area, and it will also involve working out details with two existing water companies that service both ends of the OU2 area.

There is also a process for securing project funds. This will first involve trying to get private funding for, or implementation of the remedy by Potentially Responsible Party(s). If federal funds do become necessary, funds must be allocated. If the project is federally funded, the state contributes ten percent as well, and a contract with the state is developed for this purpose. While performance of the remedial design is time consuming, this does not mean, however, that people in OU2 will be exposed to risk of contaminated water due to the length of time it takes to conduct the RD and RA. The NJDEP will continue

to provide and service POETS to impacted residences, while the RD and RA activities are moving forward.

The following letter comment was received from the Warren County Health Department, dated May 3, 2010:

The Warren County Health Department supports EPA's proposal to implement Remedial Alternative 2b—MNA, Institutional Controls, and Public water Supply Connection as the best way to ensure the safety of the drinking water for the residents in OU2 of the Pohatcong Valley Superfund Site. The expansion of nearby public water supply systems is an effective long-term solution to the problem and will provide safe drinking water for residents of the impacted area.

EPA Response: EPA acknowledges the comment.

The following letter comment was received from Agua New Jersey, Inc., dated April 26, 2010:

Aqua New Jersey, Inc. has a protected franchise to supply water utility service to Greenwich Township granted by municipal ordinance approved by the New Jersey Board of Public Utilities. Aqua is capable of serving additional water customers in Greenwich Township that are currently on private wells as part of the ongoing EPA Superfund Project referenced above.

EPA Response: EPA acknowledges the comment.

The following comments were received from Barnes & Thornburg, LLP., a law firm representing Pechiney Plastic Packaging, Inc. (PPPI), via letter dated May 17, 2010:

Comments on the Proposed Plan for OU2

1. On page 2 of the Proposed Plan, U.S. EPA makes the statement that the PCE plume is limited to the OU1 portion of the Site. While the data clearly demonstrate that the PCE plume has an origin in OU1 wholly distinct from the TCE plume, the data do not show that the PCE impacts are restricted to OU1. The regional groundwater impacts in OU2 do include PCE which may have been transported with groundwater from OU1. In addition, since TCE, is a natural breakdown product from the degradation of PCE, some of the TCE present in OU2 groundwater could have originated as PCE in OU1. U.S. EPA provides no basis for its assumption that the PCE detected in OU2 is not related to the independent PCE sources in OU1.

EPA Response:

During the OU2 RI, EPA did not find PCE anywhere in OU2 Study Area groundwater above 1 µg/l; in fact, PCE was only detected in OU2 groundwater in one instance at an estimated value of less than 1 µg/l. PPPI's statements regarding PCE impacts within the OU2 Study Area appear to be based on a hypothetical assumption that PCE in Site groundwater is reaching the OU2 study area, and is further breaking down to TCE. Extensive data collected to date as part of the OU1 and OU2 RIs, as well as for on-going OU1 remedial designs do not support this assertion.

As presented in the OU1 Study Area RI Report, the identified TCE source area contains PCE, although at concentrations much lower that the TCE. Similarly, the identified PCE source areas contain TCE, although at concentrations much lower than the PCE. Based on these data, the nature of the OU1 Study Area TCE plume (with minor PCE concentrations) and of the OU1 Study Area PCE plume (with minor TCE concentrations) was evaluated. A similar relationship between the relative concentrations of PCE and TCE are noted in the Dale Avenue and Vannatta Street public water supply wells, with the Dale Avenue well containing mostly TCE with minor amounts of PCE resulting from the TCE source area, and the Vannatta Street well containing mostly PCE with minor amounts of TCE resulting from the PCE source areas. This is due to the locations of these two wells relative to the TCE and PCE source areas. The Dale Avenue well is downgradient of the TCE source area, and the Vannatta Street well is downgradient of the PCE source area. It was also noted in Section 7.6.2 of the OU1 Study Area RI Report that degradation of the primary chlorinated VOCs to less-chlorinated forms is limited to the source area of the TCE plume and does not appear to be occurring within the groundwater, such that significant degradation of PCE to TCE is not likely to occur in downgradient groundwater areas. A further assessment of the PCE plume has been conducted during the ongoing OU1 Remedial Design (PCE), which confirmed that the PCE plume is limited in extent within OU1, and is primarily being intercepted by the Vannatta Street well; therefore, it does not migrate downgradient into the OU2 study Area. Moreover, data to date indicates that biodegradation is not occurring appreciably within the plume; the primary mechanism for attenuation is dispersion.

It should also be noted that in American National Can's 2001 104(e) response, the company admitted to using PCE for a year, so the presence of PCE cannot be ruled out in the OU1 TCE source area, at this time.

2. On page 2 of the Proposed Plan, U.S. EPA states that the RI work for OU1 began in the early 1990's. In the opening of the next paragraph, U.S. EPA states that the RI/FS activities started in 1999. The contradiction should be corrected.

EPA Response:

EPA initiated site-related activities, including pre-RI/FS activities, in the early 1990s. RI/FS field activities under a Response Action Contract (RAC) were initiated in 1999.

3. On page 3 of the Proposed Plan, U.S. EPA states that NJDEP sampled 80 residential wells in OU2 from 2002 to 2004 and that TCE was detected above New Jersey and

Federal standards in "a number of these wells". Based on the data made available to EPA, less than a quarter of the wells sampled by NJDEP showed TCE in excess of the more stringent New Jersey standards and only four percent were above the Federal drinking water standards for TCE. Similarly, in 2009, U.S. EPA sampled 204 residential wells in OU2 and TCE was detected at concentrations above the Federal MCL in only three of those wells (1.4% of the total) and at concentrations above the New Jersey standard at only 33 (16% of total). Based on these statistics supplied by U. S. EPA, it appears that TCE is not present at concentrations above the more stringent NJDEP standard in more than 75% of the wells sampled in OU2. This information should be clearly provided in the Proposed Plan so that the public better understands the limited nature and extent of TCE impacts in their area. The Proposed Plan should be clear in stating that the majority of wells were unimpacted as the U.S. EPA, NJDEP and Warren County data has demonstrated.

EPA Response:

As outlined in the OU2 RI Section 5 and Appendix I, EPA conducted four groundwater sampling events from March 2008 through August 2009 at a total of 204 residential wells. During the initial event in March 2008, 22 residential wells were sampled. Of the 22 wells sampled, TCE was identified in 14 of the wells at concentrations above the NJDEP groundwater quality standard of 1 µg/l. At one of the 14 locations, the TCE concentration also exceeded the Federal MCL of 5 µg/l. These analytical results are tabulated in RI Appendix I. This document was made available to the public on April 16, 2010.

The three remaining groundwater sampling events were conducted by EPA in March, May, and August 2009 at 182 residential wells. Based on the report prepared by EPA's Division of Environmental Science and Assessment (DESA), dated November 4, 2009, and contained in RI Appendix I, TCE contamination was identified above the NJDEP groundwater quality standard of 1 µg/l in 33 of the residential wells. At 3 of these 33 locations, the TCE concentration also exceeded the Federal MCL of 5 µg/l.

In summary, EPA's analytical results from 204 residential groundwater samples identified the presence of TCE contamination above the NJDEP groundwater quality standard in 47 residential wells.

Based on the information obtained from both EPA's ongoing residential sampling program, as well as from information recently obtained from the NJDEP, there are approximately 400 residences in the OU2 Study Area. Of these, the number of residences on POETS that have been installed and are being serviced by the NJDEP have increased from 80 to approximately 110 residences whose wells are impacted by TCE above the state groundwater standard. Several additional residences sampled were also found during sampling to have independently installed their own treatment systems. TCE contaminated groundwater is found at levels above standards throughout much of the five mile extent of the OU2 Study Area. As EPA has clearly stated, EPA considers all residences within the proximity of the aerial extent of the plume to be either impacted or threatened.

4. In its Proposed Plan, U.S. EPA draws various conclusions as to the sources and extent of the TCE impacts based on residential well sampling. However, as stated at page 3-6 of the final RI for OU2, no information about the residential well construction, well depth or integrity was available to U.S. EPA. Therefore conclusions drawn about regional groundwater conditions or sources from residential well data are premature at best.

EPA Response:

Information as to the well depths or construction were not available at many residential well locations. Based on extensive investigations at the Site, EPA has determined that, perched groundwater in the OU2 area does not occur or, if found locally, would not be sufficient to use as a potable water source. Therefore, the assumption that the residential wells are installed in the regional aquifer is reasonable and is consistent with the completion details provided on some of the residential wells. Therefore, the water quality data from the residential wells are useful for identifying the presence of TCE in the regional aquifer. The OU2 RI utilized data from monitoring wells in conjunction with the results from hundreds of residential wells, to determine the nature and extent of the contaminant plume. An overall assessment of the TCE concentration gradient through the OU2 area shows a consistent decreasing trend from the OU1 border to non detect at the southernmost extent of the plume, indicating that the investigation approach is reasonable for the scale of the RI study, as well as for the Site. The OU2 RI and FS Reports specifically acknowledge that uncertainty with respect to fluctuating TCE levels at the local level is to be expected, and this is addressed through the preferred remedy identified in the Proposed Plan (see EPA's answer to comment 3, above).

5. On page 4 of the Proposed Plan, U.S. EPA states that negotiations to have a "PRP" perform the RI/FS for OU3 were not successful. In the interests of clarifying the record in this matter, that PRP offered to complete the RI/FS for those portions of OU3 for which it could arguably have potential liability. However, U.S. EPA rejected that offer and insisted that the PRP agree to perform the RI/FS for the entire OU3 area including other independent properties for which the PRP has no potential liability or relationship under CERCLA. That insistence is contrary to CERCLA itself, as well as the recent Supreme Court decision in *Burlington-Northern & Santa Fe Railroad Company* v. *United States,* 129 S.Ct. 1870 (May 4,2009).

EPA Response:

This comment contains conclusions of a legal nature which neither request nor appear to require a change to the preferred remedy identified in the Proposed Plan. Issues pertaining to what PPPI's potential liability are under CERCLA are the subject of pending litigation and are not relevant to EPA's selection of a remedy for OU2.

6. On page 5 of the Proposed Plan, the U.S. EPA states that the Karrsville Thrust Fault provides a preferential flow pathway between OU1 and OU2. If it is assumed that is

the case, it is useful to note that the Karrsville Thrust Fault is some distance sidegradient to the PPPI property in OU1. Therefore, the Karrsville Thrust Fault is not acting as a significant groundwater conduit from the PPPI property location through OU1 to OU2.

EPA Response:

EPA disagrees with the assertion made in the comment. The Karrsville Fault is less than a half mile from, and directly downgradient of, the former American National Can facility source area located within the OU1 Study Area. The identification and understanding of the Karrsville Fault was important to complete the characterization of the TCE groundwater plume migrating through the OU1 and OU2 Study Areas. The Karrsville Thrust Fault zone plays a major role in groundwater movement and serves as a preferential flow path from the OU1 Study Area into the OU2 Study Area. The assessment of the Karrsville Fault as the main groundwater conduit through the OU2 Study is supported by geophysical data, and by groundwater data and vapor intrusion data that showed the highest TCE concentrations occur over and adjacent to the fault, and decrease away from the fault (see Figure 5-2 of the OU2 RI Report).

Prior to installing OU2 monitoring wells, a geophysical, reflection seismic survey was performed perpendicular to the axis of Pohatcong Valley at the OU1/OU2 Study Area border, in the area of Asbury-Broadway Road, to identify the location of the Karrsville Fault and to help select drilling locations within the Fault. The seismic survey was 0.5-mile-long and it crossed Pohatcong Creek. The survey confirmed the subsurface location of the Karrsville Fault along the OU1/OU2 Study Area border. The survey also revealed that the fault is not one, single feature, but is comprised of multiple parallel and sub-parallel fractures and faults that create an extensive disrupted fracture zone in the bedrock, spanning a horizontal distance of greater than 150 feet, and comprises an extensive vertical extent. It should also be noted that during drilling of the three OU2 RI ABR wells along Asbury-Broadway Road, large, karst-type voids were encountered in the bedrock and resulted in collapsed boreholes during drilling, and the shallow monitoring well produced a large volume of free flowing water during drilling, indicating the potential for high water yield. In addition, the high yield Dale Avenue public water supply well is located along the trace of the Karrsville Thrust Fault Zone within the OU1 Study Area, indicating the fault is a preferential flow groundwater pathway within the OU1 and OU2 Study Areas. Pumping of the Dale Avenue well will also draw water into the fault zone within the OU1 Study Area. The hydraulic influence of the Dale Avenue public water supply well, which is located along the fault, is presented and discussed in the OU1 Study Area RI Report (See Section 4.3.2). Within the OU2 Study Area, the ABR wells were installed within the Karrsville Fault zone near the OU1/OU2 border, had the highest concentrations of TCE detected within the OU2 Study Area.

The Karrsville Fault extends throughout the OU1 Study Area and into and through the OU2 Study Area. Within OU1, the fault is downgradient and less than a half mile from the former ANC facility. The OU1 RI identified ANC as the sole identified source of TCE groundwater contamination within the OU1 Study Area. The TCE plume within OU1 intersects the fault zone, and the fault zone parallels the regional groundwater flow direction of the valley. It has been determined that the location of the identified TCE

source area in the vicinity of the ANC facility, and the location of the fault are factors that greatly facilitate the movement of groundwater and contamination from the OU1 Study Area into the OU2 Study Area. The fault zone greatly influences groundwater flow on the local and regional levels. Section 2.4 of the OU1 RI presents a discussion of the RI finding regarding karstic features, the presence of large-scale karstic features that would create an interconnected site-wide preferential flow path were not found. However, the Karrsville Fault zone is extensive enough to provide such a preferential flow path.

7. On page 5 of the Proposed Plan, U.S. EPA includes a description of its findings in surface water samples from the Edison Quarry. According to U.S. EPA, the finding that TCE concentrations were higher at shallower depths is indicative of a regional groundwater, rather than a more localized, source of TCE. That conclusion is not supported by the available data, however. TCE is heavier than water. Therefore, if the TCE found in the Quarry water samples were solely from regional groundwater, it would be expected that the more elevated levels would occur at the deepest or middle depths corresponding to the depth of the groundwater infiltration into the Quarry excavation. The U.S. EPA cited fact that higher levels were detected at shallower depths would imply an overland runoff or other shallow overburden source for at least some of the TCE found. The data is simply insufficient to use as proof that no local or alternative source of the TCE beyond the regional groundwater exists.

EPA Response:

Based on the concentrations, the TCE in the OU2 Study Area is a dissolved component in the groundwater. At orders-of-magnitude higher concentration, TCE may occur as a separate-phase liquid in groundwater, where the TCE would form a dense, non-aqueous phase liquid capable of sinking through the aquifer or to the bottom of the quarry; however this is clearly not occurring at the Site. The depth-profile sampling at the former Edison Quarry was conducted to assess the potential that a TCE source, such as drums, was at the quarry bottom. The TCE concentrations within the south side of the quarry range from about 5 µg/l to 11.4 µg/l. Based on these vertical profile sample results, a potential TCE source at the bottom of the quarry was discounted. Overland runoff into the quarry was considered and also discounted based on the limited area of surface water runoff and the lack of industrial facilities immediately adjacent to the quarry. In fact, the quarry is surrounded by residential lawns. The proposed mechanism for TCE migration to the quarry from groundwater flow along the Karrsville Fault was considered most likely as the fault intersects the quarry and discharges groundwater to the quarry, not the other way around. It was also noted in the OU2 RI Report that the groundwater has the potential to discharge to the surface water, such as Pohatcong Creek, as well as the Edison Quarry, in the OU2 Study Area which provides a likely, viable mechanism for the TCE to reach the quarry. During the OU1 and OU2 remedial investigations, no potential sources of TCE were found to be located near the quarry.

8. On page 5 of the Proposed Plan, U.S. EPA states that "the occurrence of TCE in the Karrsville fault is due to migration from the OU1 Study Area." By omitting any reference to potential local sources, this statement implies that all of the TCE in the fault originated in OU1. The data provided by U.S. EPA are not sufficient to reach this conclusion. The minimal efforts by the Agency to identify and characterize potential source areas in OU1 were perfunctory, at best, and the OU2 RI is notable for the absence of any soil sampling at potential source areas (PSAs) and the very limited groundwater sampling program at PSAs. Due to the absence of any serious attempt to find sources of TCE in OU2, the U.S. EPA cannot credibly assert that no sources are present and that the only sources are in OU1.

EPA Response:

EPA conducted a comprehensive RI to identify potential sources of groundwater contamination in both the OU1 and OU2 Study Areas. One of the OU2 RI's main objectives was to identify and evaluate potential source areas (PSAs) in the OU2 Study Area. PPPI raises similar comments in later comments as well. Please refer to EPA's responses to Comments 10, 24, 25 and 26. EPA's response to Comment 6, 7, and 30, pertain to findings regarding the Karrsville Thrust Fault.

9. On pages 5 and 6 of the Proposed Plan, U.S. EPA summarizes vapor intrusion work and indicates that TCE vapor mitigation measures were necessary for 2 residential structures and 1 public school. However, the highest residential indoor air TCE concentration presented in the RI Report is 11 $\mu g/m^3$ and corresponds to a cancer risk of only 9×10^{-6}, which is well within the acceptable risk range of 10^{-6} to 10^{-4}. The highest nonresidential indoor air TCE concentration presented in the RI Report is 3 $\mu g/m^3$, and corresponds to a cancer risk of only 5×10^{-7}, which is lower than the low-end of the acceptable risk range. Although EPA cited these indoor air concentrations in the RI as the basis for taking vapor mitigation measures in a Removal Action, neither of these concentrations constitute an unacceptable risk based on EPA's own assumptions regarding TCE toxicity and reasonable maximum exposures to indoor air. In fact, no TCE indoor air concentration presented in the RI Report corresponds to an unacceptable risk given U.S. EPA's own assumptions and criteria.

EPA Response:

EPA did not take an action for vapor intrusion based on current indoor air risks. EPA based its action on a weight-of-evidence approach for evaluating and remediating potential vapor intrusion locations, which relies on multiple pieces of information to make a decision. This approach has been utilized at many sites within Region 2. EPA's decision to remediate was based on the potential for vapor intrusion because concentrations of VOCs detected in the subslab samples were elevated above screening levels. EPA installed a subslab vapor mitigation system to eliminate the potential future for adverse impacts to the indoor air. The fact that indoor air was being impacted by TCE at levels below screening values supports that a vapor intrusion pathway into the building already existed. This approach is standard in Region 2 and there are multiple sites where this policy has been employed.

10. On page 6 of the Proposed Plan, U. S. EPA concludes that two facilities (Vitaulic and T&M Pallets) "investigated" as source areas in OU2 have not contributed to groundwater impacts. That conclusion is based on the results of sampling in one well assumed to be downgradient of both. However, as U.S. EPA has also explicitly acknowledged, the Valley groundwater flow regime is a complex one. To reach the conclusion that neither formerly industrial property is a source of groundwater impacts based on one data point flies in the face of that complexity. This is particularly true, when onsite conditions at the facilities point to their being potential sources. Furthermore, U.S. EPA fails to explain why its investigation of source areas in OU1 generally involved multiple soil, soil gas and/or groundwater samples while, in contrast, its investigation in OU2 only involved one groundwater sample. Nor does the U.S. EPA explain why additional groundwater samples were not collected from existing wells located closer to the probable source areas for at least one of the source areas identified. Both PCE and TCE were detected in a soil sample and onsite groundwater samples at the Vitaulic property during the OU1 Remedial Investigation. In that Report, U.S. EPA concluded Vitaulic was "considered to be a contributing source of chlorinated VOCs to regional groundwater." (Page 5, OU1 Remedial Investigation Report). Now based on only one offsite data point, U.S. EPA decides otherwise.

EPA Response:

The conclusion that the Victaulic (VCA) and the adjacent pallet processing (TPC) facility have not contributed to the TCE plume is not based on one data point, as incorrectly stated in the comment. The conclusion is based on the following factors: 1) groundwater and soils results obtained from the VCA facility as part of the OU1 RI, where no TCE contaminated soils nor source was identified at Victaulic during the OU1 RI; 2) lack of TCE detected in the new OU2 downgradient monitoring well; 3) lack of TCE in downgradient residential wells; 4) consistent TCE gradients through the OU2 Study Area (i.e., no indication of major sources). The characterization previously completed under the OU1 and OU2 Study Area RIs and the number of downgradient wells that lack TCE provided a sound basis to exclude these facilities from additional investigations.

Source investigation work was included in the OU2 RI. During the planning of the OU2 RI, EPA identified and evaluated PSAs, which included an evaluation of PSAs that were identified and evaluated during the OU1 RI. A number of PSAs were previously identified and investigated within the OU2 Study Area during the OU1 RI, which included Victaulic Company of America (VCA). The OU1 Study Area has been heavily developed for decades, and includes several major industrial facilities, whereas, the OU2 Study Area is primarily rural, with interspersed suburban developments and commercial/industrial/ retail properties (see OU2 RI Section 2.3). The main industrial facility within the OU2 Study Area is the VCA property located along Edison Road south of State Route 57. During the search for additional potential sources in the OU2 Study Area, a small pallet processing facility was identified, known as the T&M Pallet Company (TPC), as evidenced by a review of aerial photographs. The TPC facility is located immediately adjacent to the VCA property. The remaining commercial/retail

properties (e.g., bank, grocery store, diner, etc.) in the OU2 area would not have likely used chlorinated solvents and were therefore not considered to be potential source areas. The OU1 RI field work progressed in phases, using soil gas, soil sampling, and monitoring well installation to gather data to screen the 107 identified potential source areas (PSAs) as described in Section 5.1 and summarized on Table 3-2 in the OU1 Study Area RI Report. During the OU1 RI, soil and groundwater samples were collected at the VCA facility, however, soil contamination was not identified, as incorrectly stated in the comment, and elevated groundwater contamination was not found. Soil sampling results at VCA indicated the presence of PCE (not TCE) at an estimated concentration of 4 µg/kg, which was below the NJDEP Impact to Groundwater Soil Cleanup Criteria. The OU1 RI groundwater sampling conducted at the VCA facility identified TCE, PCE, and other chlorinated VOCs at low concentrations (less than 10 µg/l). The OU1 RI concluded that VCA was not a source area (see Section 5.9.27).

As part of the OU2 RI, to further evaluate the VCA and adjacent TPC facilities, and to locate potential additional sources within OU2, field work consisted of the installation of groundwater monitoring wells, the collection of groundwater, residential well samples, sediment, and surface water samples. Several subsequent phases involved the expansion of the residential well sampling program, with the sampling of hundreds of residential wells. Soil sampling was considered, but based on the results of other media sampled as part of OU2 field work, as well as on the prior OU1 RI results, a soils sampling phase was not collected during the OU2 RI.

The newly installed well downgradient of the VCA and TPC facilities did not detect any contaminants of concern, and samples collected from numerous private residential wells located downgradient of the VCA and TPC facilities contained no volatile organic compounds (VOCs). Because no TCE or other chlorinated VOCs had been detected in the downgradient wells during the OU2 RI, soil sampling at VCA and TPC was not needed. These results also confirmed that the previous low level detections in the groundwater at the VCA facility are limited in extent. Therefore, based on the OU1 and OU2 RI results, the two facilities were determined not to be contributing to the groundwater contamination in the OU2 Study Area.

Similarly, the water filled former Edison Quarry was evaluated as a potential source area under the OU1 RI, and samples were collected from the quarry at multiple depths. Sample results indicated that the quarry is not a source of Site contaminants, but rather, is a reservoir primarily filled by groundwater discharging through fractures.

Despite significant efforts to identify sources, the results of the OU2 RI did not identify any source areas within the OU2 Study Area. The OU2 investigation identified a dispersed groundwater plume, having no identifiable hot spot areas, which would indicate that there are no apparent local sources within the OU2 Study Area. This supports the conclusion that there is one continuous plume extending from the identified TCE source area (the former ANC facility) within the OU1 Study Area, with generally decreasing and dispersed concentrations farther from the OU1 TCE source.

11. Beginning on page 7 of the Proposed Plan, U.S. EPA presents a summary of its human health risk assessment for the OU2 groundwater. It is important to note, that all of the potential carcinogenic risks identified are within the U.S. EPA defined acceptable risk range of 10^{-6} to 10^{-4} even with the very conservative assumptions used by U.S. EPA. In addition, the hazard index for volatile organic compounds is below one once the non-Site related constituents are excluded. In addition, the vast majority of wells tested contained TCE at below the Federal drinking water standard. The great majority of the population in OU2 faces no unacceptable risk from the presence of TCE in some of the groundwater within the area based on U. S. EPA's own conservative risk assessment and its own published drinking water standards. This fact should be clearly stated in the Proposed Plan.

EPA Response:

The risks and hazards calculated in the Human Health Risk Assessment utilized the monitoring well data to evaluate exposure to the regional groundwater aquifer. As stated in the Proposed Plan, the overall carcinogenic risk to the lifetime resident is $3.3x10^{-4}$ for a person who uses the regional aquifer, which exceeds EPA's target risk range of 10^{-6} to 10^{-4}. The portion of this risk related to TCE is 3.5×10^{-5}. This value exceeds 10^{-6}, EPA's point of departure.

In addition to the monitoring wells, there were additional data collected from private wells. The private well data indicates that there are elevated concentrations of TCE (i.e., above state and/or federal standards) over a wide area of the Pohatcong Valley. Private wells in the OU2 Study Area are either impacted or threatened by site-wide groundwater contamination. EPA's risk assessment was performed consistent with RAGS. It is part of the administrative record and contains all risk calculations.

12. On page 9, U.S. EPA includes a "Summary of Risks to Residential Receptors" discussion. Within that discussion, U. S. EPA notes that the portion of risk related to TCE, "the only Site-related compound, is 3.5×10^{-5}." As noted above, this risk level is within U.S EPA's generally acceptable risk range of $10^{-4} \times 10^{-6}$ for the Superfund program.

In addition, as part of this discussion, U.S. EPA notes that the Hazard Index for OU2 exceeds 1 solely due to non-Site related constituents which may be naturally occurring. Under U.S. EPA's own Risk Assessment Guidance documents, naturally occurring constituents would not be identified as constituents of concern for inclusion in a baseline risk assessment. In keeping with U.S. EPA guidance, the Hazard Index evaluation should have been limited to TCE and consequently the hazard index should have been identified as well within the acceptable range.

These same issues exist in U.S. EPA's discussions of the potential risks to Industrial Workers on the same page of the Proposed Plan.

EPA Response:

Inclusion of all detected compounds that exceed initial screening values are always included in Human Health Risk Assessments based risk assessment guidance (i.e., Risk Assessment Guidance for Superfund (RAGS) - Part A). Compounds that are determined to be similar to background concentrations are then discussed in the Uncertainty Section of the Human Health Risk Assessment. This is the procedure that was followed in the risk assessment for Pohatcong Valley. The calculated HI at this Site was not the basis for taking action.

13. Also on page 9, U.S. EPA discusses the sampling of twenty-two wells, fourteen of which had treatment systems already in place. The Agency then goes on to state that TCE was detected in thirteen of those wells, all at concentrations in excess of State or Federal standards. However, no information is provided as to whether the wells sampled were those with treatment systems or not, or whether the samples were collected before or after the treatment systems. Therefore, this information provides the public with no clear understanding of conditions at the twenty-two wells other than the fact that nine of the wells had no TCE detected. In addition, the inclusion of these data and exclusion of data from all of the other wells sampled is arbitrary and appears to be based on the fact that these wells were included in the Risk Assessment. Since the discussion does not provide any information about how these wells were used in the Risk Assessment. There seems to be no reason for including these data in the Proposed Plan other than to overstate the potential groundwater risks in OU2.

EPA Response:

The risks and hazards calculated in the Human Health Risk Assessment utilized the monitoring well data to evaluate exposure to the regional groundwater aquifer; residential well data was not evaluated as part of the risk assessment. In addition to the monitoring well results, which included TCE concentrations above the state and federal MCLs, there were additional data collected from private wells as part of the RI. The RI and Proposed Plan accurately noted these private well data results, and that there are approximately 100 impacted residential wells containing elevated concentrations of TCE within the OU2 Study Area (i.e., above state and federal MCLs) over a wide area of the Pohatcong Valley. This is accurate information and does not conflate the issue.

Appendix F in the OU2 RI Report summarizes the results for the March 2008 residential well sampling event. The table clearly notes sample results for pre- and post POETS samples. When a residence had an existing POETS installed, then both pre- and post-POETS samples were collected.

14. On page 10, in the Summary section, U.S. EPA again alludes to the fact that non-cancer risks associated with groundwater ingestion exceed 1. Again, that calculated risk results from non-Site related, naturally occurring constituents, and should not be repeated as a basis for implementation of a remedial action under CERCLA. Repeating this potential risk conclusion creates unnecessary public concern and does not comport with U.S. EPA risk assessment practices and guidance.

EPA Response:

See EPA's response to Comment 12.

15. On page 12 of the Proposed Plan, U.S. EPA makes a statement that monitored natural attenuation will take 67 years to bring OU2 groundwater to the 1 ppb level for TCE. Based on a review of the final RI/FS for OU2, we understand that that time period was calculated based on a model. However, it is not clear that the remedial action underway in OU1 was taken into account. Instead, U.S. EPA makes repeated statements about the OU2 groundwater TCE concentrations being at a steady state and apparently incorporated that assumption into its monitored natural attenuation model. Since data collected in OU1 show that the TCE concentrations are decreasing and not in a steady state condition, and the remedial action being implemented in OU1 will further decrease TCE concentrations, the steady state model assumption is not technically defensible. Consequently, the 67 years is likely to over-estimate the monitored natural attenuation period and should be revised.

EPA Response:

The remedial action for TCE in the OU1 Study Area includes a groundwater pump and treat system to contain elevated TCE concentrations near the source area, and monitored natural attenuation in the downgradient portions of the TCE plume. As described in Section 4.1.1.2 of the OU2 Study Area FS Report, a groundwater model (presented in Appendix B of the OU2 Study Area FS Report) was used to calculate the estimated time-of-remediation for natural attenuation component of the proposed remedies. The assumptions and limitations of the model are summarized in the OU1 Study Area FS Report, and it assumes that the "source" has been removed (i.e., that the on-going migration of TCE from the OU1 Study Area to the OU2 Study Area has stopped). This limitation of the model was recognized, prompting the discussion in the text that "...no additional mass flux will move into the area. Because the OU1 TCE will continue to migrate into this area over time, it is probable that the actual time of remediation could be longer than 67 years." The estimate of 67 years for time-of-remediation for the OU2 Study Area is considered to be an under-estimate, not an over-estimate.

EPA's evaluation of the groundwater data collected over a period of time indicates a near steady state condition for the plume. The time-of-remediation model that was run assumed a steady state condition of the plume. The near steady-state condition of the TCE groundwater plume was presented in the OU1 Study Area RI Report and based on groundwater samples collected for over 20 years at the Dale Avenue public water supply well (Figure 7-3 in the OU2 Study Area RI Report) and from groundwater samples collected in 2002 compared to the samples collected in 2000. The plume is roughly in a steady-state condition. The plume is not spreading in an appreciable manner, however, over time there can be local change and variability within the plume. See EPA's response to Comment 16, below, for a discussion on EPA's finding of the near steady-state condition of the plume.

16. Also on page 12 of the Proposed Plan, U.S. EPA begins its description of its proposed selected Remedial Alternative 2(b). That Alterative includes an approximately ten mile extension of water mains so that all homes within OU2, estimated at 320, not currently connected, would be connected to the public water supply system. The capital cost for that remedial alternative is listed as $13,992,000.00 with this water connection plan representing the most significant portion of the estimate. However, U.S. EPA is without the legal authority or a technical basis for selection of that approach to alternative water supplies in OU2.

Under CERCLA, U.S. EPA may require or implement remedial actions to address releases or threatened releases of hazardous substances. However, proposing to require that alternative water supplies be provided to homes with wells shown to be unimpacted is not within that authority. As held in *United States* v. *Bell Petroleum Services, Inc. et al.* 3F 3rd 889 (Fifth Circuit, 1993), provision of alternative water to homes not shown to be impacted was arbitrary and capricious. In that case, the administrative record included no information that anyone was actually drinking chromium impacted groundwater. Here, the administrative record relied upon by U.S. EPA includes information that demonstrates that people are not drinking TCE impacted water. The judicial precedent mandates that the proposed remedy be re-evaluated so that clean wells are not required to be provided with alternative water connections or POET's unless and until monitoring shows TCE is present over the identified remedial objective.

U.S. EPA's statements about the nature of the hydrogeology in OU2 are likewise inconsistent with the Agency's concept that all wells, even those tested to be clean, are threatened. For example, in Section 4-4 of the final RI Report for OU2, the U.S. EPA concludes that fractures away from the Karrsville Thrust Fault are **not** conduits for flow. Therefore, wells away from that Fault would not be threatened by the impacted groundwater. In addition, in the Executive Summary of the final FS, U.S. EPA states that "the TCE plume is not expected to significantly migrate beyond the current limits and is not expected to significantly affect additional non-impacted areas." (page v, final OU2 Feasibility Study) Also in the Feasibility Study, the Agency stated "there may be some residences within the OU2 Study Area that are not impacted by the groundwater contamination and are <u>not immediately threatened</u>. (emphasis added) (page 4.3, final OU2 Feasibility Study). Given those conclusions, no alternative water supply would be necessary or appropriate for wells where TCE was not detected above 1 ppb.

Further, U.S. EPA dismisses the use of POETs for all but the most remote wells saying they are not a long-term solution. However, POETs have been used and/or approved by U.S. EPA at numerous other CERCLA Sites as the appropriate approach to impacted water supplies over time. NJDEP itself has already installed POETs on at least 80 wells in OU2 with the expectation that those systems will be maintained for an indefinite period of years.

The proposed remedy is also inconsistent with the U.S. EPA's approach in OU1 of this same Site. U.S. EPA has now adopted an approach to the remaining wells in OU1 that provides for sampling, and if TCE impacts over the remedial objective are

found, consideration of whether connection to an existing water main or installation of a POET is most cost-effective. The same approach should be included in the selected proposed remedial action for OU2. Otherwise a technically baseless distinction is being made between OU1 and OU2 which would again constitute arbitrary and capricious action by U.S. EPA. Finally, U.S. EPA itself has acknowledged that it is without CERCLA or other statutory authority to require the provision of alternative water supplies for unimpacted wells. When specifically asked about this issue, Region 2 publicly stated it had no authority to provide alternative water for unimpacted wells at Superfund Sites. Similarly, at the Ellsworth Industrial Park Site in Illinois, U.S. EPA again confirmed its lack of statutory authority to undertake such a response action. Given these clear statements of U.S. EPA's own view of the scope of its statutory authority, the proposal to require alternative water for unimpacted wells is *ultra vires* action on the part of U.S. EPA.

EPA Response:

The outlined understanding of EPA's authority is not correct. As EPA has commented elsewhere, particularly regarding PPPI's implementation of the current OU1 TCE Remedial Design, EPA's authority under CERCLA not only extends to actual releases, but to the threat of releases. Regarding this Site, for areas in the vicinity of the TCE groundwater plume, there is a clear threat of release because of a number of factors: 1) the overall size of the contaminated groundwater plume 2) contamination is dispersed over a very large area, 3) the complex hydrogeology and heterogeneity of the aquifer that includes preferential flow through fractures as well as dissolution pathways in the limestone and dolomite, and 4) it is not possible to accurately predict potential future contaminant impacts to individual wells at the local level. PPPI's consultant's own work has similarly discovered the same during RD activities in the more highly contaminated OU1 area. Based on sampling conducted by the NJDEP and EPA in the OU1 and OU2 areas involving hundreds of residential wells over several years, impacted wells are found immediately next to wells that are not impacted, and the groundwater flow pattern changes over time on a local level.

Regarding bedrock fractures, in general, as stated in Section 4.4 of the OU2 Study Area RI Report, the "bedrock fractures in areas not near the fault do not appear to be permeable groundwater flow conduits." Residential water supply wells installed in these bedrock zones would not produce a sufficient amount of potable water, requiring drilling to deeper depths to find more water-bearing fractures. As discussed in Section 5.8 of the OU2 Study Area RI Report, active pumping of bedrock fractures (such as with residential water supply wells) may induce TCE migration along the bedrock fractures. In addition, as discussed in the Executive Summary of the OU2 Study Area FS report, "...it is noted that groundwater flow fluctuates on a local scale, due to natural and artificial influences, such as geology, seasonal variations in rainfall, groundwater levels, surface water, and the pumping of wells" and "[t]herefore, while the overall plume is at or near steady state, it is not possible to accurately predict potential future contaminant impacts to individual wells at the local level." In other words, although the overall TCE plume is not expected to significantly migrate, there are potential changes in the groundwater flow regime over time that may affect TCE migration at the local scale. The TCE plume is widespread, and based on the complex nature of the geology and uncertainty related to local TCE

migration over-time, residential wells not immediately impacted may become impacted in the future, therefore, hundreds of potable wells are threatened. In this situation, an alternative water supply option is the most protective of human health and the environment. As stated in EPA's response to Comment 3, EPA considers all residences within the proximity of the aerial extent of the plume to be either impacted or threatened.

EPA disagrees with the comment that the proposed OU2 remedy is inconsistent with the remedy selected in OU1. Prior to EPA's issuance of the OU1 remedy, the NJDEP had already installed waterlines throughout much of the OU1 impacted area to address the potential risk associated with exposure to contaminated groundwater. Similarly, the OU2 remedy provides for the construction of a water line and connections to address the potential risk associated with exposure to contaminated groundwater in the OU2 Study Area.

Furthermore, The *Bell* case cited by PPPI does not apply to the facts at this Site. In *Bell*, as PPPI points out, the Court found that no residential wells had been affected. Here, TCE above state and federal standards has been found in sampling of over 100 residential wells in the OU2 study area, demonstrating actual impact. Unlike *Bell*, at the Pohatcong Site residents are, in fact, exposed to contaminated water. As mentioned above, EPA's authority extends to circumstances not only where there is a "release" of hazardous substances but where there is a "substantial threat of such a release." 42 U.S.C. Section 9604(a)(1). Such a threat exists throughout the Pohatcong Valley Site.

Finally, there is no source or authority cited by PPPI for the following allegations: "Region 2 publicly stated it had no authority to provide alternative water for unimpacted wells at Superfund Sites. Similarly, at the Ellsworth Industrial Park Site in Illinois, U.S. EPA, again confirmed its lack of statutory authority to undertake such a response action." Therefore, EPA cannot respond to these alleged statements.

17. On page 14 of the Proposed Plan, U.S. EPA begins its discussion of remedial alternatives. This discussion is notable for its failure to consider the impact of the approved remedy currently being implemented in OU1, immediately upgradient of OU2. There is no technical justification for considering the OU2 remedy in complete isolation from and without reference to the OU1 remedy. Since that remedy is approved and is being implemented, the Agency should assume that the remedy will have an impact on future groundwater concentrations in OU2. If one accepts the U.S. EPA assertion, for purpose of this comment only, that the source of all of the TCE in OU2 is OU1 and that it flows from source areas in OU1, the removal of the contaminated water at the source area(s) can be expected to have a major impact on TCE concentrations in a relatively short time period. Any remedial action selected for OU2 must reflect this fact.

EPA Response:

EPA's April 2010 Proposed Plan for OU2 did take into consideration the OU1 remedy. Page 2 of the Proposed Plan states: in 2006, EPA selected a remedy for Operable Unit 1 (OU1), which includes groundwater extraction and treatment of groundwater hot spots,

and long-term monitoring of natural attenuation for areas outside hot spots. The OU1 remedy will serve to restore groundwater within the OU1 study area of the Site to beneficial use and will meet the applicable drinking water standards.

The estimated time-frame for remediation of the TCE plume in the downgradient areas in the OU1 Study Area is about 55 years based on information provided in the OU1 Study Area FS Report. To provide an estimate for the TCE plume just in the OU2 Study Area, the natural attenuation model used in the OU1 Study Area FS Report was updated using the site-specific data in the OU2 Study Area, moreover, the OU2 modeling effort assumed that the TCE plume from the OU1 Study Area has stopped flowing into the OU2 Study Area (as discussed in the OU2 Study Area FS Report). Therefore, this approach does take into account the OU1 Study Area remedy to provide an estimated time-frame for remediation.

18. On page 17 of the Proposed Plan, U.S. EPA proposes installation of approximately ten miles of water mains throughout OU2 where no public water distribution system currently exists. The cost for U.S. EPA's proposed preferred remedial alternative is estimated at $15,040,000.00 (present worth). Yet, residential groundwater sampling in the most southern portion of OU2 has demonstrated that of the approximately seventy-five wells sampled, no more than approximately one-third contained TCE in excess of New Jersey's drinking water standard. (See Figure 5-2 of final Feasibility Study). In addition, U.S. EPA's own monitoring wells, RHR and SMS, did not contain any TCE above applicable standards. To require the installation of a multimillion dollar water main system to address this clear minority of impacted wells in an otherwise clean area is not cost-effective and would therefore be inconsistent with the National Contingency Plan.

This same issue colors U.S. EPA's proposed remedial selection throughout OU2. As noted above, less than a quarter of the tested residential wells in OU2 showed TCE concentrations in excess of the New Jersey drinking water standard. Even fewer, approximately 4% showed a TCE exceedence of the Federal MCL. In a setting where no public water distribution exists, those wells can and should be addressed through the installation of POETs. The U. S. EPA proposed selected remedial alternative is simply not a cost effective or necessary remedial choice.

EPA Response:

This comment substantially repeats earlier comments. See, e.g., EPA's responses to comments 3 and 16, above. The comment is focused on the issue of cost-effectiveness. However, as mentioned in response to prior comments, "cost" is only one of the nine evaluation criteria found at Section 300.430(e)(9)(iii) of the NCP. It was duly taken into consideration in the evaluation of alternatives in the OU2 FS and the Proposed Plan. It is not determinative in and of itself.

19. On page 17 of the Proposed Plan, U.S. EPA identifies alternative 2(b) as its selected remedial approach for OU2. That selection is based on an assumption that impacted

groundwater will continue to migrate from OU1 to OU2 exchanged. However, assuming for purposes of this comment only that that is the case, other remedies such as alternative 2(a) would be as protective at far less capital and overall cost. To select a more costly remedy is inconsistent with the National Contingency Plan criteria and therefore a contravention of CERCLA.

EPA Response:

EPA assumes there is a typo in the comment, where the word "exchanged," should instead be "unchanged." As mentioned in response to prior comments, "cost" is only one of nine evaluation criteria found at Section 300.430(e)(9)(iii) of the NCP. It was duly taken into consideration in the evaluation of alternatives in the OU2 FS and the Proposed Plan. Cost is not the only factor used in evaluating proposed alternatives, nor is it the deciding factor, it is one of nine criteria that must be carefully evaluated and compared, and weighed in consideration against the other criteria. The evaluation process of these nine criteria is adequately explained in the Proposed Plan that was released to the public for comment. EPA believes that it has correctly applied the NCP and CERCLA in the evaluation of the proposed alternatives when considering the FS and the Proposed Plan, as well as in the selection of a ROD remedy.

20. As noted previously, alternative 2(b) does not meet the National Contingency Plan criteria of reduction of contaminants through treatment, short-term effectiveness or implementability as well as alternative 2(a) targeted at impacted wells would. As U.S. EPA acknowledged on its Proposed Plan, alternative 2(a) is protective of public health and the environment, would remove contaminants from groundwater at the point-of-use and would take about half the time of alternative 2(b) to implement. (See pages 14 and 15 of the Proposed Plan.) On page 16 of the Proposed Plan, U.S. EPA further acknowledges that alternative 2(b) would be more difficult to implement initially than alternative 2(a). The required balancing of National Contingency Plan criteria weighs in favor of alternative 2(a) rather than the proposed selection of alternative 2(b).

EPA Response:

EPA disagrees with the assertion that the evaluation of the nine criteria favors Alternative 2(a) over 2(b). This evaluation is clearly detailed in the Proposed Plan, which determined that the long term benefits of Alternative 2(b) far outweigh the long term O&M requirements that would be required for Alternative 2(a).

21. On pages 17 and 18 of the Proposed Plan, the U.S. EPA notes that it would consider Clean and Green technologies to address the groundwater conditions in OU2. Yet no such technologies were evaluated in the final FS for the OU2. Before a remedial alternative is selected for OU2, consideration of such green technologies should be completed.

EPA Response:

EPA selects a remedy based on the NCP and on an evaluation of the nine criteria. EPA's Clean and Green Policy will be considered and utilized where appropriate, during the RD and RA phases of the cleanup.

22. Given the results presented in the final OU2 RI/FS, the remedial alternative derived from the Feasibility Study which best meets the National Contingency Plan criteria is as follows:

- Monitored natural attenuation;
- Sampling of potable wells and provision of POETs to those found to be impacted in excess of the 1 part per billion TCE objective;
- Periodic monitoring of both POETs to demonstrate effectiveness, and other potable wells to demonstrate that water quality remains below the TCE remedial objective;
- Installation of additional or replacement POETs as needed to maintain potable water at or below the TCE remedial objective; and
- Institutional controls (CEA and/or expanded well restriction area).

This remedial approach, which is similar to that reviewed as alternative 2(a) in the Proposed Plan, would be as protective as the proposed selected alternative 2(b), while being more cost-effective, and implementable in a less disruptive and shorter time frame. It too relies on the proven technology of point of use treatment units thereby meeting the U.S. EPA's preference for active treatment over other remedial approaches. Therefore, in accordance with the National Contingency Plan, precedent and the U.S. EPA's own descriptions of its statutory authority, this approach must be viewed as the preferred remedial alternative for OU2. Adoption of this remedial approach would allow the implementation to proceed in a more timely and cost effective manner.

EPA Response:

The alternative proposed by this comment was not evaluated in the OU2 FS, and, therefore, cannot form the basis for EPA's preferred remedy. See EPA's response to Comments 19 and 20, above.

Comments on the Remedial Investigation Report
General Comments

23. The RI Report does not include any source investigation work. No soil samples were collected at any property within OU2 to see if that property were contributing to the Site groundwater conditions. OU2 includes an approximately 6.5 square mile area (4,200 acres) of mixed industrial, commercial and residential development. Given the multitude of past uses for trichloroethylene ("TCE"), and the presence of industrial/commercial facilities in OU2, it is more than likely that one or more

locations in OU2 is or was contributing to the groundwater impacts. Yet, no potential source areas ("PSAs") were investigated through soil sampling as part of the OU2 RI. This is particularly problematic given the U.S. EPA's statements on pages 1-1/1-2 and 1-6 that one of the purposes or focuses of the RI for OU2 was to identify/understand the sources of groundwater impacts in the OU2 Study Area.

Further, Task 3 of the EPA's Statement of Work for the OU2 RI describes soil and sediment sampling to be done in OU2 to fill data gaps. The fact that potential source area soil sampling in OU2 was planned by the Agency and its contractor CH2M HILL, but never performed, makes the final RI and its conclusions even more questionable.

EPA Response:

PPPI raised these comments previously. Please refer to EPA's response to Comments 8, 10, 24, 25 and 26. The OU2 RI was phased. During the planning of the OU2 RI, EPA identified and evaluated potential source areas (PSAs), which included an evaluation of PSAs that were identified and evaluated during the OU1 RI. The first field work phase of the OU2 RI consisted of the installation of groundwater monitoring wells, the collection of groundwater, residential well samples, sediment, and surface water samples. Several subsequent phases involved the expansion of the residential well sampling program, with the sampling of hundreds of residential wells. Although EPA planned for the possibility of soil sampling in the OU2 RI, based on the results of the conducted OU2 field work, EPA determined that an additional soils sampling phase was not necessary.

24. The U.S. EPA noted that the Victaulic Company of America ("VCA" or "Victaulic") property located in the midst of OU2 was a possible sources of chlorinated volatile organic compound groundwater contamination based on the limited work done during the RI for Operable Unit One ("OU1"). The history of operations on this property included a zinc plating and hot-dip galvanizing process, discharge of process wastes into a 1,500 foot long open tunnel in the basement and use of an infiltration/percolation lagoon. During the OU1 RI, four soil gas samples, two soil samples and three groundwater samples were collected. Volatile organic compounds ("VOCs"), including TCE and elevated metals were detected in both the soil and groundwater sampled at this property. All of the samples were collected on the eastern side of the property; no sampling of any kind was done on the western or downgradient half of the property. Based on this initial sampling, the U.S. EPA nonetheless concluded that this property was a probable source of groundwater impacts.

As part of the OU2 RI, the U.S. EPA installed a monitoring well at the intersection of Quarry Road and Lenape Trail in a location that is presumed to be downgradient from the Victaulic facility. TCE was not detected in the one sample collected from that well and, based on that alone, the U.S. EPA decided the Victaulic property was not and had not been a source of groundwater impacts. It is not clear why the U.S. EPA failed to re-sample the wells that are actually on or adjacent to the Victaulic property during the OU2 investigations. These data are clearly more relevant to evaluating a

known PSA than data collected from an area that is presumed, but not demonstrated, to be downgradient of the possible source area. Given the complex hydrogeology and the minimal sampling done, it is simply not possible to eliminate this property as a source of regional groundwater impacts based on one groundwater sample, particularly one that is not located at the PSA itself. In addition, U.S. EPA used this one groundwater sample to eliminate T&M Pallets as a possible source area, thereby compounding the inadequacy of its investigative approach.

EPA Response:

PPPI raised these comments previously. Please refer to EPA's response to Comments 8, 10, 25 and 26. In addition, as stated above, EPA's conclusion regarding VCA was not based on one OU2 RI sample from a newly installed well that was located downgradient. As stated in the comment, the VCA property had previously been sampled and evaluated during EPA's OU1 RI, and soil and groundwater samples were collected. During the OU2 RI, the newly installed downgradient monitoring well sample result was supplemented with the groundwater sample results from several residential wells located between the VCA facility and the former Edison Quarry. These data show that TCE is not detected in groundwater underlying residential properties immediately in the downgradient flow path from the VCA facility (nor the adjacent pallet facility, TPC), but TCE is detected at increasing concentrations toward the Karrsville Fault and the former Edison Quarry, which is toward the approximate center of the TCE plume and valley within the OU2 Study Area.

25. Two other U.S. EPA-identified PSAs are located within the OU2 acreage. Broadway Restoration and Feilbach Welding Service are both located in OU2. Neither one of these properties was sampled in either the OU1 or the OU2 remedial investigations though each has an industrial past involving the use of solvents. Despite that lack of sampling, the U.S. EPA indicated that there were no source areas in OU2 and eliminated each as a potential source of groundwater impacts without any discussion of these properties. Based on the information available to the U.S. EPA, no reasonable technical basis exists to reach that conclusion.

EPA Response:

EPA utilized the findings of the OU1 RI when developing the scope of work for the OU2 RI. In addition, Broadway Restoration and Feilbach Welding are not located within the OU2 Study Area, but within the Pohatcong OU1 boundary, and were previously evaluated as discussed in the OU1 RI Report (identified as BRC and FWC, respectively). Both of these facilities were evaluated for the potential presence of chlorinated volatile organic compounds (VOCs) through an initial soil gas sampling effort conducted during OU1 investigations and the decision-model results indicated insufficient evidence to warrant additional investigation at these facilities (See Section 5.4 of the OU1 RI Report).

26. Other properties, such as the Warren Control, Warren County Vocational School and Brockway Plastics property, were also disregarded in the OU2 RI as possible source locations based on no or inadequate characterization. For those properties where any soil samples were collected during the OU1 RI, the samples were limited in number and depth; for others, no samples were collected at all. As noted above, no soil sampling at all was done at any locations during the OU2 RI. For an approximately 6.5 square mile area of mixed industrial, commercial, agricultural and residential use, U.S. EPA assumed no source areas for one of the most commonly found volatile organic environmental contaminants in the country based on almost no data.

EPA Response:

This comment incorrectly states that EPA assumed there were no source areas within the OU2 Study Area. EPA conducted an investigation to identify potential sources within the OU2 Study Area. The properties of Warren Controls, Warren County Vocational School, and Brockway Plastics are located within the OU1 boundary and were assessed as part of the Pohatcong OU1 RI Report. Soil gas sampling results from the Brockway Plastics (identified as BPC in the OU1 RI Report) were used in the decision-model and the results indicated insufficient evidence to warrant additional investigation at this facility (See Section 5.4 of the OU1 RI Report). The OU1 RI Report documents the results of the soil and groundwater sampling results from the Warren Controls and Warren County Vocational School (identified with the acronyms of WCC and WCV, respectively), with the conclusion that the absence of chlorinated VOCs in the soils excluded these facilities from further consideration as a contaminant source area to the regional PVGCS aquifer (See Sections 5.9.31 and 5.9.32 of the OU1 Report).

27. The OU2 RI included analysis for twenty-seven volatile organic compounds, in addition to TCE and tetrachloroethylene ("PCE"), metals and semi-volatile organic compounds. The Site groundwater constituents of concern had already been defined as TCE, PCE and their natural breakdown products based on the OU1 RI work. The extent of the Site itself is defined by the detections of TCE and/or PCE in groundwater according to U.S. EPA. Therefore, no technical basis existed for disregarding the historical data and sampling for all of these constituents. On page 1-6 of this RI Report, U.S. EPA states that the RI was not intended to sufficiently or to fully characterize the nature and extent of contaminants other than TCE and PCE." Given that statement, the analysis of samples for a full range of VOCs, SVOCs and metals is arbitrary and unnecessary.

EPA Response:

As stated above, historical and background data were utilized and not disregarded. As stated on pages 1-6 of the RI report, analysis of VOCs, SVOCs, and metals was completed for samples collected from the groundwater monitoring wells, to determine the nature and extent of groundwater contamination in the OU2 Study Area, and to provide sufficient information to fully evaluate potential risks to human health and the environment for the OU2 Study Area. The same page of the RI cited above clearly states that the purpose of the OU2 RI is to "Characterize the hydrogeology and the nature and

extent of the groundwater contamination within the OU2 Study Area," and to "Perform screening-level human health and ecological risk assessments." In addition, a complete range of parameters was collected for consideration during the FS in order to adequately evaluate potential treatment technologies which could be considered. Moreover, monitored natural attenuation parameters were also evaluated for selected groundwater monitoring wells. The FS must consider all contaminants for the purpose of adequately evaluating potential treatment technologies and appropriate remedial alternatives for a Record of Decision. Note that the comprehensive laboratory analyses cited in the above comment was limited in that it was performed for only 25 groundwater monitoring well samples, 6 sediment and 9 surface water samples, collected during the OU2 RI. Once it was clear that Site Volatile Organic Compounds (VOCs) were the main contaminants of concern in the OU2 Study Area groundwater, the hundreds of groundwater samples that were subsequently collected from residential wells (204 were sampled at the time of the Proposed Plan) were analyzed for target compound list (TCL) VOCs, only. The many vapor intrusion screening samples were analyzed for an even more limited list of VOCs, as well.

28. The reported data in the RI for OU2 primarily consisted of sampling of residential or other private wells. However, no information is included in the RI as to the depth of any of these wells, the well construction or boring details. U.S. EPA acknowledges this shortcoming at page 3-6 of the RI report. It is not possible to understand anything about the integrity of the wells or what strata is being sampled at any given location based on the available information in the final RI. Instead, U.S. EPA simply assumes that all of the well samples represent the regional groundwater with equal validity. Such an assumption is not technically defensible.

EPA Response:

EPA disagrees with the commenter's assertions. The OU2 RI did not primarily consist of sampling residential wells. PPPI raises similar comments in later comments as well. As clearly stated in the OU2 RI report and in EPA's responses to Comments 8, 10, 24, 25 and 26, above, EPA conducted a comprehensive RI to identify potential sources of groundwater contamination in both the OU1 and OU2 Study Areas. One of the OU2 RI's main objectives was to identify and evaluate PSAs in the OU2 Study Area.

The OU2 RI work was phased. The first field work phase of the OU2 RI consisted of a geophysical survey, the installation of groundwater monitoring wells, and the collection of groundwater, residential well, sediment, and surface water samples. Several subsequent phases involved the expansion of the residential well sampling program, with the sampling of hundreds of residential wells.

Information as to the well depths or construction were not available at all or even most of the residential well locations. Based on EPA's understanding of groundwater occurrence in Pohatcong Valley, perched groundwater in the OU2 area does not occur or, if found locally, would not be sufficient to use as a potable water source. The assumption that the residential wells are installed in the regional aquifer is reasonable and is consistent with the completion details of some of the residential wells. Consequently, the water quality

from the residential wells are useful, in conjunction with other data collected at the Site, for the identification of TCE in the regional aquifer. An overall assessment of the TCE concentration gradient through the OU2 area shows a consistent decreasing trend, suggesting that the investigation approach is reasonable given the scale of the site. The OU2 RI and FS Reports, however, specifically acknowledge the issue of uncertainty at the local level with the occurrence or absence of TCE and this uncertainty is addressed through the preferred remedy identified in the Proposed Plan.

The regional groundwater gradient and flow through the Pohatcong Valley is based on monitoring well data, as depicted on RI Figure 4-2, which clearly shows that the regional groundwater elevation decreases from approximately 410 feet above sea level in the northeast part of OU1 Study Area, near the former ANC facility as the identified TCE source area, to approximately 270 feet above sea level in the southwest part of the OU2 Study Area, a decrease of approximately 140 feet. The regional groundwater gradient and flow direction across the Site, from northeast to southwest is conclusively established.

29. A portion of the OU2 RI work involved vapor intrusion sampling. However, the justification for such sampling is not clear in the document. In most areas, the detected levels of volatile organic compounds in the ground water do not support the conclusion that a risk of vapor intrusion would exist. This is especially true in areas where the detected TCE concentrations were consistently measured as being below the Federal and State MCLs. U.S. EPA guidance views Federal MCLs as protective for the vapor intrusion pathways. Further, while the RI assumes that each subslab or indoor air finding of TCE is caused exclusively by groundwater impacts, information to eliminate other alternative sources on a property-specific basis is not provided in the Report.

EPA Response:

Vapor intrusion (VI) sampling was conducted in both the OU1 and OU2 areas because EPA needed to evaluate the exposure potential of the vapor intrusion pathway due to widespread volatile organic compounds detected in Site groundwater. VI work is justified at every site where volatile contamination in groundwater exceeds federal or state standards and underlies structures. This condition is met throughout the OU1 and OU2 Study Areas, where residences, offices, businesses, schools and daycare centers are located. It should also be mentioned that transects were also used to look at vapor intrusion gradients across the plume, as well as gradients radiating from the Karrsville Fault zone along Asbury-Broadway Road area.

As stated in the Final OU2 RI, the Proposed Plan, as well as on pages V and VI of the Executive Summary in the Final OU2 Study Area FS Report, potential changes in groundwater flow patterns over the years could locally influence the TCE migration flow path such that residences in the OU2 Study Area are considered to either be impacted or at risk of exposure to site-related contaminants. Also see EPA's response to Comment 3, above.

As discussed in detail in Section 5.7 the OU2 RI Report, the potential threat of impact due to site-related vapor intrusion was of sufficient concern to warrant a removal action at one elementary school and two private residences (See Section 5.7.6 of the OU2 RI Report).

30. The RI for OU2 places great reliance on its characterization of the Karrsville Thrust Fault as a preferential flow pathway for groundwater from OU1 to OU2 and as a mechanism to move TCE from the alleged source areas in OU1 to OU2. This assertion is based on essentially one comparison of two data points - the one well drilled along the fault and another well drilled same distance from the fault. These data cannot be extrapolated to the entire fault zone or to all of OU1 and OU2. In addition, the U.S. EPA's map (Figure 2-1), which is based on geologic studies of the area, shows that the Fault does not extend anywhere near the source areas that the U.S. EPA has alleged exist in OU1. Therefore, if U.S. EPA contends that the source of TCE contamination must be connected to this Fault, then another source of contamination must exist along the Fault and at least a mile or more north and west of the previously U.S. EPA-alleged source areas.

EPA Response:

EPA disagrees with the assertion made in the comment. The assessment of the Karrsville Fault was not based on one data point. The identification and understanding of the Karrsville Fault was important to complete the characterization of the TCE groundwater plume migrating through the OU1 and OU2 Study Areas. While the regional groundwater flow gradient is from the OU1 to the OU2 Study Areas, it must be clearly noted that the Karrsville Thrust Fault zone plays a major role in groundwater movement and serves as a preferential flow path from the OU1 Study Area into the OU2 Study Area. The assessment of the Karrsville Fault as the main groundwater conduit through the OU2 Study is supported by geophysical data, and by groundwater data and vapor intrusion data that showed the highest TCE concentrations occur over and adjacent to the fault, and decrease away from the fault (See Figure 5-2 of the OU2 RI Report). Also, see EPA's responses to Comments 6 and 7, pertaining to findings regarding the Karrsville Thrust Fault, for further discussion.

31. The analyses of samples from domestic wells are the single largest dataset in the RI and the most critical data for evaluating and determining the remedy selected in the FS. Given the critical nature of these data, it is difficult to understand why the RI provides so little information on these wells. Information such as the depth of the wells, the open hole or screened interval, and the location of the sample in relation to any testament systems or holding tanks is not provided. In addition, as noted elsewhere in these comments, the table summarizing the sampling results (Table 6-19) is not in the RI. All of these data should be presented in the Report. Well construction data are readily available for many of these wells because drillers have been required to file permits and logs with the NJDEP for all wells constructed since 1947. In addition, the WCHD may have copies of some of these well records. No

statement is made in the RI as to whether U.S. EPA attempted to obtain any of this critical information.

EPA Response:

As described in Section 3.3.4 of the OU2 Study Area RI Report, groundwater samples from residential wells were collected by the NJDEP and the Warren County Department of Health (WCDOH), as well as the EPA. As mentioned in EPA's answer to Comment 28, above, for these data sets, information about the wells, such as depth, were either unknown to the well owner or could not be field verified. In addition, well construction logs were not available from the NJDEP. EPA disagrees with PPPI's assertion that well completion data were "the most critical data" for understanding residential well contamination and impacts, as well as groundwater contamination patterns. EPA based its decision to recommend Alternative 2b on many other factors and data that are clearly outlined in the RI and FS reports, as well as in the Proposed Plan.

The residential groundwater sampling data collected by the WCDOH, NJDEP, and EPA are included in the OU2 Study Area RI Report and are clearly identified in Appendices F, G, H, and I, respectively. The table reference (Table 6-19) should have referenced Appendix I. This change will be reflected in errata to the RI that will be released separately.

Specific Comments
Remedial Investigation Report

32. On page v of the final RI Report, in the second paragraph, the U.S. EPA states that drilling and groundwater flow/quality testing through the fault zone at the OUl-OU2 boundary revealed a permeable water-bearing zone that promotes migration of contaminated groundwater along the hydraulic gradient from OU1 to OU2. However, it should be noted that these conclusions were drawn based on the comparison of two data points. Given the heterogeneity of the subsurface materials, the conclusions drawn based on this very limited comparison cannot properly be extrapolated to the fault zone as a whole. Additionally, the EPA states that TCE concentrations in groundwater collected during packer testing and sampling at this location reached 31 µg/l. Based on the data reported in Table 5-2, TCE concentrations up to 33 µg/l were reported.

EPA Response:

Drilling and testing within the Karrsville Fault zone represents many data points (multiple groundwater samples were collected from the 3 new ABR wells and 6 separate completion zones), as well as from packer tests completed in various zones within the fault zone, to characterize the nature of the hydraulics and groundwater quality near the OU1/OU2 boundary. These data do not represent one data point, but rather one location. The Karrsville Thrust Fault is a major previously mapped geologic feature that extends throughout the OU1 and OU2 Study Areas. The nature of the fault laterally would not be expected to change significantly unless other major structural elements, such as intersecting faults or geologic features were identified that intersect or disrupt the fault

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and would therefore potentially affect groundwater flow. As intersecting faults or other major geologic features were not identified, nor are they expected based on previous United States Geological Survey (U.S.G.S.) geologic mapping of the area, it is reasonable to conclude that the nature of the Karrsville Fault is consistent throughout the OU2 Study Area. In addition, EPA conducted a seismic survey across the fault in the Asbury-Broadway area, which indicated that it is a fault zone of numerous disrupted reflectors that span a horizontal distance of more than 150 feet, as well as comprises extensive vertical extent. It is not a single limited fault plane, and is therefore more likely to influence groundwater flow on the local and regional level. The comment is not correct, nor based on an accurate reading of the OU2 RI report. The groundwater sample referenced had a TCE concentration of 31 µg/l, whereas the highest TCE concentration from the packer testing at the same location was 33 µg/l. The difference is not statistically significant. Also, see EPA's responses to Comment 6, 16, and 30, above.

33. On page 2-2, the U.S. EPA indicates that the main industrial facility within the OU2 Study Area is the VCA property; however, no discussion of any investigation of this company as a PSA is provided in the RI. Additionally, no other industrial facilities or other PSAs are included in the OU2 RI report, other than a mention of the existence of T&M Pallets. As to that property, no description is given of its period or type of operations in the OU2 RI and no onsite investigation was done.

EPA Response:

This comment is a reiteration of several previous comments, and has been responded to previously. Page 2-2 of the OU2 RI identifies VCA and an adjacent property (a small pallet processing facility) as industrial facilities in the OU2 Study Area. Investigations at the VCA facility are summarized in the OU1 RI report (Section 5.9.27). The former Edison Quarry was also investigated as a potential source of dumping during the OU1 RI. The additional OU2 RI work and conclusions regarding VCA and the pallet facility are clearly outlined in the OU2 RI. Also see EPA's answers to Comments 10 and 24, above.

34. On pages 2-3, 2-5 and 4-3, the U.S. EPA acknowledges the impact on groundwater flow patterns caused by the presence of karstic features, such as dissolution and voids in the development of preferential pathways. However, the Agency focuses much of the discussion and the Conceptual Model for the Site on one pathway located along the Karrsville Fault. There are insufficient data to conclude that this Fault is the only significant pathway for groundwater or TCE migration in OU1 and OU2.

EPA Response:

There is sufficient data to support the conclusion that the Karrsville Fault zone is a significant preferential pathway for groundwater. On page 2-3 of the OU2 Study Area RI report, the EPA identified that the presence of karstic features that "...are expected to affect groundwater and contaminant migration on the local scale." On page 2-5, the EPA indicated that "Faulting and dissolution also create preferential flow pathways on a local and large scale." Unlike the Karrsville Fault, the karstic bedrock features, such as voids,

were found to be localized features and were not sufficiently interconnected to affect large-scale groundwater flow. With the large-scale migration of TCE in groundwater from the OU1 Study Area through the OU2 Study Area, the Karrsville Fault was identified as the main geologic feature that represents a large-scale conduit for groundwater and contaminant migration. See also EPA's response to Comments 6, 7, 8, 29, 30, and 32.

35. On page 2-5, there is a typographical error in the last sentence. The word "continue" should be "continues".

EPA Response:

Comment noted.

36. On page 3-2 of the RI, U.S. EPA states that monitoring wells were installed in the first-encountered groundwater zone either at the overburden/bedrock interface or within the bedrock. This statement again highlights the Agency's apparent assumption that any and all groundwater in OU1 and OU2 is connected. No attempt has been made to differentiate between TCE in overburden groundwater which may be related to local sources and TCE in deeper bedrock zones, which may be related to the presence of TCE regionally as well as to localized sources.

EPA Response:

EPA had not made any prior assumptions regarding groundwater flow in the OU2 Study Area. The data collected during the OU2 RI showed that groundwater within the OU2 Study Area occurs as one aquifer, because the OU2 RI did not find a hydraulic barrier that would separate groundwater into different aquifers. This was a conclusion based on the analysis of numerous data points. Within OU2, the shallow and deep zones are all part of the same aquifer, there are no hydraulic barriers such as clays, shale, or silt layers, separating the shallow from the deep portions of the aquifer.

In addition, as indicated in OU2 RI, Section 3.3.1, the only location within OU2 where groundwater was found above the bedrock was at the Asbury-Broadway Road area, where a multiple zone completed well was installed. At this location, no hydraulic barriers to regional groundwater flow were identified in the overburden (weathered bedrock) and the deeper bedrock, the shallow and deep zones are hydraulically connected.

37. On page 3-3, the U.S. EPA includes a list of wells installed during the OU2 investigation and indicates that "the three character site designation follows each name." However, the name of only one well location is included in the table, while abbreviations are provided for the others.

EPA Response:

The abbreviations are included in the Acronyms and Abbreviations list following the RI Report table of contents.

38. On page 3-7, there is a typographical error in the third line. The word "collected" should be "collect".

EPA Response:

Comment noted.

39. On pages 3-8 and 4-5, the U.S. EPA states that a synoptic groundwater elevation survey was conducted. However, the data presented includes measurements collected more than three months apart on August 13, 2007 and November 27, 2007 without consideration of seasonal climatic conditions that could influence the data. The word "synoptic" implies that all data points were collected at the same point in time and are therefore comparable. Measurements collected more than 3 months apart cannot be considered synoptic.

EPA Response:

The groundwater elevations used to construct the groundwater flow map (Figure 4-4) were measured during the August 2007 synoptic measurement event. The November 2007 data were not used, therefore the measurements collected were synoptic.

40. The U.S. EPA begins a review of its vapor intrusion assessment activities on page 3-11 of the RI Report. Reportedly U.S. EPA assessed two public buildings and nine residences, and collected approximately 102 samples of subslab soil gas, indoor air and outdoor air. Very little, if any consideration seems to have been given to the location of the tested buildings in relation to the groundwater testing. Additionally, no information is included on the rationale for selection of vapor sampling locations, which, in several cases, are located in areas where groundwater concentrations of TCE were reported to be low and unlikely to cause elevated subslab and indoor air vapor concentrations. For example, several tested buildings were located in areas having only 1 ppb of TCE in the area wells. Such low levels of TCE would not warrant vapor intrusion testing and, in fact, the U. S. EPA identified no indoor air or subslab concentrations above applicable standards in those locations. In addition, the selection of these locations when many other areas with TCE groundwater concentrations above 1 ppb were not tested, highlights the absence of a clear rationale for the location of the sampling. Finally, to provide additional clarity to the Report, it would be helpful if the OU1 and OU2 vapor intrusion results were clearly differentiated.

EPA Response:

The locations of the vapor intrusion testing were based on a combination of factors, including the following: groundwater contamination levels in a particular area, granted

access, depth to groundwater, overall coverage, and specific focus was based on identifying and testing local public schools and daycare centers, where sensitive populations could be exposed to contamination. It should also be mentioned that transects were identified to look at vapor intrusion gradients across the plume, however, the data collected along transects was spotty because access was not granted at all locations along transects. One transect that had good coverage resulted in the sub-slab vapor gradient radiating from the Karrsville Fault zone along Asbury-Broadway Road area. EPA obtained vapor intrusion screening results at limited locations throughout the OU2 Study Area, including in the downgradient portion of the OU2 area, where groundwater concentrations were lower, however, the depth to groundwater is also generally less, as well. The one large downgradient residential development located within Greenwich Township was of interest because it is located along the center of the plume and along the Karrsville Fault zone preferential flow pathway. Select properties located along the Karresville Fault zone were screened in order to be adequately evaluated. See also EPA's responses to Comments 6, 9, 29, and 30.

Vapor intrusion is a potential concern whenever there is a VOC groundwater plume, a large TCE groundwater plume is present within the OU2 Study Area. The fact that vapor intrusion results identified no indoor air or subslab exceedences in much of this area is a conclusion that was based on the data collected during the investigation. In addition, as stated in the Final OU2 RI, it is difficult to predict groundwater TCE concentrations on a local scale.

As discussed in detail in Section 5.7 of the OU2 RI Report, the vapor intrusion sub-slab results were of sufficient concern to warrant a removal action at one Elementary School (See Section 5.7.6 of the OU2 RI Report). It should be noted that vapor intrusion activities and results in the OU1 Study Area were not presented in the Final OU2 RI Report. These data will be provided as part of a separate future report.

41. On page 3-12, the U.S. EPA indicates that the samples were analyzed for VOCs, SVOCs, and inorganic metals. Yet, as previously noted in the Introduction (page 1-6), the U.S. EPA has stated that the focus of the RI is primarily TCE and that the RI was not intended to sufficiently or fully characterize the nature and extent of contaminants other than TCE. The Site was listed on the NPL and the Site boundaries are defined based on PCE and TCE detections. Sampling data from OU1 confirms that the only arguably Site-related constituents are PCE and TCE and their natural break-down products. Therefore, there is no technical justification for analyzing samples for parameters other than PCE, TCE and associated degradation products and natural attenuation parameters in this RI. The expense of analyzing samples for parameters other than PCE, TCE and associated degradation products and natural attenuation parameters should not be included in the investigation costs associated with this RI. Discussion of these potential contaminants should be the focus of a separate report since none of these other constituents has figured in the remedial considerations for OU2.

EPA Response:

PPPI raises the same comment several times in its letter. Please see EPA's response to Comment 27.

42. On page 4-2 and again on page 4-15, the statement is made that the American National Can ("ANC") site in Washington Borough has been identified as the source of the TCE concentration in OU1. The use of the phrase "the source" implies that the former ANC site is the only source of TCE contamination. The documentation presented to date does not justify this implication. Given the large areal extent of OU1 and OU2 and the ubiquitous use of TCE, it is more than likely that there are additional sources of TCE in both OU1 and OU2.

Also, as previously noted, the distribution of TCE indicates the presence of several different sources within OUl, including a source area upgradient from the former ANC property. As the U.S. EPA's own data demonstrate, other sources of TCE in the groundwater beneath OUl exist. For example, sampling has shown elevated TCE in a well that is more than 700 feet upgradient of PPPI's property and over 1200 feet upgradient from the nearest source area identified by the U.S. EPA. In addition, past groundwater sampling has demonstrated elevated levels in locations not consistent with a plume originating at PPPI. The U.S. EPA's review of past uses in OU1 and OU2 has identified several other industrial operations that used and may have released solvents such as TCE in past decades. The U.S. EPA has simply disregarded all of that information in insisting that PPPI's property is the source in this OU2 RI.

EPA Response:

ANC is the only identified TCE source for the OU1 and OU2 Study Areas, as per the OU1 and OU2 RI Reports. Despite these extensive investigations to identify potential sources, the former ANC facility was the only identified source of TCE. The significant amount of TCE found in soil and groundwater beneath the former ANC building, as evidenced in EPA's OU1-RI, as well as in PPPI's reports generated for the New Jersey Department of Environmental Protection, such as the *Remedial Action Selection Report and Remedial Action Work Plan for Soil Pechiney Plastic Packaging Inc. (former American National Can Company),* dated January 2008), among others, demonstrating that the ANC facility is the major source of TCE groundwater contamination.

It is noted that the distribution of concentrations in the TCE groundwater plume shows a consistent gradient from near the OU1 Study Area source (former ANC building and area) of about 4,000 µg/l, to the STJ and Dale Avenue public water supply well area (about 100 µg/l), to the end of the OU1 Study Area (about 30 µg/l), to near the end of the OU2 Study Area (about 1 to 5 µg/l). The observed TCE concentration decline with distance is consistent with one main source area with high TCE concentrations generating one plume, with little or no contributions from other potential source areas. No additional TCE soil source areas were identified in the OU1 and OU2 Study Areas.

43. On page 4-2, the U.S. EPA again refers to the source of the TCE groundwater concentrations in the OU1 Study Area as the former American National Can site.

That statement is not supported by U.S. EPA's own data as summarized in the previous comment above.

EPA Response:

This is the same Comment as Comment 42, above. Please refer to EPA's response to that comment.

44. On pages 4-2, 4-3 and page 4-5, the U.S. EPA provides its most complete presentation of its argument in support of preferential flow along the Karrsville Fault. The argument as presented in these pages appears to be primarily based on the relatively low flow encountered in one well not on the Fault (RHR location) versus the much greater flow encountered at the ABR location that is on the Fault. While it is possible that there is preferential flow along this Fault, it is technically unsound to draw a sweeping conclusion about the nature of flow in the aquifer based on a comparison of fractures from wells at two locations. In addition, this argument completely ignores the impact on flow from the complex karst environment, which, as the U.S. EPA acknowledges in other sections of the RI, includes solution features and voids that create preferential pathways. In all likelihood, there are a number of preferential pathways throughout OU1 and OU2 that are based on both faults and solution features. The data do not support placing such an emphasis on one particular pathway.

EPA Response:

As noted in response to numerous comments (see EPA's responses to Comments 6, 7, 8, 30, 32, 34, and 40, the large-scale preferential groundwater and contaminant migration is primarily through the Karrsville Fault. This conclusion was drawn in part based on the localized, isolated nature of karstic features, the occurrence of fewer water-bearing fractures away from the fault, and the distribution of TCE in the groundwater. These multiple lines of evidence were used to support the construction of the Conceptual Site Model, which is consistent with all available data. The karstic features were noted to affect local groundwater flow conditions and are not believed to be a preferential pathway for the entire OU2 Study Area, unlike the Karrsville Fault.

45. On page 5-1, U.S. EPA again lists the volatile organic compounds used as analytes for the OU2 RI. In addition, U.S. EPA states that metals and semi-volatiles were included for analysis as well. As noted previously, no technical justification exists for including this wide range of constituents in the characterization of TCE and PCE impacts in OU2. Nor were any of these data used in the FS in defining appropriate remedial alternatives.

EPA Response:

This is the same comment that PPPI has raised in prior comments. Please refer to EPA's response to Comment 27.

46. On pages 5-1 to 5-2, the U.S. EPA states that dissolved contaminants in the groundwater from the OU1 study area would migrate with the groundwater to areas hydraulically downgradient from the release and impact water supply wells, and that the Karrsville Fault connects OU1 and OU2 and may provide a preferential pathway for contaminants to migrate in the overburden and bedrock aquifers. The U.S. EPA neglects to mention that migration of contamination is likely also influenced by pumping of public water supply and residential wells in the area. No pumping test data were included to show the extent of influence of these public supply or residential wells on groundwater flow patterns in the Operable Unit. In addition, although the RI acknowledges in several locations that the groundwater flows through a karst environment with many void features, the impact of these features and the potential flow pathways is not discussed.

EPA Response:

EPA has previously answered the points raised in this question, and agrees that the pumping of large scale public water supply wells would be expected to influence groundwater flow on the local and regional levels. It should be noted that the closest public water supply well to the OU2 Study Area is the Dale Avenue public water supply well, which is located three miles upgradient of the OU2 Study Area. The direct influence of its pumping is limited to the OU1 Study Area. Based on available information, TCE migration within the OU2 Study Area would not be directly affected by public water supply wells. Pumping of residential wells was discussed in the OU2 RI Report (See Section 5.8) and is considered in the OU2 FS Report. Currently, the volume and rate of extraction of groundwater from residential wells is low relative to the volume and groundwater flow rate of the aquifer, such that the influence of residential water supply wells on regional groundwater flow patterns would be small. However, residential well pumping would be expected to have an influence on the groundwater flow and contaminant migration on the local level, and this variability on the local level makes it impossible to accurately make predictions about future impacts at the local levels of individual residential wells, and some of this variability would be caused by the pumping of residential wells. We can expect that there are and will continue to be variable levels of contaminants found at wells within the plume. The preferred alternative addresses this variability by requiring the closure of threatened and impacted residential wells.

47. Pages 5-3 and 5-4 includes a discussion of TCE results for the Asbury-Broadway Road wells. TCE was first detected in the overburden at a depth of 5 to 15 feet and in deep bedrock groundwater at 155 to 175 feet, but not in several water bearing zones in between these depths (30, 75, 95 and 100 feet). Additional sampling using packer tests resulted in TCE being detected at similar concentrations in all of the zones tested. The explanation that the U.S. EPA offers for this discrepancy is that under so-called "active conditions" during the packer tests more water flowed in to the wells than during so-called "passive conditions" during low flow sampling. According to U.S. EPA more TCE was present in these fractures when they were pumped and TCE

was not present when they were pumped during low flow sampling. The U.S. EPA then concluded that the results demonstrate that TCE is distributed throughout the bedrock fractures with no vertical distinctions. This conclusion is apparently based on the premise that the packer test data are a more reliable indication of aquifer conditions at this well than low flow sampling. To accept the packer test data as more representative than low flow sampling contradicts standard U.S. EPA guidance and practices, as well as other sources on the interpretation of groundwater data. Low flow purging is considered to be the standard, state-of the-art sampling method for collecting representative samples from fracture zones, while samples collected during packer tests are generally considered to be less representative data. In addition, there are a number of explanations for why the packer tests results differ from the "passive conditions" results. For example, the packers may not have properly sealed and resulting in groundwater from contaminated zones migrating into the packed zone along the open borehole. Another possible explanation is that the low flow sampling which used a CMT system that was not used in other wells that were sampled was not conducted properly. The uncertainty surrounding the sampling conducted in this area suggests that the text should be modified to include a much more detailed explanation of the results, including a discussion of the very real possibility that the shallow TCE contamination was not caused by contamination in the regional aquifer, but was instead the result of a local source of TCE. The U.S. EPA has failed to investigate additional source areas that may be responsible for contamination of different water bearing zones in this area or OU2 as a whole.

EPA Response:

The text clearly indicates the differentiation between the packer test data and the groundwater sampling data, and that both sets of data are useful. The groundwater samples collected at the 30, 75, 95, and 100-foot depth zones were from the multiple zone completion in the continuous multi-channel tubing monitoring well (CMT, for short). As explained in Section 5.3.1 of the OU2 RI Report, the groundwater samples after completion were collected using low-flow sampling methods (the flow rate is significantly lower than that used during the packer testing). TCE was present in the groundwater samples collected during the prior packer testing (high pumping rate) but not during subsequent groundwater sampling (low-flow pumping). While both sets of samples (packer and completed well) were collected with pumping, the packer testing was at higher flow rates, which draws in larger volumes of water toward the borehole, and has a better ability of drawing TCE impacted water that is not located immediately next to the borehole. What the comment fails to note is that the CMT well after completion does not allow large volumes of water to be drawn from these same discrete zones that were previously packer tested, and therefore draws water from a smaller area around the borehole during sampling.

The Packer Test Data (Appendix D of the OU2 RI Report) indicates that the integrity of the packer seal was maintained during the tests, eliminating the potential of drawing groundwater containing TCE into the packer interval through the borehole. It was also noted in the OU2 RI Report that shallow groundwater has the potential to discharge to nearby surface water, such as to the Pohatcong Creek, and the Edison Quarry, in the OU2 Study Area which provides a likely viable mechanism for the TCE noted in the

overburden monitoring well. In fact, this well is located very near the Pohatcong Creek, and produced large quantities of flowing water while being drilled. As discussed in EPA's responses to Comments 8, 10, 24, 25 and 26, EPA searched for potential sources of TCE throughout the OU2 Study Area. There are no current identified potential sources of TCE located near the overburden well. In fact, the area is mostly rural; therefore, the contamination is clearly from the regional aquifer.

48. On page 5-6, in the fourth full paragraph, the U.S. EPA asserts that since no CVOCs were detected in the groundwater sample collected from PVQUA01 during OU2 RI activities at a depth of 80-100 feet bgs, the data indicate that the VCA and adjacent T&M wooden pallet processing facility are not contributing and have not contributed to the TCE groundwater concentrations noted in the groundwater adjacent to the former Edison Quarry. The data presented are not sufficient to draw this conclusion. The U.S. EPA has not shown these facilities and their relationship to either this new well or any other wells on any of the maps and has not provided any information on these facilities. The Agency has also not provided any evaluation of current and historical chemical use at these PSAs in this report, and has not reported the results of any investigations of these properties. Additionally only one groundwater sample was collected from this well at a depth of 80 to 100 feet. The information provided in the final RI is simply inadequate to support the conclusion asserted.

EPA Response:

PPPI had raised these issues in several prior comments. EPA disagrees with the assertions made in this comment. Sufficient data is presented in the OU1 and OU2 RI reports to support its conclusions. These data show that VCA and the adjacent pallet processing facility are not potential source areas for the TCE groundwater plume in the OU2 area, and that the detected TCE concentrations are consistent with the conceptual site model discussed in Section 7.9. Also see EPA's responses to Comments 10, 24, and 33.

49. On page 5-6, last sentence, there is a grammatical error. The phrase "they were" should be replaced with "it was."

EPA Response:

Comment noted.

50. On page 5-7, fifth paragraph, the measured depth for well MW-104A was not provided in the list of well depths.

EPA Response:

To clarify, the well depths for the four wells on the SIG property are: MW-101 (42.8 ft bgs), MW-104A (97 ft bgs), MW-107 (52 ft bgs), and MW-110 (90.8 ft bgs). These data are found in Appendix D of the OU2 RI Report.

51. On pages 5-7 and 5-8, the U.S. EPA describes its groundwater sampling program in OU2. A rationale for the selection of these particular wells for sampling and exclusion of some existing monitoring wells is not provided. In addition, it is inexplicable that the wells installed at and near the Victaulic facility during the OU1 investigation would not be sampled as part of this investigation. This is particularly true since the U.S. EPA claims that the Victaulic facility is not considered to be a source area based on sampling from a well installed at a presumed downgradient location. It is technically unsound to base a decision on the possibility of a source area contributing to the regional contamination based on one monitoring well that is presumed to be located downgradient, while ignoring and not sampling wells that are located much closer to and on the presumed source area.

EPA Response:

The assertion regarding EPA's conclusions for the VCA facility is a reiteration of several previous comments, and has already been replied to. See EPA's responses to comments 10, 24, 33, and 48, above. As stated previously, EPA did not rely on one data point, and EPA had not installed monitoring wells at VCA during OU1 (see Section 5.9.27 of the OU1 Study Area RI Report). The OU1 RI clearly states that the 2 wells at this property were existing wells installed by another party, and were not EPA's wells. EPA attempted to gain access to sample these wells during the OU2 RI, but was not successful. A rationale for selecting the monitoring wells in the OU1 Study Area as part of the OU2 RI was provided in Section 5.5, which states that "These monitoring wells were selected to understand the regional groundwater flow conditions and to provide an update of the previous levels of Chlorinated Volatile Organic Compounds (CVOCs) at these locations upgradient from the OU2 Study Area." It was considered an unnecessary and unreasonable use of resources to resample all existing monitoring wells in the OU1 Study Area as part of the OU2 RI. EPA considers the information obtained and evaluated during the OU1 and OU2 RIs sufficient to provide information for the regional groundwater conditions and to identify potential source areas in the OU2 Study Area.

52. On pages 5-10 and 5-13, the U.S. EPA describes the vapor intrusion assessment that it conducted from March 2006 to January 2008. However, the assessment, as reported, was not consistent with U.S. EPA's own 2002 OSWER Draft Guidance for Evaluating Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance) EPA-530-D-02-004 or the U.S. EPA risk assessment guidance in effect during this period, particularly the U.S. EPA's 2003 OSWER Directive 9285.7-53 regarding Human Health Toxicity Values in Superfund Risk Assessments. For example, the U.S. EPA apparently applied residential screening values to non-residential buildings. The Agency apparently used the 2001 draft TCE inhalation toxicity value which was highly controversial, never finalized, and was withdrawn by the U.S. EPA prior to the start of the vapor intrusion assessment in March 2006. The soil gas screening levels used in the assessment appear to ignore both the U. S. EPA's 2002 draft vapor intrusion guidance on the use of the attenuation factors, as well as empirical attenuation factors that the Agency

could have readily derived from the subslab and indoor air data it collected over the approximately 20 months of vapor intrusion assessment at this Site. In addition, no information is provided as to whether alternative sources of TCE such as ambient air or consumer products were taken into consideration. Sampling locations were not correlated with either higher groundwater VOC detections or shallower groundwater. Given the flaws in the assessment, it is impossible for the U.S. EPA to ascribe any "elevated" vapor levels to the regional groundwater conditions.

EPA Response:

EPA disagrees with the assertions made in this comment. Separate parts of the comment are responded to as follows:

a) Methods of conducting vapor intrusion investigations and remediation have changed substantially since vapor intrusion was identified as a potential pathway of concern. EPA did follow the 2002 OSWER Draft Guidance for Evaluating Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils, however, it should be noted that Region 2 has modified some of the procedures to implement the latest advances in evaluating vapor intrusion.

b) Regarding the point raised that EPA applied residential screening values to non-residential buildings, the vapor intrusion guidance contains one set of indoor air values for screening purposes, and Region 2 has determined that those values are applicable for both residential and non-residential screening purposes. Region 2 typically uses a single set of screening criteria, based on residential exposure, to evaluate vapor intrusion, especially when addressing potential exposure at homes, schools, or daycare facilities, which was done in this investigation.

c) Regarding the use of the 2001 draft TCE inhalation toxicity value, although the 2001 TCE value is utilized in the 2002 EPA Vapor Intrusion Guidance, this value was not used in the assessment. For this assessment, indoor air values for TCE (5 ug/m^3) and PCE (100 ug/m^3) were utilized for screening indoor air concentrations. These values were developed by the New York State Department of Health. These indoor air values were adjusted using appropriate attenuation factors to derive subslab screening values. An attenuation factor of 10 was used, as recommended in the 2002 EPA Vapor Intrusion Guidance, to derive a soil gas screening value of 50 ug/m^3 for TCE and 1,000 ug/m^3 for PCE, which were used in the vapor screening. The text in the Remedial Investigation Report (p. 5-10) incorrectly identifies the interim soil gas values for TCE and PCE as 5 ug/m^3 and 100 ug/m^3, respectively. This error was not uncovered in time to be addressed by an RI errata and addenda completed in August 2010.

d). Regarding the possibility of alternative sources, such as ambient air or consumer products, appropriate QA/QC procedures were followed with respect to the vapor intrusion sampling, and EPA did confirm and identify potential indoor sources of VOCs prior to sampling, as standard protocol. EPA collected ambient air samples whenever indoor air samples were collected and an inventory of potential indoor sources was taken. It is also noted that, prior to sampling, the EPA did confirm the presence of potential indoor air sources of volatile organic compounds, and removed them when necessary. An inventory of potential sources was taken for the SUMMA canister sampling, and

similarly, the Trace Analysis Gas Analyzer (TAGA). The TAGA was utilized at multiple locations. The lab reports clearly show that ambient and other QA/QC samples were identified in the OU2 RI Report (Appendix K). It should be noted that the TAGA was utilized at locations where remediation was to be performed. The TAGA, via real-time analysis, is especially useful for identifying potential indoor sources. In addition, the fact sheet mailed to property owners whose properties were to be sampled, included in OU2 RI Appendix K, clearly indicates that potential local VOC sources were to be removed prior to sampling.

e) Finally, it is indicated that sampling locations were not correlated with groundwater VOC detections. In fact, data collected during the OU2 RI along Asbury-Broadway Road actually showed a strong correlation with groundwater concentrations and subslab vapor concentrations. As discussed in Section 5.8 of the OU2 Study Area RI Report, the results of the sub-slab vapor intrusion sampling conducted along Asbury-Broadway Road showed a consistent decrease in TCE concentrations away from the Karrsville Fault (See RI Figure 5-3), consistent with the groundwater conditions noted elsewhere in the OU2 Study Area, as described in the conceptual site model. The Franklin school, and the ABR well, which had the highest TCE groundwater concentrations detected in the OU2 Study Area, are along the Karrsville fault preferential flow pathway. Based upon this information, EPA determined that an adequate evaluation was completed to show that elevated subslab concentrations of site-related contaminants were associated with regional groundwater contamination.

53. The OU2 RI Report, including Appendix K, did not provide a clear explanation for U.S. EPA's choice of vapor intrusion screening criteria or its basis for concluding that the TCE and PCE indoor air concentrations summarized in Tables 5-4 to 5-9 posed a threat to public health. As part of its review of the OU2 RI, ENVIRON calculated reasonable maximum exposure (RME) risks associated with the TCE and PCE indoor air concentrations reported by EPA, and compared the estimates of RME risk to EPA's acceptable risk levels.

ENVIRON's estimates of RME risks were calculated in accordance with current EPA risk assessment guidance. Specifically, the estimates were calculated using the inhalation unit risks for TCE and PCE that U.S. EPA used in the baseline risk assessment (see Table 6.2 in Appendix M of the OU2 RI Report), the current U.S. EPA guidance on inhalation risk assessment (Risk Assessment Guidance for Superfund, Part F), and U.S. EPA's standard default residential and nonresidential inhalation exposure factors, which are as follows:

Residential: 24 hours/day, 350 days/year, and 30 years
Nonresidential: 8 hours/day, 250 days/year, and 25 years

Using these U. S. EPA assumptions, the residential TCE indoor air concentration of 11 $\mu g/m^3$ cited in Table 5-5 of the RI Report corresponds to a RME risk of only 9×10^{-6} Similarly, the nonresidential TCE indoor air concentration of 3 µg/m3 cited in Table 5-6 of the RI Report corresponds to a RME risk of only 5×10^{-7}, which is lower than the acceptable risk range. Neither of these TCE indoor air concentrations, which

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are the highest on Tables 5-4 and 5-9 of the RI Report, poses an unacceptable risk to public health.

EPA Response: **

This comment regards the Franklin School vapor intrusion sampling and related removal action. EPA did not take an action for vapor intrusion at this property based on current unacceptable indoor air risks, but on subslab screening values, which were 50 ug/m^3 for TCE and 1,000 ug/m^3 for PCE. The TCE subslab screening value was exceeded. In addition, indoor results at levels below indoor screening levels indicated that TCE vapor intrusion was occurring, and subslab vapors were entering the building. EPA used a weight-of-evidence approach and based much of its decisions on the potential for vapor intrusion into the building considering the high TCE subslab sampling results that were determined to be elevated above EPA's screening values, and had the potential to seep into the building at unacceptable indoor air concentrations. Therefore, a subslab depressurization system was installed to prevent potential vapor intrusion into the indoor air of the building in the future. This approach is standard in Region 2 and there are multiple sites where this approach has been employed. Occupants of the building were considered to be threatened over the long-term by site-related vapor intrusion, emanating from contaminated groundwater. Also, see EPA's response to Comments 9, 29, 40, 52.

54. While PPPI has no potential CERCLA liability with respect to PCE, Environ performed similar calculations for EPA's reported PCE findings. Those calculations show that the highest residential PCE indoor air concentration of 0.63 µg/m^3 on Table 5-5 of the RI Report corresponds to a RME risk of only 2 x 10^{-6}, which is at the low end of EPA's acceptable risk range of 10^{-6} to 10^{-4}. The highest nonresidential PCE indoor air concentration of 1.6 µg/m^3 on Table 5-6 of the RI Report corresponds to a RME risk of only 8 x 10^{-7}, which is lower than the acceptable risk range. Like TCE, these PCE indoor air concentrations do not pose an unacceptable risk to public health.

EPA Response:

With respect to PPPI's assertion that it does not have liability for PCE, this is a legal assertion that EPA will not respond to in this document. The technical portion of this comment regards data collected during the vapor intrusion sampling and related remedial action taken at the former Tung-Sol manufacturing facility. This facility is located within the OU1 Study Area, not within the OU2 Study Area, and actions taken at this facility are not relevant to the proposed OU2 remedy. Therefore, the vapor intrusion sampling results at this location were subsequently removed from the Final OU2 RI report, dated July 2010.

55. ENVIRON also reviewed the TCE and PCE indoor air data summarized in Tables 5-4 to 5-11 of the OU2 RI Report and did not find any indoor air concentrations that pose an unacceptable risk to public health (i.e., risk exceeding 10^{-4}). (Note that the pairs of indoor air and subslab soil gas data in Table 5-6 are incorrectly labeled in at least rows 1 and 2, and in rows 5 and 6.) The highest RME risk associated with the TCE

and PCE indoor air data on these summary tables is approximately 3 x 10^{-5}, which is well within U. S. EPA's acceptable risk range. Therefore, U.S. EPA's stated justification for installing mitigation systems as a removal action is not supported by its own data when conservatively evaluated. The OU2 RI/FS must be revised to reflect the appropriate risk evaluation so that further actions inconsistent with the National Contingency Plan are not implemented. In addition, TCE and PCE soil gas screening criteria of 5 $\mu g/m^3$ and 100 $\mu g/ m^3$ should not be used to justify vapor mitigation or to guide future vapor assessments. The derivation of risk-based criteria and screening levels for these purposes is discussed in the next two comments.

EPA Response:

Actions taken related to vapor intrusion findings at the Site are not inconsistent with the NCP. Regarding the risk-related technical portion of the comment, refer to EPA's answers to Comments 53 and 54, immediately above. As noted in EPA's responses, EPA Region 2 relies on a weight-of-evidence approach for evaluating and remediating potential vapor intrusion sites. Emphasis is not only placed on indoor air concentrations, but also includes subslab vapor concentrations.

56. Removal actions to mitigate vapor intrusion should be based on indoor air, rather than subslab soil gas data because indoor air data (after accounting for background sources of contamination) provide a more direct measure of exposure. Indoor air data should be compared to risk-based indoor air criteria that are calculated following current U.S. EPA risk assessment guidance. In particular, separate indoor air criteria should be calculated for residential and nonresidential assessments *(See* RAGs Part F, 2009). These criteria should be derived using inhalation toxicity values for short-term *(e.g.,* subchronic) exposure, which are more appropriate for evaluating the need for removal action. For example, the TCE indoor air criteria for determining if removal action is warranted for a residence should be 560 $\mu g/m^3$, which is calculated using U. S. EPA's standard default residential exposure factors.

EPA Response:

Please see EPA's several responses to Comments 53, 54 and 55, immediately above, related to vapor intrusion.

57. To guide vapor intrusion assessments and to support vapor intrusion remedial action decisions, appropriate risk-based indoor air screening levels should be calculated first, and then used to calculate screening levels for subslab soil gas and groundwater using attenuation factors consistent with the U.S. EPA's 2002 draft vapor intrusion guidance or using empirical attenuation factors based on data collected for this RI. For example, the TCE indoor air screening level should be 60 $\mu g/m^3$, which is based on a target cancer risk of 5 x 10^{-5}, an URF of 2 x 10^{-6}, per $\mu g/m^3$, and U.S. EPA's standard default residential exposure factors. The target cancer risk of 5 x 10^{-5} is appropriate in this case because TCE and PCE are the only two Site related carcinogens, and it would still ensure that the Site-related cumulative cancer risk will not exceed 10^{-4}.

Using this TCE indoor air screening level, the TCE groundwater screening value would be 250 mg/L, which is based on U.S. EPA's generic groundwater attenuation factor of 0.001 and a Henry's law constant of 0.247 at the typical groundwater temperature of 13.5°C in New Jersey. The TCE subslab soil gas screening level would be 600 $\mu g/m^3$ if calculated using U.S. EPA's generic subslab attenuation of 0.1. However, as U.S. EPA noted in Sections 5.7.2 to 5.7.5, the vapor intrusion assessment found that indoor air concentrations are generally 2 to 3 orders of magnitude lower than the subslab soil gas concentrations, which means that the subslab soil gas attenuation factor should be 0.01 to 0.001 for this Site. Using the more conservative empirical attenuation factor of 0.01 would give a subslab soil gas screening level of 6,000 $\mu g/m^3$. Future vapor intrusion assessments at this Site should use these groundwater and subslab soil gas screening levels consistent with U. S. EPA's own guidance and practices.

EPA Response:

Please see EPA's responses to Comments 53, 54, 55 and 56, immediately above, related to vapor intrusion.

58. On page 5-13, the U.S. EPA again asserts that the Karrsville Thrust Fault "extends toward the former American National Can facility, which was identified as the source area for TCE groundwater contamination in the OU1 Study Area". As previously noted, geologic mapping of this fault, as shown on Figure 2-1 of the RI shows that the Fault trace actually extends on a northwest-southeast trending line (paralleling the Pohatcong Valley) at a location that is at least 1 mile side-gradient from the former ANC site. The statement that the fault extends to the former American National Can facility is incorrect and misleading and should be deleted. Moreover, designation of the American National Can facility as "the" source ignores all of the evidence of other source areas in the Pohatcong Valley.

EPA Response:

This comment is the same as several prior comments and has already been replied to. See EPA's responses to above Comments 6, 7, 8, 29, 30, 32, 34, and 40 regarding preferential groundwater and contaminant flow through the Karrsville Fault. OU2 RI Figure 2-1 shows the geology in the OU1 and OU2 Study Areas, including known faults. The former American National Can facility is located less than a half mile from the trace of the Karrsville Fault. Considering the scale of this Site, the 0.5 miles distance between the former ANC facility and the fault is near. The TCE groundwater plume is approximately 10 miles in length, starting at the former ANC facility, and migrating in a southwest direction. The OU1 Study Area RI Report included a detailed search for TCE source areas in the OU1 Study Area and concluded that the former ANC facility represented the sole source of the TCE groundwater contamination (See Section 5.10.1 of the OU1 Study Area RI Report). Subsequent investigations at the former ANC facility identified very significant TCE concentrations in soil and groundwater beneath the main building, as predicted in the OU1 Study Area RI Report (Section 5.10.1) and FS Report (See Section 1.5.1). After extensive OU1 and OU2 RIs, thousands of samples collected,

and extensive efforts to find sources of groundwater contamination, the former ANC facility is currently the only identified source of TCE contamination at the Site, and represents a current ongoing significant source.

59. On page 5-13, the U.S. EPA asserts that Figure 5-3 "graphically shows the relationship between the Karsville Thrust Fault trace and the TCE groundwater concentrations." This suggests that the map shows a clear pattern of the highest TCE concentrations at the Fault trace and progressively lower concentrations away from the Fault trace. However, a statistical analysis of the data would be required to support this hypothesis because a visual examination of the spatial relationship between concentrations at individual wells that are presented and the Fault trace do not convincingly demonstrate this correlation. An examination of the isoconcentration lines for TCE also shows a less than convincing correlation. The isoconcentration lines do not appear to correlate with the Fault trace since the Fault trace is not parallel to the long-axis of the isoconcentration lines. In fact, the isoconcentration lines appear to follow the trend of the Valley more than the trend of the Fault. This suggests that the hypothesized correlation of TCE concentrations with the Fault trace may be more an artifact of the fact that the Fault is nearly parallel to the Valley (which helps control the trend of the flow) than the results of the TCE concentrations following the Fault trace. Finally, the presence of the results of the vapor intrusion (VI) studies at a large scale on the map is confusing at best. Since these VI data are on Figure 5-2, there is no need to repeat them on this figure.

EPA Response:

The trend of the fault correlates in general with the trend of Pohatcong Valley, except in the area of the residential development in Greenwich Township where the valley trend follows the course of Pohatcong Creek whereas the trend of the fault extends under the residential development. The long axis of the isoconcentration contour parallels both the trend of the Karrsville Fault and the trend of Pohatcong Valley, except in the area of the Greenwich residential development where it parallels the fault. It is noted that the Karrsville Fault represents numerous parallel to sub-parallel fractures such that the fault should not be considered as a single fracture (i.e., a line on a map) but rather a series of fractures over an area creating a permeable groundwater flow conduit.

An example of the correlation between TCE concentrations and distance from the Karrsville Fault is shown in Figure 5-3 around the Former Edison Quarry. At that location, the TCE concentrations immediately on the south side of the quarry range from about 5 µg/l to 11.4 µg/l whereas the residences further away from the quarry generally range from about 1 µg/l to about 4 µg/l. Residential wells further south have TCE concentrations generally ranging from non-detect to less than 1 µg/l. On the north side of the quarry, a similar pattern emerges with higher TCE concentrations generally being detected closer to the Karrsville Fault. The few exceptions to this pattern, such as TCE at below detection limits, may be reasonably explained by the uncertainty of well depths, fracture density, and pumped volumes from the residences.

The VI data on Figure 5-3 is the same as on Figure 5-2, and shows the relationship between the location of the Karrsville Fault and the TCE concentrations detected in the subslab soil gas samples, as discussed in Section 5.8 of the OU2 Study Area RI Report.

60. Despite the OU1 RI findings of impacts at this property, the U.S. EPA concludes on page 5-13 that the Victaulic Company (VCA) property is not a source of TCE in the groundwater. This conclusion is apparently based solely on the results of a low flow groundwater sample collected from a single depth from the Quarry Road monitoring well (PVQUAOl). As previously noted, in its analysis of the Asbury Broadway Road wells, the U.S. EPA dismissed the results showing the absence of TCE from low flow sampling under so-called "passive conditions" and accepted the results showing the presence of TCE from the packer test sampling under so-called "active conditions." When the "active conditions" samples at the Asbury Broadway Road contain VOCs, the U.S. EPA concludes the area was impacted all along and dismisses the "passive conditions" samples. In contrast, at the Quarry Road well, U.S. EPA accepts the "passive conditions" low flow sample data showing the presence of TCE and makes no attempt to collect samples under "active conditions" because it was not possible to conduct packer tests. Here one "passive conditions" sample is taken from a well and the U.S. EPA concludes that not only the groundwater, but also the upgradient property is of no concern, while at another location the so-called "passive conditions" sample is considered invalid. Such arbitrariness is not technically defensible.

EPA Response:

EPA's analysis of groundwater data is not arbitrary. The comment raises several different points, and EPA's response is provided as follows:

a) The portion of PPPI's comment regarding EPA's conclusions for VCA (and the adjacent pallet facility) as potential source areas has been addressed in several previous comments. See EPA's responses to Comments 10, 24, 33, and 48. As previously stated, EPA did not base its conclusion solely on one result. The new downgradient QUA monitoring well did not have detectable levels of contaminants of potential concern (COCs) in it, and this result was supplemented with groundwater sample results from residential wells located between the VCA area and the former Edison Quarry. Residential well sample results are included on Figure 5-3, and show that TCE is not detected at several residential properties immediately downgradient of the VCA/TPC facilities and the QUA well. However, TCE is detected at increasing concentrations toward the former Edison Quarry and center of the valley. Taken together, these data show that VCA and the adjacent TPC facility are not current source areas for the TCE groundwater plume in the OU2 area, and that the QUA well is located sidegradient to the TCE plume.

b) The statement that EPA dismissed low-flow "passive conditions" sampling results for the ABR well location, and had accepted the low-flow results for the QUA well location is not correct. EPA did not dismiss the "low-flow" sample results, which showed the absence of TCE during low flow sampling at both

locations. The RI clearly considered all sample results in both the QUA and ABR areas.

c) Regarding the ABR wells, the low-flow sampling results were considered in conjunction with the packer test data. The detection of TCE in samples collected during the packer testing indicates that the ABR well location is located within the flow path of regional groundwater contamination. Compared to low-flow sampling, sampling during packer tests generate a larger volume of water prior to sampling and therefore may actively draw nearby contaminated groundwater from bedrock fractures into the borehole. Moreover, groundwater data from groundwater wells along the center of Pohatcong Valley upgradient and downgradient from the ABR well location is consistent with the conclusion that TCE occurs in groundwater at the ABR well location. These data include numerous impacted residential wells and the Edison Quarry. Please also see EPA's prior response to Comment 47, for further discussion of the ABR low vs. high flow sample results.

d) Regarding the QUA well location, the absence of TCE in the PVQUA01 sample collected during low flow is consistent with the sample results from adjacent residential wells. The residential wells are active and generate a large volume of water prior to sampling compared to the low-flow sampling. The absence of TCE in the PVQUA01 sample and the adjacent residential well samples is consistent with the conclusion that the upgradient properties of VCA and TPC are not TCE sources to the TCE groundwater plume noted in OU2, and that the QUA well is located side-gradient and outside of the TCE contaminant plume toward the center of the valley.

61. On page 5-14 and 5-15, the U.S. EPA presents a bulleted recitation of its groundwater sampling results for non-CVOCs. Once again, there is no appropriate technical rationale provided for the analysis of samples for these constituents in OU2 of this Site.

EPA Response:

See EPA's responses to Comments 27 and 41.

62. On page 6-4, the U.S. EPA acknowledges that releases of CVOCs may have occurred in the OU2 Study Area. However, despite that admission, virtually no source investigation work was done as part of the OU2 RI.

EPA Response:

See EPA's responses to Comments 8, 10, 23, 24, 25 and 26. As noted previously, EPA did substantial source investigation work as part of the OU1 and OU2 RIs.

63. The Human Health Risk Assessment (Section 6-2) included VOCs, SVOCs, pesticides, PCBs and metals. Yet, the U.S. EPA acknowledges in the RI that, aside from TCE, PCE and their natural degradation products, these constituents are not Site-related and states in the final FS that none of these non-site related constituents would be addressed as part of their CERCLA response in OU2. Therefore, the expenditure of CERCLA dollars to evaluate these chemicals was unnecessary and inappropriate. Such costs are not consistent with the National Contingency Plan.

EPA Response:

See EPA's response to Comment 27.

64. The conclusion of the Human Health Risk Assessment (Section 6-2) as to the TCE in groundwater is that the compound does not present an unacceptable risk, but as it is above New Jersey and/or Federal drinking water standards in certain sampled locations, remedial action is necessary. As noted above, the Human Health Risk Assessment also included many chemicals that are not site-related, which was not only unnecessary, but also creates a potential for misinterpretation or obfuscation of the very low Site-related potential risks. For example, the copc's selected for sediment were metals and PAHs; that for surface water was the metal manganese. For groundwater, metals and pesticides and bis (2 ethyl-hexyl) phthalate (an SVOC that is often unintentionally introduced into the process of sample collection and laboratory analysis) were selected in addition to CVOCs. None of these constituents were the focus of either the RI or the FS for OU2 by U.S. EPA's own statements.

EPA Response:

The comment is not correct, and is addressed in two parts.

1) The approach used to evaluate the risks and hazards posed by the Pohatcong Valley Superfund site adhered to standard EPA risk assessment guidance (RAGS), and was not misleading. The conclusion of the Human Health Risk Assessment was that TCE was present in the regional aquifer at concentrations that presented a cancer risk of 3.5×10^{-5}, which is above EPA's point of departure, and the concentrations were also above federal and state drinking water standards, which indicates that remediation is appropriate. TCE was identified as a contaminant of potential concern (COPC). There were other compounds that were identified as COPCs in groundwater, surface water and sediment earlier in the risk assessment process that were determined not be site-related compounds and/or were determined to not pose unacceptable risks or hazards.

2) Metals were not identified as site-related COCs in the early stages of the Human Health Risk Assessment because they are likely considered to be background, and the OU2 RI and the Proposed Plan clearly state this. However, it is EPA's standard practice to define the risk related to all contaminants detected, including those that are not site related. EPA believes that the description of Site risks and hazards was adequately and correctly outlined, as well as the identification of the potential source of the groundwater contamination, therefore, no changes are needed to the human health risk assessment. See EPA's responses to Comments 65, 66, and 67, below.

65. On pages 6-26 and 6-27, the U.S. EPA indicates that the unacceptable human health risks in OU2 were driven by a few metals (thallium, arsenic, cobalt, iron and manganese) and not by TCE or PCE or their degradation products. The only unacceptable hazard quotients ("HQs" identified through the risk assessment process are those for metals. In its discussion of residential and industrial worker risks through the use of groundwater, the U.S. EPA does not even mention the potential risk associated with CVOCs and attributes all of the significant risks to various metals. This information concerning risks that U.S. EPA has acknowledged are not Site-related and should not have been developed as part of this RI, and should not be reported as characteristic of this Operable Unit. The U.S. EPA's approach to these non-Site related substances is misleading at best.

EPA Response:

As stated immediately above, EPA's performance of the risk assessment was consistent with RAGS. In Section 6.2.8 in the OU2 Study Area RI Report, the cancer risk from exposure to the Site-related contaminants TCE and PCE exceeded the lower end of the acceptable risk range of 10^{-6}, which is also known as the "point of departure". Remedial action is based on TCE detected in residential water supply wells at concentrations above the more stringent of the NJDEP groundwater quality standards and the NJ and federal MCLs.

It appears that the comment is focusing on the non-cancer hazard index which was driven by metals. VOCs did not account for much of the non-cancer hazard, thus they were not identified in the non-cancer section. Please refer to the Human Health Risk Assessment and specifically the Table 7 series that contain the values for non-cancer exposures. It should be noted that while cancer risks associated with metals are exceeded, the proposed remedial action is not based on these constituents, even though there will be an ancillary benefit provided by the proposed remedy.

66. On pages 6-29 and 6-30, the U.S. EPA summarizes the results of the risk assessment and, once again, indicates that the only COPCs with risks that exceed U.S. EPA target risk levels are metals, and not CVOCs. The Agency again acknowledges here in the summary of the Human Health Risk Assessment that these metals are not related to the Site. This raises the question of why U.S. EPA selected these metals as COPCs for risk assessment in the first place.

EPA Response:

Metals were selected as COPCs consistent with RAGS. Also, see EPA's response to Comments 27, 64, and 65.

67. On page 7-3 the U.S. EPA describes an imagined scenario involving TCE release and migration from the former American National Can property through a channel to nearby properties. This description fails to take into account that soils data developed

through the New Jersey ISRA process demonstrated that TCE is not present in the soils along this so called channel. In addition, no evidence is found in the data to demonstrate vertical migration into the soils along this imaginary channel. Nor does visual observation show that a channel in fact exists in this area.

EPA Response:

The OU2 RI Section 7.3.2 (Release Mechanisms) was prepared based on information generated during the OU1 Study Area RI Report. In the OU1 RI Report, evidence of TCE in the soils along the channel leading from the former American National Can facility to the enclosed basin area along a drainage swale was presented. The drainage swale location and function presented in the OU1 RI shows a connection between the ANC and AC1 facility properties identified in the OU1 RI Report, with the drainage swale located between them. The U.S.G.S. topographic map shows that topography decreases between ANC and AC1, as well, which is the path that surface water drainage would follow. The OU1 RI includes soil sampling results from PVAC106 with TCE concentrations in soil at 3,100 µg/kg (surface soil), 7,600 µg/kg (1-2 ft), 52,000 µg/kg (2-8 ft), and 9,800 µg/kg (15 ft), in the surface impoundment low area, which are very high concentrations above action levels. The impoundment collects surface runoff water from the surrounding upgradient area. ANC is immediately uphill of AC1 and the drainage swale. In addition, two water samples were collected during a rain event discharging from a pipe identified to be along the swale during the OU1 RI in the early 1990s, which both revealed low levels of TCE. This TCE is considered to be relic of plant operations in the early decades of plant operations prior to 1980, when TCE is anticipated to have been utilized at the facility as part of its production process. The fact that remedial levels of TCE were not currently detected in surface soils immediately at the pipe location is not surprising given the decades lapse in time during which active TCE-related plant operations and discharge is anticipated to have occurred, and is consistent with TCE findings observed elsewhere within the OU3 source area as well as under the facility. It should be noted that TCE remediation had been undertaken in the past under an ISRA directed action at the former ANC facility at another storm water discharge location in the same general area. Selected historical information pertaining to past investigations and remedial actions conducted at the former ANC facility is included in the Appendix of the OU1 RI. The drainage swale noted in the comment is still present at the site, and additional sampling is being planned as part of EPA's upcoming OU3 RI Study Area, where the full nature and extent of contamination will be determined.

68. On pages 7-6 and 7-7, the U.S. EPA makes the assertion that the current concentrations of TCE in OU1 wells are close to the same concentrations as those found in 2002. While some of the wells, including the four cited by U.S. EPA have similar concentrations, most of the wells in the upgradient areas of OU1 where TCE concentrations are generally higher than in OU2, show significant decreases in concentrations between the sampling of 2000-2002 and 2007-2009. For example, a review of the data for monitoring well PVWLY08 shows an order of magnitude decrease between 2002 and 2009, when the most recent sampling was done. Other wells in this area show similar decreases. In addition, as shown on Figure 7-3, the

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most recent data from the Dale Avenue public water supply well in OU1, also shows a long-term decrease in TCE concentrations over time.

EPA Response:

EPA disagrees with the commenter's statement that most of the wells in the upgradient area show significant decreases in TCE concentration over time. This is not the case, and the comment references very limited data of the large amount of data available for this Site. In the well cited as an example in the comment, RI PVWLY08, the TCE concentration was 140 µg/l in 2002. In May 2009, this well had a TCE concentration of 47 µg/l. This well is considered to be side gradient to the 500 µg/l TCE isoconcentration line, which is the hot spot area to be addressed through active pump and treatment as part of the OU1 remedy. Not cited in the comment is well VTC13, which is more central to the OU1 TCE plume. This well was sampled in 2002 and had a TCE concentration of 1,100 µg/l. Well VTC13 was resampled in May 2009, and the TCE concentration had more than doubled to 2,600 µg/l. Wells PVSTJ01A, PVCHU02, PVWCV05 and PVWCC15, located in the OU1 plume, were sampled during 2007-2009, as part of the OU2 RI, and as noted in the comment, these wells show similar concentrations to the 2000-2002 OU1 RI sampling. The specific TCE concentrations in the Dale Avenue public water supply well over a 20 year period, as shown in Figure 7-3, show that TCE levels fluctuate slightly overtime and any decrease in TCE levels is relatively minor. The Dale Avenue well remains significantly contaminated. As EPA has stated previously, variation at specific sampling locations on the local level is not surprising and is to be expected (see also EPA's response to comment 69).

69. U.S. EPA includes statements about the steady state of the TCE groundwater levels on pages 7-6, 7-7 and 7-12 of the final RI The data do not demonstrate that such a steady state exists. *(See* the previous comment above.) PPPI agrees with the statement that natural attenuation is taking place in the Site groundwater. However, PPPI strongly disagrees with U.S. EPA's stated underlying assumptions. The measured decreases in groundwater TCE concentrations, particularly in the upgradient areas of OU1 where TCE concentrations are generally higher than in OU2, are indicative of attenuation. It is incorrect to create a scenario of an ongoing source equivalent to attenuation so that a functional steady state can be assumed as U.S. EPA has done. The groundwater data simply do not support that Site description.

EPA Response:

There is insufficient data to support the commenter's conclusion that TCE groundwater concentrations are decreasing in the upgradient areas of OU1. In fact, there is data currently being conducted as part of the OU1 RD that supports the conclusion that groundwater levels are in a near steady state. Additional data are currently being collected as part of the on-going OU1 RD for use in the preparation of the engineering design of the OU1 remedy. The near steady-state condition of the TCE groundwater plume, however, was presented in the OU1 Study Area RI Report and is based on groundwater samples collected for over 20 years at the Dale Avenue public water supply well (Figure 7-3 in the OU2 Study Area RI Report), as well as on numerous monitoring

well samples collected in 2000 and 2002. The ongoing identified source of TCE contamination to groundwater is a conclusion based on elevated TCE concentrations in soil and groundwater beneath and near the former ANC facility building, as well as data currently being collected at and immediately downgradient of the Former ANC facility, as part of the on-going OU1 TCE RD. The highly contaminated soils in the vicinity of the former ANC facility are the subject of the planned OU3 RI, and the extent of the contamination has yet to be fully determined. In addition, appreciable natural attenuation of TCE within the downgradient area is anticipated after the groundwater remedial system in the ANC OU1 area is completed and operational, which has not occurred yet. See also EPA's response to comment 68, above.

70. On pages 7-12 and 7-13, the U.S. EPA presents its "Conceptual Site Model "That description states that the Karrsville Thrust Fault runs close to the OU1 source area. As previously noted, the U.S. EPA's map (Figure 2-1), which is based on detailed geologic studies of the area, shows that this Fault is actually located more than a mile to the north and west of the alleged source areas in OU1 that were identified by the U.S. EPA in the OU1 RI. In addition, no data have been presented suggesting that the Fault has any connection to those alleged source areas. Therefore, there is no technical justification for assuming that the Fault runs close to U.S. EPA's alleged OU1 source areas and the Conceptual Site Model needs to be adjusted to reflect this fact as well as the data collected to date.

EPA Response:

This comment has been previously presented and replied to. See EPA's responses to above Comments 6, 7, 8, 29, 30, 32, 34, 40, and 58 regarding preferential groundwater and contaminant flow through the Karrsville Fault.

71. The U. S. EPA's Conceptual Site Model states that there is a potential for groundwater to discharge to surface water. That potential may exist. However, it should be noted that the surface water and sediment have been sampled and VOCs have not been identified as a concern for either.

EPA Response:

As identified in the OU1 RI, TCE was detected in 17 of 19 surface water samples collected from the Edison Quarry. The Edison Quarry is located within the OU2 Study Area. One surface water sample collected in the OU2 Study Area had a low level of TCE (See Section 5.6 of the OU2 Study Area RI Report), and low levels of TCE were detected in sediment samples collected in the OU2 Study Area (See Section 5.9.36 of the OU1 Study Area RI Report). Based on the findings of the remedial investigation and risk assessment, sediments and surface water do not pose an unacceptable risk.

72. The table that reportedly shows the residential well sampling results (Table 5-19) is not included in the final RI Report. In addition, the tables that present the results of

some of the RI sampling (in Appendix I) do not clearly indicate where the sample was taken, whether at the wellhead or at some other locations. Table 5-1 presents the results of the temporary well point sampling, but does not provide the depths for any of the samples. This information, which is critical to the evaluation of data, is not supplied in the text of the RI Report either. In addition, Figure 5.4 shows data from a number of sampling locations without differentiating depth or providing any additional information. The commingling of data from multiple sources (e.g., monitoring and domestic wells) may be justified if there is reason to believe the data are from the same aquifer. However, the OU2 RI fails to provide any technical justification for assuming that all of these data points are in the same aquifer. It also fails to distinguish between treated and untreated water samples for the domestic wells sampled.

EPA Response:

The reference to Table 5-19 was in error and the correct reference was to the table in Appendix I, as mentioned in the comment. The first table in Appendix I is a summary of the March 2008 residential well sample results. Samples collected from residences with treatment have the sample ID's annotated with "Pre" or "Post" indicating whether the sample was taken before or after treatment system, respectively. The samples were taken from existing taps on the water line.

Section 3.0, "Description of Events," in the Sampling Report and Data Presentation (USEPA) included in OU2 Appendix I, provides information on the EPA sampling events conducted in 2009. In Section 3, it is noted that the samples from properties with water filters were collected from ports before and after the treatment systems, and that the sample designations were identified with either a "B" for before the treatment system or an "A" for after the treatment system.

The temporary well samples identified on Table 5-1 of the OU2 Study Area RI Report include samples PVABR01-WP1, PVQUA01-MW1, PVMWO07, PVSMS01-MW1, and PVABR01-WP2 collected at depths of 7 ft, 97 ft, 16 ft, 72 ft, and 9 ft, respectively, which are clearly presented on Table 5-1. These temporary well point data are considered to be of screening-level quality and were used only to supplement the groundwater analytical data collected from the packer tests and from the installed monitoring wells. In one instance, the detection of TCE (at a concentration of less than 1 µg/l) in the temporary well point sample where the remaining samples contained no TCE was used as an indication that the well location may define the lateral edge of the TCE plume.

The residential groundwater data shown on Figure 5-4 were collected prior to any treatment and are considered untreated water samples. The nature of the bedrock discussed in Section 2 of the OU2 Study Area RI Report indicates that carbonate sedimentary rock beneath Pohatcong Valley do not include shales or other rock types that would represent a potential aquitard or barrier to vertical groundwater flow potential. Therefore, the groundwater in the bedrock is considered to be in one, regional aquifer (Also see response to Comment 28 above).

73. Table 5-1 presents the results of the temporary well point sampling, but does not provide the depths for any of the samples.

EPA Response:

See EPA's response to Comment 72, above.

Feasibility Study Report Comments

74. In its array of groundwater alternatives for the OU2 Feasibility Study, U.S. EPA assumes that all wells, whether impacted or not, will have an alternative water supply connection or POET provided. U. S. EPA is without the authority to require such remedial action for wells which are not impacted above the established Site ARAR-based standard. Wells found to have less than 1 part per billion (ppb) TCE in them do not require remedial action and U.S. EPA does not have the authority to undertake it pursuant to the Comprehensive Environmental Compensation and Liability Act. The cost figures used in the FS require re-evaluation once the un-impacted wells are deleted from the numbers of wells to be addressed.

EPA Response:

See EPA's response to Comment 16.

75. The FS does not provide appropriate technical justification or internal consistency regarding the timeframes, number of extraction wells, and other features of the proposed alternatives. The U.S. EPA should provide a more detailed and technically sound justification for its alternative analyses.

EPA Response:

The timeframes, number of extraction wells, and other features of the proposed alternatives are described in the Final OU2 Study Area FS Report, dated April 2010. These were adequately outlined. The FS followed standard policy and guidance.

76. Alternative 2(b) is not cost-effective since the cost of this remedy is not proportional to the overall effectiveness of Alternative 2(b) when compared to the overall cost and effectiveness of Alternative 2(a). The National Contingency Plan lists nine specific criteria for the selection of a remedial action, one of which is that the remedy must be cost effective. In accordance with the National Contingency Plan, the remedial action selected shall be cost effective, provided that it first satisfies the threshold criteria (overall protection of human health and the environment and compliance with ARARs). Alternatives 2(a) and 2(b) both satisfy the threshold criteria. In fact, Alternative 2(a) provides effectiveness similar to that of Alternative 2(b), but at significantly lower cost. In accordance with the National Contingency Plan, costs

that are grossly excessive compared to the overall effectiveness of alternatives may be considered as one of several factors used to eliminate alternatives.

EPA Response:

This comment is a reiteration of prior comments, and has already been replied to. See EPA's responses to comments 19 and 20. As mentioned in response to prior comments, "cost" is only one of nine evaluation criteria found at Section 300.430(e)(9)(iii) of the NCP. It was duly taken into consideration in the evaluation of alternatives in the OU2 FS and the Proposed Plan.

The Proposed Plan concluded that the long-term benefits of Alternative 2(b) far outweigh the long-term O&M requirements and inconvenience that would be required for Alternative 2(a).

77. Alternative 2(b), which provides a long-term alternate water supply by public water connections may be appropriate when: 1) the impacts from contaminants are expected to remain for an extended period of time; 2) it is determined to be technically infeasible to remediate the groundwater to meet the remedial action objectives (RAOs); or 3) it provides cost savings when compared to Alternative 2(a) that uses POETs to provide an alternative water supply. However, it should be clearly noted in the FS that Alternative 2(b) will not provide any significant difference in the long term protection of human health and environment when compared to Alternative 2(a). Therefore, given it higher cost, Alternative 2(b) should be eliminated from further considerations.

EPA Response:

This comment is a reiteration of prior comments, and has already been replied to. See EPA's responses to comments 19 and 20. Long-term effectiveness and permanence is one of EPA's nine criteria for the evaluation of alternatives (see Section 300.430(e)(9)(iii)(C)). Alternatives 2a and 2b were compared in the FS to each other and to the other alternatives based on nine criteria, as per EPA guidance, not only on the three criteria cited in this comment. The Proposed Plan and the FS Report correctly evaluated the nine criteria. In addition, regarding long term effectiveness and permanence, please refer to OU2 FS Report Section 5.3.2.3.

78. Alternative 2(b) may be desirable if there were an existing water main near the affected properties, and the water purveyor has the capacity to supply the impacted properties with water. However, the U.S. EPA failed to verify if the Aqua New Jersey Water Company or the New Jersey American Water Company has the capability to provide potable water to approximately 320 additional homes. This consideration is critical to the determination of implementability under the National Contingency Plan.

EPA Response:

The comment is not correct. Discussions with Aqua New Jersey and New Jersey American verify that both potential water purveyors have capacity to support the residential homes in the OU2 Study Area. In addition, statements to this effect were made by representatives of these water companies at the public meeting.

79. The FS does not provide any map depicting the location of the impacted residential well or other information (depth and construction) for these residential wells. It also fails to evaluate the option of replacing the existing residential wells with new supply wells screened into a deeper aquifer that may not be impacted. Replacement of the TCE impacted supply wells should be considered since connection to, or extension of, a water supply system is so prohibitively expensive that the replacement of the wells with deeper wells may be both cost effective and result in an of added protection to public health and environment that is equivalent to that provided by public water connections.

EPA Response:

The location of the residential wells is provided in the OU2 Study Area RI Report. Well depth and construction details were either not available or confirmed during the sampling effort. The nature of the bedrock discussed in Section 2 of the OU2 Study Area RI Report indicates that carbonate sedimentary rock beneath Pohatcong Valley do not include shales or other rock types that would represent a potential aquitard or barrier to vertical groundwater flow potential. The groundwater in the bedrock is considered to be in one, regional aquifer. Therefore, an option to drill a deeper water supply well at each of the threatened residences was not considered to be protective of human health or the environment. The costs for installing a water line are not considered to be prohibitive.

80. The U.S. EPA did not follow the Region 2 Clean and Green policy and the Executive Orders 13423 and 13513, which require a review of the sustainability criteria (e.g., Carbon Dioxide Emissions, Total Energy Consumed, Safety/ Accident Risk, etc.). The FS should utilize green remediation metrics or tools (e.g., Region 2 Green Remediation Measurements/Evaluation Metrics and AFCEE sustainability protocol). For example, implementation of Alternative 2(b) that involves construction of a 10-mile long water line and disruption to local communities should be analyzed to see if it is more energy intensive and is likely to generate more greenhouse gases than Alternative 2(a).

EPA Response:

See EPA's response to Comment 21, above.

81. The selection of remedial alternatives in the FS and the Proposed Plan primarily focus on TCE, without consideration of other contaminants such as PCE (1 µg/l) and 1,2dichloropropane (13 µg/l), which were detected in the residential wells located at 8 Herleman in Greenwich and House 13A, respectively. These contaminants should be

considered in the evaluation of remedial alternatives because they may impact the effectiveness of the selected remedy.

EPA Response:

The remedy identified in the Proposed Plan would address all groundwater contaminants, as public water would be supplied to residences. The remedy was selected based on an evaluation of Site conditions and all Site contaminants.

82. On page iv of the Executive Summary of the FS, U.S. EPA states that concentrations of TCE in a significant number of the tested residential wells within OU2 exceeded the NJDEP drinking water standard. A map and table identifying the location and exact number of impacted residential wells should be provided with the FS. In addition, the term "significant" needs to be better defined to have any real meaning in this context. This is particularly true given the low percentage of total sampled wells that were in fact so impacted.

EPA Response:

The residential wells are discussed in the OU2 Study Area RI Report. See also EPA's response to Comment 3.

83. On page v of the FS Executive Summary, the U.S. EPA identifies the former American National Can facility as a "major" source of TCE to the regional aquifer. The U.S. EPA has no data on which to base such a statement. No assessment of the volume of TCE that the U.S. EPA alleges originated at the former facility has been performed, nor are data available to complete such an assessment. This unsupportable statement should therefore be deleted from the FS.

EPA Response:

See EPA's response to Comment 42.

84. On page v of the FS Executive Summary, the U.S. EPA asserts that the former American National Can facility is upgradient of the Karrsville Thrust Fault. This statement is not supported by the data collected by the Agency, which shows that the former American National Can facility is, in fact, located over a mile sidegradient from the Fault.

EPA Response:

This comment has been previously responded to. The former American National Can facility is about a half mile from, and upgradient of, the Karrsville Fault. See EPA's response to Comments 6 and 30.

85. On page vi of the FS Executive Summary, the U.S. EPA selected an ARAR of 1 ppb for TCE in groundwater. That ARAR was "used to establish media-specific concentrations of TCE in groundwater that will pose no unacceptable risk to human health and the environment". Therefore, any well found to have less than the 1 ppb level of TCE does not pose an unacceptable risk and does not warrant a response action. The US. EPA's remedial alternative descriptions and cost estimates need to be revised to reflect this fact as acknowledged by the Agency itself.

EPA Response:

See EPA's response to Comment 16.

86. On page 1-5 of the FS, the U.S. EPA states that the Karrsville Thrust Fault extends to "near" the former American National Can property. That Fault has never been mapped at any location near that property, however. As previously noted, the U.S. EPA's map (Figure 2-1), which is based on detailed geologic studies of the area, shows that this Fault is actually located more than a mile to the north and west of the former American National Can property. The FS should be modified to accurately reflect the Site data.

EPA Response:

Figure 2-1 shows the geology in the OU1 and OU2 Study Areas including known faults. The former American National Can facility is located upgradient, and less than a half mile from the Karrsville Fault. See EPA's response to Comments 6 and 30.

87. On page 1-5 of the FS, the U.S. EPA states that since TCE concentrations in groundwater seem to be decreasing from OU1 to OU2, that all of the TCE migrated from OU1 to OU2. That conclusion is not supported by the Site groundwater data. The detected concentrations over the years do not exhibit a consistent plume character moving from one spot or area downgradient. The U.S. EPA did no sampling in OU2 to identify possible contributing sources and only minimal sampling in OU1. Therefore, the U.S. EPA is in no position to reach the conclusion stated at this point in the FS based on existing data.

EPA Response:

This is a reiteration of several previous comments. Please see EPA's response to Comments 42, 68, and 69.

88. On page 2-4 of the FS, the U.S. EPA again assumes that no sources of the TCE in the groundwater exist in OU2. That conclusion is grossly premature since the U.S. EPA has done almost no characterization work to determine if sources do in fact exist. Instead, the Agency has assumed the sources are all in OU1, while avoiding any sampling to test that assumption.

EPA Response:

EPA did not assume that no sources of TCE groundwater contamination existed in the OU2 Study Area. As noted previously, EPA did substantial source investigation work as part of the OU1 and OU2 RIs. Data collected and evaluated during the OU2 RI support this conclusion. See EPA's responses to Comments 8, 10, 23, 24, 25, 26 and 62.

89. In its development of remedial alternatives in Section 4 of the FS, the U.S. EPA has assumed that 320 private wells will be given public water supply connections or POETs. This assumption is made despite the fact that about three-fourths of the wells tested to date have had less than 1 ppb of TCE in them. There is no reason to suppose that a significant percentage of wells still to be tested will not also have TCE concentrations below 1 ppb. This is particularly true since most of the wells tested are located in the center of the Valley where U.S. EPA would anticipate finding the greatest regional impact. As stated in previous comments, no remedial action is needed or statutorily authorized for these wells.

EPA Response:

EPA disagrees with the comment that no remedial action is necessary and EPA has no statutory authority for these wells. The OU2 RI/FS and Proposed Plan support EPA's preferred remedy which will provide public water to threatened and impacted properties within the OU2 Study Area. See also EPA's responses to Comments 16 and 85.

90. Beginning on page 4-5 of the FS, the U.S. EPA adds a remedial option of *insitu* hotspot treatment. *Insitu* oxidation is considered for an area at the boundary between OU1 and OU2. That artificial line has no meaning in actuality (i.e., no groundwater divide or barrier exists at that point). It is incorrect to view the area as a "source area" for the remainder of OU2 based simply on Agency created division between OU1 and OU2. As the U.S. EPA itself acknowledges, OU1 and OU2 are interconnected and the road intersection boundary is arbitrary. Applying an *insitu* treatment technology at the Asbury-Broadway Road areas would clearly involve injecting chemicals in *media res* with no valid technical justification. The FS should be revised to take into account the fact that the Asbury-Broadway Road line is an Agency-created convenience, rather than an actual aspect of the Site's hydrogeology. Remedial alternative development should be based on actual Site conditions, as opposed to artificial features.

EPA Response:

The nature of the boundary between the OU1 and OU2 Study Areas is clear in the OU1 and OU2 RI and FS Reports. The issues with the in-situ treatment alternatives, described in Sections 4.1.1.4 and 4.1.1.5 of the OU2 Study Area FS Report, were discussed in detail in Section 5.3. The alternatives that include an in-situ treatment component were evaluated at the border of OU1/OU2 Study Areas because it was found to have the most highly contaminated groundwater in the OU2 Study Area.

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91. On Page 5-6 of the FS, Section 5.3.2.3 refers to remedial alternatives that result in a reduction in TCE concentrations in groundwater near the soil source areas. However, the U.S. EPA has not identified any soil source areas in OU2. The area where the *insitu* treatment is expected to occur is not near any of the source areas identified by the Agency to date. Therefore, it is not clear how the proposed alternatives that are discussed could have any impact on any of U.S. EPA's postulated soil source areas.

EPA Response:

The language referenced in the comment pertains to an earlier draft of the FS Report (June 2009). That version of the FS Report was modified in the Final OU2 Study Area FS Report dated April 2010. The language on Page 5-6 of the Final FS Report states: "All alternatives would be effective in the long-term and would be permanent. Through active source removal (as part of other operable units) and continued long-term monitoring of plume stability and decreasing concentrations, the MNA component of all alternatives is effective and permanent." Potential reference to "active source removal" includes a note specifying that it would be "as part of other operable units", which would potentially include future activities in the OU3 Study Area, and the groundwater TCE (and PCE) source containment remedies presently being conducted as part of OU1 RD activities.

92. As stated in comment 46 above, U.S. EPA has concluded that OU1 and OU2 are interconnected. Therefore, remedial benefits from the *insitu* treatment option contemplated under Alternatives 3a and 3b will not be effective long term, if at all, since it does not address OU1 groundwater contamination. Therefore, the long term effectiveness of Alternative 3a and 3b should be considered to be low through the FS evaluations.

EPA Response:

EPA agrees with the comment. The discussion of the alternatives with an *in-situ* treatment component in the OU2 FS report accurately reflects the long-term effectiveness of these alternatives, as follows:

> "In general, alternatives that include active reduction of contaminant concentrations (such as Alternatives 3a and 3b) would be more effective in the long-term than options that only rely on MNA (such as Alternatives 2a and 2b). However, due to the continued migration of contaminated groundwater from the OU1 Study Area, there is no significant difference in the long-term effectiveness of the active treatment options versus MNA options. Because of the potential for contaminated groundwater to migrate into the OU2 Study Area after ISO treatment at the ABR area, additional dosing may be required, which would limit the effectiveness and permanence of the remedy, along with significantly increasing costs. In addition, significant continued injection of oxidant into the aquifer beyond the estimated one-year timeframe may begin to cause detrimental impacts to the aquifer, such as the presence of unreacted oxidant."

93. On page 5-6 of the FS, Section 5.3.2.4, the U.S. EPA concludes that Alternative 3a and 3b will remove and treat "most" of the TCE. This statement is not supported by any analysis and has no technical justification given what is known about the Site as a whole.

EPA Response:

The language referenced in the comment pertains to an earlier June 2009 version of the FS Report, and was modified in the Final OU2 Study Area FS Report dated April 2010. The Final April 2010 FS report does not indicate that Alternative 3a and 3b will remove and treat "most" of the TCE. The language states that "Alternatives 3a and 3b are the best alternatives for the reduction of TMV (toxicity, mobility, and volume) since they would rely on active treatment processes to remove and treat the TCE migrating into the OU2 Study Area due to the continuing migration of impacted groundwater from the OU1 area."

94. On pages 5-7 and 5-8 of the FS, Section 5.3.2.6, the U.S. EPA fails to mention any other implementation issues with respect to Alternatives 3a and 3b such as limited delivery options for fractured bedrock.

EPA Response:

The language referenced in the comment pertains to an earlier June 2009 version of the FS Report, and was modified in the Final OU2 Study Area FS Report dated April 2010. The Final April 2010 FS report text states the following: "In addition, the performance of ISO injection may would [sic] have difficulty in adequately contacting TCE in groundwater because of the complex bedrock geology and the uncertainty that sufficient chemical reagent will reach the targeted TCE plume. In addition, there would be the potential that unreacted oxidant would migrate downgradient and pose a risk to private wells. For these reasons, Alternatives 3a and 3b would be more difficult to implement than Alternatives 2a and 2b.and currently details implementation concerns related to Alternatives 3a and 3b." Unfortunately, there is a typo in the first sentence of the final FS language that was not corrected. The word "may," should instead be "would."

95. On Page 5-8, Section 5.3.2.7 of the FS, the U.S. EPA correctly states that the capital cost of Alternative 2(b) is higher than that of Alternative 2(a), but significantly overestimates the long term O&M costs of Alternative 2(a). In estimating O&M costs for Alternative 2(a), U.S. EPA assumed the GAC filters associated with the POET system would need to be replaced at a frequency of once per household per year. This replacement costs represents almost 85% of the estimated annual O&M cost of Alternative 2(a). Carbon replacement frequency which depends on many factors including the level of contamination, water temperature, pH, water usage, and the presence of other constituents. Due to the relatively low TCE concentrations present in the wells in OU2 (most are below 5 µg/l) the carbon usage is likely to be considerably less than estimated in the FS. In addition, the vulnerability and potential maintenance of proposed water lines were not taken into consideration in estimating

the O&M cost associated with Alternative 2(b). Therefore, while the O&M costs for POETs is higher than that for water connections, the U.S. EPA estimate of O&M costs associated with Alternative 2(a) is overly conservative and the comparison of the O&M cost for Alternative 2(a) and Alternative 2(b) in selecting one alternative over the other is biased and inappropriate.

EPA Response:

The cost details and assumptions for the remedial alternatives are provided in Appendix D, as referenced in Section 5.3.2.7 of the OU2 FS Report. The assumption of yearly change-out of the GAC was used as a conservative estimate. Based on information and discussions provided by the NJDEP, which is currently servicing POETS in the OU2 Study Area, a yearly change-out of the GAC was considered to be a reasonable assumption. Break-through time of each of the individual GAC system would need to be assessed on a continuing basis to be protective of human health, and for 400 such systems, the O&M costs would be significantly higher than the other alternative.

For the alternatives which provide for public water (Alternatives 2b and 3b), the water lines would be owned by the public water supply purveyor, who would be responsible for the long-term O&M of the system. Therefore, these costs were not included in the cost estimate calculations.

96. In Table 5-1 of the FS, the U.S. EPA concludes that Alternatives 2a and 2b will achieve the preliminary remediation goals ("PRGs") in approximately 30 years; that Alternatives 3a and 3b will achieve the PRGs in approximately 10 years, and that Alternatives 4 will achieve the PRGs in approximately 14 years. No technical justification is provided for these timeframe estimates.

EPA Response:

The language referenced in the comment pertains to an earlier June 2009 version of the FS Report, and was modified in the Final OU2 Study Area FS Report dated April 2010. The Final April 2010 FS report Table 5-1 states that the time until the RAOs are achieved would be 67 years for all alternatives (except for the No Action alternative). The basis for the 67 year time-frame is discussed in Section 4.1 and detailed in Appendix B of the OU2 Study Area FS Report (April 2010).

97. In Table 5-1 of the FS, the discussion concerning the technical feasibility of Alternatives 3a and 3b should mention issues related to limited delivery options in fractured bedrock. In addition, the description for Alternative 3b appears to be an error.

EPA Response:

The language referenced in the comment pertains to an earlier June 2009 version of the FS Report, and was modified in the Final OU2 Study Area FS Report dated April 2010. In the Final April 2010 FS report Table 5-1 corrects the description of Alternative 3b

mentioned in the comment. Section 5.3.2.6 of the OU2 Study Area FS Report (April 2010) discusses the issues related to the implementability of the ISO treatment, although the remedial options could be implemented with available equipment and technology.

Attachment A

Proposed Plan

Superfund Program Proposed Plan for Operable Unit 2

Pohatcong Valley Groundwater Contamination Site

Warren County, New Jersey

EPA

April 2010

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan identifies the Preferred Alternative to address contaminated groundwater in the downgradient portion of the groundwater plume located in Franklin and Greenwich Townships, Warren County, New Jersey, and provides the rationale for this preference. This area is referred to as Operable Unit 2 (OU2) of the Pohatcong Valley Groundwater Contamination Site (Site). Alternatives have been developed to address groundwater contaminated primarily with the volatile organic compound trichloroethene (TCE).

The U.S. Environmental Protection Agency's (EPA's) Preferred Alternative to address groundwater contamination in the OU2 Area is Alternative 2b, which includes provision of potable water to impacted and threatened properties through the construction of a water line and connections, abandonment of private potable wells, and Monitored Natural Attenuation (MNA).

This Proposed Plan includes a summary of all cleanup alternatives evaluated for OU2 at the Site. This document is issued by EPA, the lead agency for Site activities, and New Jersey Department of Environmental Protection (NJDEP), the support agency. EPA, in consultation with NJDEP, will select the final remedy for OU2 after reviewing and considering all information submitted during a 30-day public comment period. EPA, in consultation with NJDEP, may modify the preferred alternative or select another response action presented in this Proposed Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all the alternatives presented in this document.

EPA is issuing this Proposed Plan for OU2 as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended

Mark Your Calendar

April 16, 2010 – May 17, 2010: Public Comment Period on the Proposed Plan.

April 29, 2010, at 6:00 p.m.: The U.S. EPA will hold a Public Meeting to explain the Proposed Plan, at the Washington Borough Municipal building, 100 Belvidere Avenue, Washington, NJ 07882
Telephone: (908) 689-3600

For more information, see the Administrative Record file (which includes the Proposed Plan and supporting documents), available at the following locations:

Warren County Health Department
700 Oxford Road
Oxford NJ, 07863
Telephone: (908) 475-7960
Fax: (908) 475-7964
Website: http://www.co.warren.nj.us/healthdept/
Hours: Monday-Friday: 8:30 am – 4:30 pm

And USEPA-Region II
Superfund Records Center
290 Broadway, 18th Floor
New York, NY 10007-1866
(212) 637-4308 Monday-Friday, 9:00 a.m. - 5:00 p.m.

Written comments on this Proposed Plan should be addressed to:

Stephen Cipot
Remedial Project Manager
Southern New Jersey Remediation Section
U.S. Environmental Protection Agency
290 Broadway, 19th Floor
New York, New York 10007-1866
Telephone: (212) 637-4411, Fax: (212) 637-4429
Email address: Cipot.Stephen@epa.gov

or

Pat Seppi,
Community Involvement Coordinator
290 Broadway, 26th Floor
New York, New York 10007-1866
Telephone: 212-637-3679
Email address: Seppi.Pat@epa.gov

EPA's website for the Pohatcong Valley Groundwater Contamination Site:
www.epa.gov/region2/superfund/npl/pohatcong
The link to EPA's complete Proposed Plan is at:
http://www.epa.gov/region02/superfund/npl/pohatcong/OU2ProposedPlan

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(CERCLA, or Superfund). This Proposed Plan summarizes information that can be found in greater detail in the OU2 Remedial Investigation and Feasibility Study (RI/FS) reports and other documents contained in the Administrative Record for the Site.

SITE DESCRIPTION

The Site is located in portions of Washington Borough, Washington Township, Franklin Township, and Greenwich Township in Warren County, New Jersey (see Figure 1). Pohatcong Valley is a northeast-southwest trending valley that is bounded by mountains, is part of the Delaware River watershed, and is drained by Pohatcong Creek and associated tributaries.

The OU1 Study Area consists of approximately 8.75 square miles (5,600 acres), that includes portions of Washington Borough, and extends to approximately Asbury-Broadway Road in Franklin Township.

The OU2 Study Area consists of approximately 6.5 square miles (4,200 acres), and begins at the western terminus of OU1 and continues westward through portions of Franklin and Greenwich Townships. The OU1 and OU2 areas encompass about 15 square miles, or 9,800 acres (see Figure 1).

The TCE and tetrachloroethylene (PCE) groundwater plumes begin at separate source areas within the OU1 Study Area, and comingle in the aquifer. The TCE plume is the substantially larger plume extending throughout the valley. The PCE plume is limited to an area within the OU1 portion of the Site.

A third Operable Unit, OU3, includes the former American National Can (ANC) facility, now owned by Pechiney Plastics Packaging Inc. (PPPI), and adjacent areas within the Borough of Washington. OU3 includes identified source areas that contributed to the Site-wide TCE contaminated groundwater.

SITE HISTORY

Chlorinated volatile organic compounds (VOCs), specifically TCE and PCE, were detected in groundwater from two public potable-water supply wells in Washington Borough in the late 1970s. The two potable-water supply wells are known as the Vannatta Street Well and the Dale Avenue Well, owned and operated by New Jersey American Water Company. TCE and PCE were detected in groundwater samples collected from the Vannatta Street well in July 1978 at concentrations of 1.7 micrograms per liter (µg/L) and 8.3 µg/L, respectively. Only TCE was detected in groundwater samples collected from the Dale Avenue well in early 1979, at concentrations between 44 µg/L and 160 µg/L.

After subsequent investigations conducted by the Warren County Department of Health and NJDEP, NJDEP installed public water supply connections to homes and businesses within the contaminated area of Washington Township in 1989. Wellhead treatment systems were added to the public wells so groundwater was treated to meet the drinking water standards prior to distribution.

EPA included the Pohatcong Valley Site on the National Priorities List (NPL) in March 1989.

Due to its size and complexity, EPA has divided the Site cleanup into three phases, or Operable Units, referred to as OU1, OU2, and OU3. This Proposed Plan addresses OU2, which includes contamination within the OU2 Study Area defined later in this Proposed Plan. In 2006, EPA selected a remedy for Operable Unit 1 (OU1), which includes groundwater extraction and treatment of groundwater hot spots, and long-term monitoring of natural attenuation for areas outside hot spots. The OU1 remedy will serve to restore groundwater within the OU1 study area of the Site to beneficial use and will meet the applicable drinking water standards. An engineering design is currently being prepared for the OU1 remedy. A Remedial Investigation is currently underway to define the nature and extent of contaminant source areas and soils in the OU3 portion of the Site.

OU1

EPA initiated preliminary RI work in the early 1990s, which included reviewing Site background information from the Warren County Department of Health and the NJDEP, and developing an initial list of 107 Potential Source Area (PSA) facilities to be evaluated as possible sources of chlorinated VOCs and other contaminants. EPA issued over 100 information request letters to facilities, and conducted

Site visits.

In 1999, EPA initiated OU1 RI/FS activities, to delineate the nature and extent of contaminated groundwater and source areas, and evaluate potential human health and ecological risks based on Site-related contaminants.

Based on the results of the OU1 RI, elevated levels of TCE and PCE were detected within Washington Borough, and 3 facilities were issued general notice letters informing them that they are Potentially Responsible Parties (PRPs) for the Site. These parties are American National Can, now owned by PPPI Inc., L&L Econowash Cleaners, and Modern Valet Services. A fourth historical source of groundwater contamination was identified by EPA in 2009 as Tung-Sol Tubing, a company which had become defunct.

Past disposal practices at these identified source areas contributed contaminants to the groundwater, which continues to migrate.

EPA completed the OU1 RI/FS in 2005 and released the results to the public in July 2005. In August 2005, EPA issued a Proposed Plan to address groundwater contamination within the OU1 Study Area. The selected groundwater remedy for the OU1 study area was documented in the OU1 Record of Decision (ROD), issued on July 13, 2006. The OU1 remedy includes the extraction and treatment of contaminated groundwater in TCE and PCE hot spot areas, and reinjection of treated groundwater to the aquifer. Long–term monitoring of natural attenuation will be used in the downgradient portions of the OU1 TCE and PCE plumes.

While it is believed that most businesses and residences are connected to public water, if, during implementation of the OU1 remedy, residences or businesses within the aerial extent of the OU1 plume are found to have not yet been connected to public water, EPA will consider connecting them, and sealing their wells.

The remedial design (RD) phase for the OU1 groundwater remedy is presently underway. The RD to address the portion of the remedy for the TCE portion of the plume is being performed by PPPI, under EPA oversight. The RD for the PCE portion of the plume is being performed by EPA and the U.S. Army Corps of Engineers.

OU2

Between 2002 and 2004, NJDEP sampled more than 80 residential wells downgradient of EPA's OU1 Study Area. This sampling revealed levels of trichloroethylene (TCE) detected above the New Jersey Ground Water Remediation Standard (NJ GWRS of 1 microgram per liter (µg/l) in a number of the tested wells. At the present time, the public water supply ends near the southwestern boundary of the OU1 Study Area and does not extend into the OU2 Study Area. Therefore, NJDEP is providing individual Point of Entry Treatment Systems (POETS) to residences where TCE concentrations have been detected above the NJ GWRS. POETS treat the TCE contamination through carbon adsorption.

Residents using private wells within the OU2 Study Area may be at risk of exposure to Site-related contaminants through contaminated residential well water. NJDEP and the Warren County Department of Health recommend that residents on private wells sample their wells once a year, however, it is not clear that all residents do so.

Between 2006 and 2009, EPA conducted a RI in the OU2 Study Area to determine the nature and extent of contamination. The RI also included an assessment of the hydraulic gradient and hydrogeologic connection from the OU1 to the OU2 Study Areas, and an evaluation of potential human health and ecological risks based on the occurrence and distribution of Site-related contamination in sediment, surface water, residential wells, indoor air, and groundwater.

As part of the OU2 RI/FS, EPA drilled 105 feet of overburden and 906 feet of bedrock to install 7 new monitoring wells in the OU2 Study Area; completed a 2,640-foot line of surface geophysics and 735 feet of subsurface geophysics; performed packer testing in 12 bedrock zones; collected 14 groundwater samples from the 7 new and 4 existing monitoring wells in the OU2 Study Area; collected 11 groundwater samples from 11 existing monitoring wells within the OU1 Study Area; collected groundwater samples from 204 residential wells; collected 6 sediment and 9 surface water samples; and utilized the results of 667 groundwater samples collected by NJDEP and the Warren County Department of Health.

In addition, vapor intrusion evaluations were conducted at 9 residences and 2 public buildings within the OU2 Study Area. Samples were collected to assess the potential for volatile organic compounds (VOCs) to volatize from groundwater and accumulate underneath or within buildings. Some properties were sampled multiple times.

OU3

The OU3 study area is within Washington Borough, and includes the contaminated source areas and soils located on and in the vicinity of the former American National Can facility. In March 2008, EPA initiated enforcement negotiations with the PRP for the performance of the OU3 RI/FS. These negotiations were unsuccessful and were terminated in September 2008. EPA is currently performing the OU3 RI/FS with field work scheduled to begin in 2010.

SITE CHARACTERISTICS

Geology/ Hydrology

The Pohatcong Valley is located in the New Jersey Highlands Physiographic Province and is one of a series of northeast/southwest trending valleys in the area that are separated by similarly trending mountains. In the study area, the Pohatcong Valley is bounded by the Scotts, Oxford, and County House Mountain chain on the northwest side and by the Pohatcong and Upper Pohatcong Mountain chain on the southeastern side. The mountains bounding Pohatcong Valley are composed of Precambrian igneous and metamorphic rocks and were thrust up during a series of complex mountain building periods in the Paleozoic Era.

The Pohatcong Valley contains surficial Pleistocene unconsolidated glacial sedimentary deposits, and underlying sedimentary rocks. The surficial glacial deposits are typically described as low-permeability, poorly sorted clay-bearing sediments ranging from very fine to coarse sands and gravels. The underlying sedimentary rocks are of Cambrian and Ordovician age, composed mainly of shallow water limestones and dolomites. The strike of the beds is generally parallel to the trend of the Valley floor and dip gently to the southeast. The limestones and dolomites are known to form karstic features such as extensive bedrock voids and sinkholes in the Valley.

The Paleozoic formations that underlie Pohatcong Valley include, from oldest to youngest, the Hardyston Quartzite, Leithsville Formation, Allentown Dolomite, Lower Beekmantown Group, Upper Beekmantown Group, and Jacksonburg Limestone and are described by Drake (1967), Drake et al (1994), and Drake et al (1996). A geological map illustrating the configuration of these formations is included in the OU2 RI report.

Groundwater in the Pohatcong Valley occurs mainly in the limestone and dolomite carbonate rocks underlying the glacial sediments. Karstic development in these carbonate rocks greatly increases the porosity and permeability of the aquifer. Faulting and dissolution create preferential flow pathways on both the local and large scales. The regional groundwater flow direction is from the Washington Borough area in OU1, to the OU2 area, trending northeast to southwest toward the Delaware River.

Groundwater is used by residential, farm, and commercial properties as a primary source of potable drinking water and by industrial facilities as a source of cooling and process water. A majority of the potable water in the more heavily populated OU1 Study Area is supplied through public water supply wells. A majority of the potable water in the OU2 Study Area is supplied through private residential wells.

The Pohatcong Thrust Fault occurs near the base of Pohatcong Mountain adjacent to Pohatcong Valley and the Brass Castle Thrust Fault occurs near the base of Scott, Oxford, and County House Mountains adjacent to Pohatcong Valley. These thrust faults strike parallel to the Valley and dip steeply toward the southeast. A third mapped fault in the OU2 Study Area, known as the Karrsville Fault, roughly parallels the Pohatcong and Brass Castle faults and occurs near the center of the Valley.

Surface water features in Pohatcong Valley include Merrill and Pohatcong Creeks, which drain the valley, and water-filled quarries, such as Edison Quarry located adjacent to Edison Road in Stewartsville, NJ. The water-filled quarries are located along the

Karrsville Fault, and are fed by groundwater discharging through the fault.

Groundwater

OU2 RI activities included a geophysical seismic survey to identify the presence of the Karrsville Fault near the OU1/OU2 boundary, monitoring well installation, and the collection of sediment, surface water, groundwater, residential well, soil gas and air samples.

The geophysical survey confirmed that the Karrsville Fault zone that is mapped in the OU2 Study Area extends through the OU1 Study Area. Five new monitoring wells were installed at three locations along the fault to assess groundwater flow and contaminant migration; two wells were installed in areas away from the fault to assess a potential source area and to evaluate migration of contaminants away from the fault trace. The fault zone was identified as a major conduit for groundwater flow and a preferential pathway for contaminant migration through Pohatcong Valley. Consistent with known conditions in the OU1 Study Area, borehole geophysics and packer tests performed at the new monitoring wells confirmed that the TCE occurs in bedrock fractures. However, not all bedrock fractures contain TCE, which indicates complex groundwater and contaminant flow migration through the fractured bedrock. This finding also explains the complex pattern of results observed with the comprehensive residential well sampling program.

Based on EPA's OU1 and OU2 RI studies, the groundwater gradient, and results from groundwater monitoring, and residential well sampling involving hundreds of wells, EPA has concluded that TCE forms a continuous groundwater contaminant plume extending from the OU1 and OU3 areas, and moves downgradient in a southwesterly direction, into the OU2 Study Area. The Karrsville fault provides a preferential pathway for both groundwater and the flow of contaminants from the OU1 Study Area through the OU2 Study Area. TCE groundwater concentrations within the OU2 Study Area ranged from below detection to a high of 21 µg/L, near the OU1/OU2 border. The plume primarily follows the regional flow pattern as well as the northeast to southwest trending Karrsville fault.

Surface Water and Sediment

As part of the OU2 RI, the former Edison Quarry, which is located along the Karrsville fault was evaluated. Geologically, the quarry was located at an area where the fault emplaced a section of limestone that was quarried and used in the manufacture of cement. Limestone excavation continued until the operation intercepted high yield water bearing fractures, and the flow of groundwater from the fault could no longer be controlled through pumping and the quarry filled with groundwater. The former quarry continues to receive about 3 million gallons of water per day from the Karrsville fault, based on the volume of water discharged to Pohatcong Creek from an overflow channel.

As discussed in detail in the OU1 RI report, surface water and depth discrete water samples had been collected during OU1 from the former Edison Quarry. Of the 15 samples that were taken at various depths in Edison Quarry (10 feet (ft) below water surface, 10 ft above quarry bottom and at mid-point), all 15 had TCE detections ranging from 0.36 µg/L (estimated value) to 6.2 µg/L. The higher concentrations tended to be located in the shallower depths. These results indicate that the Edison Quarry is not itself a source of the TCE detected in its water, and that the Karrsville fault serves as an effective preferential groundwater flow and contaminant migration pathway. It is noted that residential well samples collected immediately adjacent to the Edison Quarry and the Karsville fault generally contain higher TCE concentrations than well samples collected further from the quarry (i.e., further from the Karrsville fault). The occurrence of TCE in the Karrsville fault is due to migration from the OU1 Study Area.

During the OU2 RI, all 6 sediment samples and 9 surface water samples collected from 9 locations along Pohatcong Creek had detections of VOCs. No TCE was identified in the 6 sediment samples collected. One detection of TCE was identified in the surface water in Pohatcong Creek immediately downgradient from the Edison Quarry discharge outlet, at a concentration of 1.2 µg/L.

OU2 Study Area Vapor Intrusion Program

Within the OU2 Study Area, during the OU2 RI, approximately 19 subslab soil gas and 33 air samples were collected from 9 residences, and 2 public

buildings including an elementary school. For TCE contamination, in one public school and 2 residential structures, a number of the sub-slab and several indoor air sample results indicated that measures to mitigate these levels needed to be undertaken. These three structures are located near the eastern border of the OU2 Study Area, near the boundary with the OU1 Study Area. As a result, to address Site-related volatile vapors, EPA installed vapor intrusion mitigation systems at one residence and the school during 2008 and 2009. A third property owner installed a system privately, during remodeling. Elevated levels of TCE were not detected in vapor samples collected from other subslabs and indoor air throughout the OU2 Study Area.

As noted with TCE groundwater concentrations, TCE soil gas concentrations were similarly found to be higher closer to the center of the Karrsville fault, and decreased away from the fault. This pattern mimics the results noted with groundwater concentrations.

Residential Groundwater Sampling Program

The EPA, NJDEP, and the Warren County Department of Health collected residential groundwater samples prior to and concurrent with EPA's OU1 and OU2 investigations. The Warren County Department of Health collected 303 groundwater samples from about 185 residences in Franklin and Greenwich Townships between 2002 and 2005, with some residences being sampled multiple times. NJDEP collected 343 samples from 74 residences between 2002 and 2008, again with some residences being sampled multiple times. To date, approximately 74 residences have POETS that the NJDEP installed and continues to maintain through NJDEP's Spill Fund. POETS are small treatment systems connected to a residential water supply line to remove VOCs from groundwater using activated carbon. The carbon has to be periodically sampled and replaced to remain protective. Presently, NJDEP's Spill Fund pays for maintenance and monitoring of the POETS by private contractors hired by individual property owners to ensure the systems are operating properly.

In March 2008, as part of the OU2 RI, EPA sampled a limited number of residential wells, collecting 37 samples from 22 residences. Based on the results, EPA expanded the residential well sampling program in 2009 to a comprehensive sampling of all residential wells in the OU2 Study area that were not connected to NJDEP POET systems, and for which property owners granted EPA access to sample their wells. EPA mailed approximately 650 access request letters to property owners, along with Site fact sheets updating specific Site and residential sampling activities. In March 2009, 112 residential wells were sampled. An additional 62 residential wells were sampled in May 2009. Additional sampling was conducted at 9 residences in August 2009. In total, EPA sampled 204 residential wells during the OU2 RI.

Based on sampling results conducted by NJDEP, the Warren County Department of Health and EPA, to date, approximately 100 residential wells in the OU2 Study Area were found to contain TCE concentrations above the NJ GWRS of 1 µg/L. TCE is the only Site-related compound detected above standards within OU2. Properties that are impacted by Site contaminants above standards have been referred to NJDEP for further evaluation and action, which includes confirmation sampling, and the installation and maintenance of POETS until EPA has selected and implemented a remedy for the OU2 area. NJDEP installed 23 POETS in 2009 at properties where TCE contamination was confirmed above the NJ GWRS. The well sampling program is ongoing.

Other Potential Source Areas

During the OU2 investigation, EPA identified and evaluated potential source areas, to determine if a source other than those identified during the OU1 RI, were contributing to contaminated groundwater within the OU2 Study Area. Two facilities, located along the southern periphery of the valley, were identified as potential sources, however groundwater sampling in newly installed downgradient wells did not detect any contaminants of concern. These data indicate that the two facilities are not contributing to the TCE groundwater contamination in OU2.

Similarly, sample results obtained from the former Edison Quarry indicate that is not a source of Site contaminants, but a reservoir primarily filled by groundwater flowing through fractures.

The results of the OU2 RI did not identify any "principal threat wastes" at the OU2 Study Area.

Principal threat wastes were previously identified during the OU1 RI and consist of the source areas for the Site-wide groundwater contamination. Source areas and principal threat wastes are being addressed in OU3, and through EPA's OU1 remedial design activities.

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 ground water, surface water or air, or acts as a source for direct exposure. Contaminated ground water generally is not considered to be a source material; however, Non-Aqueous Phase Liquids (NAPLs) in ground water may be viewed as source material. 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.

SCOPE AND ROLE OF THE ACTION

EPA has addressed the cleanup of this Site by implementing immediate actions to address situations which present an imminent threat to human health, and long-term cleanup actions. With respect to immediate actions taken, EPA has sampled residential wells in the OU2 Study Area and referred all impacted wells to NJDEP for action. As a result, NJDEP has provided funding for or installed POETS to address contamination at approximately 100 properties.

The long-term cleanup will be conducted in three discrete phases, or operable units.

- OU1, which was the subject of a 2006 ROD, provides for the implementation of a groundwater remedy in the OU1 Study Area which consists of the extraction, treatment and reinjection of highly contaminated water in identified hot spots, as well as natural attenuation for other portion of the OU1 groundwater plume.

- OU2, which is the subject of this Proposed Plan, will provide for the implementation of a remedy to address groundwater contamination in the OU2 Study Area of the Site.

- OU3 will address the remediation of source areas at the Site. Currently, investigations are ongoing for the OU3 portion of the Site. The OU3 ROD is expected to be the final remedy selected for this Site.

RISK SUMMARY

The purpose of the risk assessment is to identify potential cancer risks and noncancer health hazards at the Site assuming that no further remedial action is taken. A baseline human health risk assessment was performed to evaluate current and future cancer risks and noncancer health hazards based on the results of the Remedial Investigation.

As described in the "What is Risk and How is it Calculated?" box, the cancer risk is compared to EPA's acceptable cancer risk range of 10^{-6} to 10^{-4}. The lower end of EPA's acceptable risk range is 10^{-6}, and is also referred to as the "point of departure." Cancer risks that exceed 10^{-4} indicate that a remedial action should be taken. Cancer risks calculated between 10^{-4} and 10^{-6} indicate that a remedial action may be warranted under certain circumstances. Generally no action is taken when the cancer risk is lower than 10^{-6}.

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

Human Health Risk Assessment

As part of the RI/FS, a baseline human health risk assessment was conducted for the OU2 Study Area to estimate the risks and hazards associated with the current and future effects of contaminants on human health and the environment. A baseline human health risk assessment is an analysis of the potential adverse human health effects caused by hazardous-substance exposure in the absence of any actions to control or mitigate these under current and future land uses.

A four-step human health risk assessment process was used for assessing Site-related cancer risks and noncancer health hazards. The four-step process is comprised of: Hazard Identification of Chemicals of Potential Concern (COPCs), Exposure Assessment, Toxicity Assessment, and Risk Characterization (see adjoining box "What is Risk and How is it Calculated").

The baseline human health risk assessment began with selecting COPCs in the various media (i.e., groundwater, surface water, and sediment) that could potentially cause adverse health effects in exposed populations. The current/future land use scenarios included the following exposure pathways and populations:

- Adult and Child Residents: ingestion of groundwater and inhalation and dermal absorption while showering (regional aquifer groundwater):
- Adult and Youth Recreational: incidental ingestion and dermal contact with surface water; incidental ingestion and dermal contact with sediment:
- Adult Industrial Worker: ingestion of groundwater and inhalation and dermal absorption while showering (regional aquifer groundwater): and
- Adult Agricultural Worker: inhalation of volatiles from groundwater used for irrigation.

In addition, groundwater data from domestic wells were compared to state and federal Maximum Contaminant Levels (MCLs) used for drinking water.

Under the future land-use scenario, the exposure pathways and populations evaluated included the exposure pathways listed for the current land use scenario.

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 evaluation of all exposure scenarios can be found in the baseline human health risk assessment. It should be noted that no TCE soils source areas were identified in the OU2 Study Area, and that the Site groundwater was the

WHAT IS RISK AND HOW IS IT CALCULATED?

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

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

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

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

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

only identified OU2 media of concern.

Summary of Risks to Residential Receptors – The carcinogenic risk to the lifetime resident ($3.3x10^{-4}$) who uses the regional aquifer exceeds EPA's target risk range of 10^{-6} to 10^{-4}. The portion of this risk related to TCE, the only Site-related compound is $3.5 x 10^{-5}$. This value exceeds 10^{-6}, EPA's point of departure. The non-carcinogenic hazards to adult (Hazard Index (HI) of 10) and child (HI of 24) residents who use groundwater from the regional aquifer without treatment would exceed the EPA target HI of 1.0. Ingestion of groundwater is the exposure route that contributes the greatest to this hazard. The chemicals driving the risk associated with these HI values are primarily inorganic compounds (thallium, arsenic, cobalt, iron, manganese, and bis(2-ethylhexyl)phthalate) that are not considered to be Site-related contaminants. The five metals identified, thallium, arsenic, cobalt, iron and manganese, are intermittently distributed in the aquifer and may be naturally occurring.

The Risk Assessment included an evaluation of the March 2008 sampling event, where 22 domestic wells were evaluated by comparing sampling results to NJ GWRS and federal MCLs. Eight of the evaluated residential wells did not have treatment systems, and 14 residential wells had an existing treatment system installed. TCE was detected in thirteen of the 22 domestic wells, and all detections were at concentrations above state or Federal standards. The levels of TCE ranged from non-detectable to 10 µg/L.

EPA also evaluated the potential for vapor intrusion into structures within the area that could be potentially affected by the groundwater contamination plume. The groundwater data collected during this investigation indicated that the groundwater plume decreases in depth as the groundwater migrates from the OU1 into the OU2 Study Area, following the regional flow direction in a southwesterly direction. This has resulted in areas having an increased risk for vapor intrusion as the soils above the plume which would prevent the migration of vapors that could impact any structures above the contaminated plume are thinner. The depth to groundwater decreases from greater than 50 ft near the OU1/OU2 boundary, to less than 40 ft in downgradient OU2 areas. Presently, three structures required remediation for vapors within the OU2 Study Area.

Summary of Risks to Industrial Workers – The carcinogenic risk for industrial workers that use the regional aquifer is $8.7x10^{-5}$. The cancer risk associated with exposure to TCE is 7.1×10^{-6}. Both of these values are above EPA's point of departure, indicating that a remedial action may be warranted under certain circumstances, such as chemical concentrations exceeding drinking water standards. The non-carcinogenic hazard to the industrial workers exposed to groundwater from the regional aquifer as a potable water supply at the workplace without treatment is 3.8, which exceeds EPA's target HI of 1.0. Ingestion of groundwater is the exposure route that contributes the greatest to this hazard. As stated previously, the chemicals driving the risks resulting in this HI value are thallium, arsenic, cobalt, iron, and manganese. These inorganic compounds are intermittently distributed in the regional aquifer and may be naturally occurring. They are not considered to be Site-related contaminants.

Summary of Risks to Agriculture Workers – The inhalation exposure risks and hazards for the agricultural worker exposed to Site groundwater through spray irrigation was evaluated qualitatively. The results of the adult residential showering exposure to regional aquifer groundwater indicated that the risks and hazards were within or below acceptable EPA values. Given that exposure to an agricultural worker would be less than the exposure to an adult resident due to less frequent exposure, and the exposure would occur outdoors instead of inside a building, there should be no unacceptable risks for the farm worker.

Summary of Risks posed by Surface Water and Sediment - There are several locations where residents could come into contact with groundwater that discharges to sediment and surface water. These areas include Pohatcong Creek, Merrill Creek, and Edison quarry. The risk assessment evaluated the potential for exposure to occur to adult and youth recreational users through incidental ingestion and dermal contact with surface water and sediment. For the recreational adult who wades in Pohatcong Creek, Merrill Creek, and Edison Quarry, the HI is 0.025 and the carcinogenic risk is $1.5x10^{-6}$. For the recreational youth who wades in Pohatcong Creek, Merrill Creek, and Edison Quarry, the HI is 0.34 and the carcinogenic risk is $2.8x10^{-6}$. The cancer risk for all

of the recreational populations that may have current or future exposure to the surface water or sediment from Pohatcong Creek, Merrill Creek and Edison Quarry fall into the range between 10^{-4} and 10^{-6} indicate that a remedial action may be warranted under certain circumstances. However, EPA does not believe that direct action is warranted for surface water and sediment at the Site, as these water bodies are not a direct source of drinking water and based on the findings of the ecological risk assessment (see below). In addition, all non-cancer hazards were below EPA's acceptable HI of 1.

Screening Level Ecological Risk Assessment

A screening-level ecological risk assessment was conducted to evaluate the potential for ecological effects from exposure to groundwater discharging to sediment and surface water, specifically in Pohatcong Creek, Merrill Creek, and the Edison Quarry. Groundwater concentrations were compared to ecological screening values as an indicator of the potential for adverse effects to aquatic life. The screening of groundwater as opposed to surface water does not account for the dispersion or dilution that would occur before and/or immediately following discharge and the volatilization of the VOCs that would occur immediately following discharge. Screening groundwater thus provides a highly conservative indicator of the potential for adverse effects to aquatic life. Several VOCs were detected in the groundwater monitoring wells at concentrations that were below the screening values. No TCE was identified in sediment samples collected. One detection of TCE was identified in the surface water in Pohatcong Creek immediately downgradient from the Edison Quarry discharge outlet, at 1.2 µg/L. None of the surface water samples exceeded ecological risk screening criteria. No other CVOCs were detected and the HQs based on comparison of the maximum reporting limits to screening values remained below 1.0 for all CVOCs with available screening values.

Based on this isolated occurrence in the OU2 Study Area, and because of dilution, dispersion, and volatilization effects, it is concluded that VOCs in groundwater do not represent a potential risk to aquatic life if they should discharge to surface water. The results of the sediment and surface water screening, which indicates no potential for adverse effect to aquatic life from the presence of VOCs in these media, confirm these conclusions.

Summary

The cancer risk from exposure to Site-related TCE groundwater contamination was below the upper-bound of the acceptable EPA risk range of 10^{-4}, however, the cancer risks exceeded the lower end of the acceptable risk range of 10^{-6}, which is also known as the point of departure. In such instances, additional information can be evaluated to determine if a remedial action is warranted. For OU2 at the Pohatcong Valley Groundwater Contamination Site, the TCE concentrations associated with the groundwater plume are present at levels of up to 21 µg/L, which exceeds both the federal MCL (5 µg/L for TCE) and the state GWRS (1 µg/L for TCE), which are Applicable or Relevant and Appropriate Requirements (ARARs) for the Site. In addition, elevated TCE contamination has been determined to be present in a number of residential wells throughout the OU2 Study Area. Non-cancer risks exceed the EPA target HI of 1.0. These risks are primarily driven by inorganic compounds which are not considered to be Site-related, and may be naturally occurring. Further, the potential for vapor intrusion exists in localized areas.

Given that the point of departure is exceeded, as well as the fact that state and federal promulgated criteria are exceeded, a remedial action is warranted to reduce the potential risks and hazards from drinking water contaminated with Site-related compounds above acceptable drinking water criteria.

It is EPA's current judgment that the Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in the Proposed Plan, is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

REMEDIAL ACTION OBJECTIVES

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

RAOs were developed for groundwater to address the human health risks and environmental concerns posed by Site-related contamination.

Groundwater Remedial Action Objectives

- Prevent or minimize the current and future human exposures, including ingestion of groundwater, from Site-related VOCs in groundwater that present a risk to public health and the environment;
- Minimize the further migration of Site-related VOCs in groundwater; and
- Restore the aquifer to meet drinking water standards within a reasonable time-frame.

To achieve these RAOs, remediation goals for groundwater at the Site were identified based, in part, on the available information and standards such as ARARs, to-be-considered (TBC) guidance, and risk-based levels established in the risk assessment.

The Remediation Goals selected for the OU2 Study Area are based on the groundwater ARARs for this Site, which are the Federal MCLs and state GWRS. The Site groundwater remediation goals are the most conservative of Federal MCLs or GWRS. The remediation goals were then used as a benchmark in the technology screening, alternative development and screening, and for the detailed evaluation of alternatives presented in the FS Report. The remediation goal selected for this Site is 1 µg/L for TCE in groundwater, which is the state GWRS.

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA Section 121(b)(1), 42 U.S.C. Section 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARs, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, and contaminants at a site. CERCLA Section 121(d), 42 U.S.C. Section 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 Section 121(d)(4), 42 U.S.C. Section 9621(d)(4).

The objective of the FS for the OU2 Study Area is to identify and evaluate remedial action alternatives to meet the RAOs. Figure 1 shows the groundwater contaminant plume and the area proposed for remedial action.

A total of six alternatives were initially developed and screened in the FS for overall implementability, effectiveness, and cost. After an initial screening, the Entire Plume Extraction, Treatment, and Reinjection alternative (Alternative 4) was screened out for further evaluation since it was considered to be potentially ineffective and technically impractical, could cause natural resource injury due to pumping large quantities of water, and is not cost-effective. This alternative would include a public water supply and/or POETS in order to be protective. At approximately $46,610,000, this alternative would likely result in limited groundwater availability and damage to surface water habitats such as streams and wetlands.

Five groundwater alternatives were retained for a detailed evaluation against the nine National Contingency Plan (NCP) evaluation criteria. The sections below present a summary of the alternatives that were retained and evaluated. The Present-worth Costs are based on a 30-year timeframe in accordance with EPA guidance.

All of the groundwater remedial alternatives, with the exception of the No Action Alternative (Alternative 1), would include the establishment of a Classification Exception Area (CEA) in accordance with state regulations to minimize the public's potential exposure to contaminated groundwater until the groundwater meets the remediation goals. However, consistent with expectations set out in Superfund regulations, none of the alternatives rely exclusively on institutional controls to achieve protectiveness.

All of the groundwater remedial alternatives, with the exception of the No Action Alternative (Alternative 1) would rely in whole or in part on monitored natural attenuation (MNA) to restore groundwater in the OU2

Study Area to drinking water standards. The implementation of MNA requires long-term monitoring to monitor the contaminants as they naturally attenuate through dispersion, adsorption, and dilution until groundwater returns naturally to concentrations below the remediation goals. The time for the OU2 portion of the aquifer to attenuate to meet the NJ GWRS for TCE is estimated to be approximately 67 years, based on the modeled MNA component of these alternatives, as outlined in the OU2 FS It is expected that active treatment of high-level groundwater contamination through the implementation of the OU1 remedy, as well as actions to address source areas currently being investigated as OU3 will reduce the continuing source of groundwater contamination into the OU2 Study Area and help to further reduce the concentrations of TCE in the OU2 Study Area over time.

The time frames presented below for construction do not include the time for pre-design investigations, remedial design, or contract procurements. Each of the groundwater alternatives will take longer than five years to achieve remediation goals. Therefore, a review will be conducted every five years (Five-Year Review) after the initiation of the remedial action, until remediation goals are achieved.

Detailed descriptions of the remedial alternatives for the OU2 Study Area can be found in the FS report.

Alternative 1 – No Action (NA).

The No Action Alternative was retained, as required by the National Contingency Plan (NCP), and provides a baseline for comparison with other alternatives. No remedial actions would be implemented as part of the No Action Alternative. Furthermore, this alternative would not involve any monitoring of groundwater or institutional controls. Groundwater would continue to migrate and the contamination would continue to attenuate through natural attenuation processes.

Capital Cost:	$0
Annual O&M Cost:	$0
Present-Worth Cost	$0
Duration Time:	67 years

Alternative 2a - Monitored Natural Attenuation (MNA), Institutional Controls, and Private Well Head Treatment.

Capital Cost:	$2,344,000
Annual O&M Cost:	$339,000
Present-Worth Cost:	$6,640,000
Monitored Natural Attenuation:	67 years
Time to Install POETS:	1 year

Groundwater Alternative 2a relies on monitored natural attenuation to address the groundwater plume while placing institutional controls and groundwater use restrictions on the areas of groundwater exceeding remediation goals until groundwater returns naturally to concentrations below the remediation goals. Private potable wells within the OU2 Study Area would be treated using POETS. Based on the number of residences estimated to be in the OU2 area, 320 POETS would be installed. A time-frame of 1 year is estimated for the installation of POETS. Natural attenuation processes would be used for the remediation of the OU2 area exceeding remediation goals.

Alternative 2b - MNA, Institutional Controls, and Public Water Supply Connection

Capital Cost:	$13,992,000
Annual O&M Cost:	$77,000
Present-Worth Cost:	$15,040,000
Monitored Natural Attenuation:	67 years
Time to Install Public Water Supply:	1 – 2 years

Similar to Alternative 2a, Groundwater Alternative 2b relies on MNA for the groundwater plume while placing institutional controls and groundwater use restrictions on the areas of groundwater exceeding remediation goals until groundwater returns naturally to concentrations below the remediation goals.

This option is different from Groundwater Alternative 2a in that all homes within the OU2 Study Area would be connected to the public water supply. Water supply lines would be extended into the OU2 Study Area from existing supplies that presently service Washington Borough, and the Phillipsburg areas. Approximately 10 miles of water supply line would be constructed within the OU2 Study Area under this alternative. Each residence or business to be connected would receive its own service-line

connection from the supply line to the home or building. It is estimated that the public water supply lines would require up to 2 years to install. Following connection to the public water supply, private potable wells within the OU2 Study Area would be abandoned in accordance with applicable requirements. Private potable wells at remote locations where connection to a public water supply is not feasible would be monitored and treated using POETS as part of this alternative. Properties connected to the public water supply would be responsible for payment of water bills once the connections are complete. Natural attenuation processes would be used for the remediation of groundwater within the OU2 Study Area exceeding remediation goals.

Alternative 3a - In-Situ Treatment, Private Well Head Treatment, and MNA

Capital Cost:	$3,644,000
Annual O&M Cost:	$615,000
Present-Worth Cost:	$8,200,000

Monitored Natural Attenuation:	67 years
Time to Conduct In-Situ Treatment:	1 year
Time to Install POETS	1 year

Alternative 3a includes the in-situ oxidation (ISO) of TCE at a location near the boundary of the OU1 and OU2 Study Areas and within the geologic fault zone which serves as a preferential flow pathway of TCE into the OU2 Study Area. This in-situ technology would be expected to treat an area of groundwater contamination over approximately eight acres with the highest levels of TCE within the OU2 Study Area.

When ISO is used, an oxidant or oxygen releasing compound is injected into a well or wells placed in the contaminated groundwater. The oxidant mixes with the contaminants, causing them to decompose. When the process is complete, only water and other harmless breakdown products are left in the area that is treated. It is estimated that in-situ ISO treatment would be ongoing in the selected treatment area for approximately 1 year.

Private potable wells within the OU2 Study Area and remote locations would be treated using POETS. Natural attenuation processes would be used for the remediation of groundwater within the OU2 Study Area exceeding remediation goals. Natural attenuation processes will address groundwater throughout the OU2 Study Area concurrent with and after the ISO treatment.

Institutional controls and groundwater use restrictions would be placed on the areas of groundwater exceeding remediation goals until groundwater returns to concentrations below the remediation goals.

Alternative 3b - In-Situ Treatment, Public Water Supply Connection, and MNA

Capital Cost:	$15,292,000
Annual O&M Cost:	$352,000
Present-Worth Cost:	$16,590,000

Monitored Natural Attenuation:	67 years
Time to Install Public Water Supply:	2 years

This alternative is similar to Alternative 3a with groundwater treatment utilizing in-situ oxidation of TCE at a location near the boundary of the OU1 and OU2 Study Areas and within the geologic fault zone which serves as a preferential flow pathway of TCE into the OU2 Study Area. This eight-acre area is the area with the highest levels of TCE within the OU2 Study Area.

This alternative varies from Alternative 3a in that instead of installation of POETS throughout the entire OU2 Study Area, residences would be connected to the public water supply as described in Alternative 2b. Private potable wells at remote locations where connection to a public water supply is not feasible would be monitored and treated using POETS. After residences are connected to the public water supply, private potable wells within the OU2 Study Area would be abandoned in accordance with applicable requirements. Properties connected to the public water supply would be responsible for payment of water bills once the connections are complete. Natural attenuation processes would be used for the remediation of groundwater within the OU2 Study Area exceeding remediation goals.

EVALUATION OF ALTERNATIVES

Nine criteria are used to evaluate the different remedial alternatives individually and against each other in order to select the best alternative. This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. The nine evaluation criteria are discussed below. A more detailed analysis of the presented alternatives can be found in the Feasibility Study Report.

THE NINE SUPERFUND EVALUATION CRITERIA

1. **Overall Protectiveness of Human Health and the Environment** evaluates whether and how an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)** evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

3. **Long-term Effectiveness and Permanence** considers the ability of an alternative to maintain protection of human health and the environment over time.

4. **Reduction of Toxicity, Mobility, or Volume (TMV) of Contaminants through Treatment** evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

5. **Short-term Effectiveness** considers the length of time needed to implement an alternative and the risks the alternative poses to workers, the community, and the environment during implementation.

6. **Implementability** considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

7. **Cost** includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

8. **State/Support Agency Acceptance** considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.

9. **Community Acceptance** considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

Overall Protection of Human Health and the Environment

The No Action Alternative (Alternative 1) is not considered protective of human health and the environment, because it does not prevent the current and future use of contaminated groundwater which presents an unacceptable human health risk. It also does not include any long-term groundwater monitoring to assess or address potential short or long term exposure to groundwater by area residents.

The remaining alternatives are considered protective. They all eliminate exposure to contaminated groundwater and include institutional controls to minimize potential exposure to contaminated groundwater until the alternatives are implemented, and remediation goals have been achieved.

Compliance with ARARs

All of the alternatives would eventually meet the NJ GWRS and MCLs. The No Action Alternative would not assure that residential drinking water met the ARAR for TCE in the short term. Alternatives 2a, 2b, 3a and 3b assure that potable water would meet the chemical-specific ARAR for TCE in the short term. However, Alternatives 2b and 3b are the alternatives that best meet this criterion as they provide for residences to be connected to the public water supply, ensuring that potable water meets all applicable standards. Alternatives 2a and 3a would provide for potable wells to meet cleanup goals through the use of POETS. POETS require diligent operations and maintenance to assure that they continue to properly address groundwater contamination in each residence over time. All of the alternatives would comply with location- and action-specific ARARs such as the Freshwater Wetlands Protection Act, and the Federal Clean Water Act.

Long-Term Effectiveness and Permanence

Alternatives 2b and 3b would be effective and permanent because they involve permanent infrastructure to convey water from a reliable

contaminant-free source of potable water. Alternatives 2a and 3a would require significantly more maintenance to remain reliable, such as confirmation sampling and carbon replacement in order for POETS to remain protective, and are not as permanent as Alternatives 2b and 3b. Long-term monitoring and servicing of hundreds of POETS for contaminant breakthrough, fouling, and regular sampling would be cumbersome, and would require highly coordinated efforts. In addition, if filters are not properly maintained, they can serve as a source of microbial as well as chemical contamination in potable water.

There are no significant differences in the long-term effectiveness and permanence of alternatives with an in-situ treatment component (3a and 3b) compared to the other alternatives. The in-situ component of Alternatives 3a and 3b would operate for approximately 1 year. Although this may be effective in reducing TCE levels at the boundary of the OU1/OU2 Study Areas in the short term, contamination would continue to migrate into the OU2 area from the OU1 area after the in-situ treatment ends. Significant continued injection of oxidant into the aquifer beyond the estimated 1 year timeframe may begin to cause detrimental impacts to the aquifer, such as the presence of unreacted oxidant. Therefore, the overall time to restore the aquifer to meet cleanup objectives throughout the OU2 Study Area would not be reduced by the in-situ component of Alternatives 3a and 3b.

Reduction in Toxicity, Mobility or Volume

Groundwater Alternatives 3a and 3b are the best alternatives for the reduction of TMV since they would rely on active treatment processes to remove and treat TCE migrating into the OU2 Study Area from the OU1 Study Area. However, once this treatment was halted, after approximately 1 year, there would be continued impact to OU2 groundwater due to the continuing migration of impacted groundwater from the OU1 area. Long-term application of ISO to address continuing migration of TCE into the OU2 Study Area from the OU1 Study Area would not be practical, and would have potential detrimental impacts to the aquifer. Therefore, groundwater in the area of ISO treatment would become recontaminated as groundwater from the OU1 Study Area continues to migrate in to the OU2 Study Area. Under Alternatives 2a and 3a, the POETS would remove contaminants from the groundwater at their point-of-use, but would not effectively remove the TCE mass throughout the plume. The continued pumping of the residential wells would remove only a minor volume of contaminants from the aquifer. Therefore, Alternatives 2a and 3a are comparable to Alternative 2b under this criteria. All alternatives would have a similar degree of reduction of TMV of the TCE in groundwater through natural attenuation processes.

Short-Term Effectiveness

Each alternative has some short-term impacts because it would be necessary to construct parts of the remedies on the property of land owners, and over roadways and right-of-ways.

The construction of a public water supply throughout the OU2 Study Area, as described in Alternatives 2b and 3b, would require approximately 2 years. Approximately 10 miles of water supply lines would be installed in streets, along right-of-ways, and on private property. This would cause some disruption to the community in the short term. Work can be phased to minimize disruption. Further, this type of construction is common and can be performed safely by adherence to appropriate safety standards. Installation of POETS in all private buildings and residences as described in Alternatives 2a and 3a would take approximately 1 year and would also cause some short-term disruption to property owners since some work would be done in each residence.

Alternatives 3a and 3b, which include in-situ chemical oxidation, would involve short-term disruption to landowners in the northeastern part of the OU2 Study Area, near the fault zone, where well construction and above ground delivery and conveyance systems of approximately would be built and then maintained for approximately 1 year. The full extent of any impacts would depend on the number and location of the injection wells. The oxidation of the organic compounds found in the groundwater requires chemicals that require special handling, and involves an exothermic (heat generating) reaction. Special precautions would be needed to protect workers on-Site. Also, there would be the potential that unreacted oxidant would migrate downgradient and pose a risk to private potable wells. It is estimated that a near-

Site in-situ chemical oxidation system, when constructed, would operate for one year.

Alternatives 2b and 3b would take longer to construct compared to 2a and 3a because the waterlines are more involved to construct compared to the installation of POETS. In addition, the engineering design of the water line is more complex and would take longer to complete compared to the design needed for the installation of POETS. However, the waterline is considered more permanent and protective in the long term compared to the POETS because alternatives that include a public water supply would eliminate issues of contaminant breakthrough and regular maintenance of individual POETS. Before construction of a public water supply, the existing POETS would continue to be necessary for short-term effectiveness.

Implementability

All retained alternatives can be implemented with available equipment and technology. However, permitting requirements would need to be met and access to private property would be required for Alternatives 2a, 2b, 3a and 3b.

Alternatives 3a and 3b include in-situ chemical oxidation injection, which are the most difficult alternatives to implement as introduction and proper distribution of the oxidant presents technical challenges. Problems with achieving proper distribution of oxidant into the aquifer could lead to inadequate contact with the TCE. This is due to the complex geology of the Site. Also, there would be the potential that unreacted oxidant would migrate downgradient and pose a risk to private potable wells. In addition to the difficulties in implementing Alternatives 3a and 3b compared to the other alternatives, the overall benefit of the ISO component is minimal, as contamination would continue to migrate into the OU2 Study Area from the OU1 Study Area. As a result, there would be no reduction in the overall aquifer remediation timeframe with ISO treatment (Alternatives 3a and 3b) and without active treatment (Alternatives 2a and 2b).

The public water supply connection component of Alternatives 2b and 3b would be more difficult to implement initially than Alternatives 2a and 3a which rely on POETS, based on the type and amount of design, permitting, and construction required. These difficulties would include the short term disruption of the community due to the estimated 10 miles of water supply lines that would be constructed. Alternatives 2a and 3a would be easier to implement initially, but would require significant ongoing efforts associated with the sampling, installation and long-term operation and maintenance of POETS. Long-term maintenance of POETS would go on for over 60 years. This would require regular sampling, as well as replacement of POETS and/or POET components within hundreds of individual residences and businesses. Significant resources would be required to provide for access to do this work within so many homes over such an extensive length of time.

Cost

The estimated capital, annual O&M, and present-worth costs for each of the alternatives are presented in Table 1. The present-worth costs for each alternative was assumed to be 30 years based on EPA guidance.

Table 1: Cost Comparison for Alternate Water Supply Alternatives

Remedial Alternative	Capital Cost	Annual Cost	Present Worth
1	0	0	0
2a	2,344,000	339,000	6,640,000
2b	13,992,000	77,000	15,040,000
3a	3,644,000	615,000	8,200,000
3b	15,292,000	352,000	16,590,000

Besides Alternative 1 (No Action), the lowest capital costs are the alternatives that include POETS (Alternatives 2a and 3a). The capital costs are higher for Alternatives 2b and 3b due to the capital cost for providing public water supply to the homes within the OU2 Study Area. Annual O&M costs for the alternatives with POETS (Alternatives 2a and 3a) are higher than alternatives with public water supply connections (Alternatives 2b and 3b) due to the need for continued maintenance.

State Acceptance

The state of New Jersey agrees with the Preferred Alternative in this Proposed Plan.

Community Acceptance

Community acceptance of the Preferred Alternative will be assessed in the ROD following review of the public comments received on the Proposed Plan.

Because the No Action Alternative is not protective of human health and the environment, and it does not satisfy many of the evaluation criteria, it was eliminated from further consideration.

SUMMARY OF THE PREFERRED ALTERNATIVE

Based upon an evaluation of the five alternatives, EPA recommends Alternative 2b: Monitored Natural Attenuation, Institutional Controls, and Public Water Supply Connection as the Preferred Alternative for OU2 of the Pohatcong Valley Groundwater Contamination Site.

The Preferred Alternative was selected over the other alternatives because it will provide the best overall protection of human health and will eliminate risks to residents from consumption of and contact with contaminated drinking water. This is because the groundwater plume that originates within the OU1 Study Area will continue to migrate toward the OU2 Study Area and will continue to impact private potable wells, until the aquifer has been restored to health based levels. Based on preliminary modeling of the TCE groundwater plume in the OU2 Study Area, it will take approximately 67 years for the groundwater contamination to naturally attenuate to levels below the NJ GWRS of 1 ug/L.

Alternative 2b will provide an alternate water supply to the residences and businesses within the OU2 Study Area via the delivery of water from a nearby existing public water supply. Two existing public water supply companies will be considered for providing water to the OU2 Study Area. Aqua New Jersey Water Company, in Philipsburg, which currently provides water service near the southern end of theOU2 Study Area, to Philipsburg, Greenwich, Lopatcong, and Pohatcong Townships; and New Jersey American Water Company, which currently provides water service to the northern end of the OU2 Study Area, as well as to the OU1 Study Area. Both Aqua New Jersey Water Company and New Jersey American Water Company undergo regular testing to ensure the quality of the water is in compliance with New Jersey State regulations.

POETS will continue to be operated and maintained as long as necessary, until individual residences are switched over to the public water supply. Additionally, threatened potable water supply wells will be identified and fitted with POETS, if appropriate, until connection to public water supply can be made. Based on current groundwater use, it is estimated that approximately 320 homes will be connected to the public water supply. However a survey would be conducted during the design phase to provide an accurate number of residences requiring public water. After residences are connected to the public water supply, private potable wells within the OU2 Study Area would be abandoned in accordance with applicable requirements. Properties connected to the public water supply would be responsible for payment of water bills once the connections are complete. Private potable wells at remote locations within the OU2 Study Area, where connection to a public water supply is not easily implementable, will be treated using POETS and monitored regularly.

Groundwater Alternative 2b relies on MNA for the groundwater plume while placing institutional controls and groundwater use restrictions on the areas of groundwater exceeding remediation goals until groundwater returns naturally to concentrations below the remediation goals.

Long-term monitoring of the TCE concentrations in groundwater and in vapors will be conducted. If necessary, based on this data, vapor remediation mitigation will be implemented.

EPA and NJDEP believe that Alternative 2b, MNA, Institutional Controls, and Public Water Supply Connection, would eliminate the potential for exposure to contaminated drinking water within the OU2 Study Area while providing the best balance of tradeoffs among the alternatives with respect to the evaluation criteria.

Consistent with EPA Region 2's Clean and Green policy, EPA will evaluate the use of sustainable

technologies and practices with respect to any remedial alternative selected for the Site.

As is EPA's policy, Five-Year Reviews will be conducted until remediation goals are achieved.

COMMUNITY PARTICIPATION

EPA provided information to the public regarding the cleanup of the OU2 portion of the Pohatcong Valley Groundwater Contamination Superfund Site through public meetings, the Administrative Record file for the Site and announcements published in the Warren Reporter. EPA encourages the public to gain a more comprehensive understanding of the Site and the Superfund activities.

For further information on EPA's Preferred Alternative for the OU2 portion of the Pohatcong Valley Groundwater Contamination Superfund Site, please contact:

Stephen Cipot	Patricia Seppi
Remedial Project Manager	Community Relations
(212) 637-4411	(212) 637-3679

U.S. EPA
290 Broadway, 19th Floor
New York, New York 10007-1866

The dates for the public comment period; the date, the location and time of the public meeting; and the locations of the Administrative Record files are provided on the front page of this Proposed Plan.

GLOSSARY

ARARs: Applicable or Relevant and Appropriate Requirements. These are Federal or State environmental rules and regulations that may pertain to the Site or a particular alternative.

Carcinogenic Risk: Cancer risks are expressed as a number reflecting the increased chance that a person will develop cancer if exposed to chemicals or substances. For example, EPA's acceptable risk range for Superfund hazardous waste sites is 1×10^{-4} to 1×10^{-6}, meaning there is 1 additional chance in 10,000 (1×10^{-4}) to 1 additional chance in 1 million (1×10^{-6}) that a person will develop cancer if exposed to a Site contaminant that is not remediated.

CERCLA: Comprehensive Environmental Response, Compensation and Liability Act. A Federal law, commonly referred to as the "Superfund" Program, passed in 1980 that provides for response actions at sites found to be contaminated with hazardous substances, pollutants or contaminants that endanger public health and safety or the environment.

COPC: Chemicals of Potential Concern.

CVOCs: Chlorinated Volatile Organic Compounds

SLERA: Screening Level Ecological Risk Assessment. An evaluation of the potential risk posed to the environment if remedial activities are not performed at the Site.

FS: Feasibility Study. Analysis of the practicability of multiple remedial action options for the Site.

Groundwater: Subsurface water that occurs in soils and geologic formations that are fully saturated.

HHRA: Human Health Risk Assessment. An evaluation of the risk posed to human health should remedial activities not be implemented.

HI: Hazard Index. A number indicative of noncarcinogenic health effects that is the ratio of the existing level of exposure to an acceptable level of exposure. A value equal to or less than one indicates that the human population is not likely to experience adverse effects.

HQ: Hazard Quotient. HQs are used to evaluate noncarcinogenic health effects and ecological risks. A value equal to or less than one indicates that the human or ecological population are not likely to experience adverse effects.

ICs: Institutional Controls. Administrative methods to prevent human exposure to contaminants, such as by restricting the use of groundwater for drinking water purposes.

Nine Evaluation Criteria: See text box on Page 7.

Noncarcinogenic Risk: Noncancer Hazards (or risk) are expressed as a quotient that compares the existing level of exposure to the acceptable level of exposure. There is a level of exposure (the reference dose) below which it is unlikely for even a sensitive population to experience adverse health effects. USEPA's threshold level for noncarcinogenic risk at Superfund sites is 1, meaning that if the exposure exceeds the threshold; there may be a concern for potential noncancer effects.

NPL: National Priorities List. A list developed by USEPA of uncontrolled hazardous substance release sites in the United States that are considered priorities for long-term remedial evaluation and response.

Operable Unit (OU): a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site can be divided into a number of operable units, depending on the complexity of the problems associated with the site.

POETS - are small treatment systems that are connected to the residential water supply line to remove VOCs from groundwater using activated carbon. They have to be periodically sampled and the carbon replaced to remain effective.

Practical Quantitation Level (PQL): means the lowest concentration of a constituent that can be reliably achieved among laboratories within specified limits of precision and accuracy during routine laboratory operating conditions.

Present-Worth Cost: Total cost, in current dollars, of the remedial action. The present-worth cost includes capital costs required to implement the remedial action, as well as the cost of long-term operations, maintenance, and monitoring.

Proposed Plan: A document that presents the preferred remedial alternative and requests public input regarding the proposed cleanup alternative.

Public Comment Period: The time allowed for the members of a potentially affected community to express views and concerns regarding USEPA's preferred remedial alternative.

RAOs: Remedial Action Objectives. Objectives of remedial actions that are developed based on contaminated media, contaminants of concern, potential receptors and exposure scenarios, human health and ecological risk assessment, and attainment of regulatory cleanup levels.

Record of Decision (ROD): A legal document that describes the cleanup action or remedy selected for a site, the basis for choosing that remedy, and public comments on the selected remedy.

Remedial Action: A cleanup to address hazardous substances at a site.

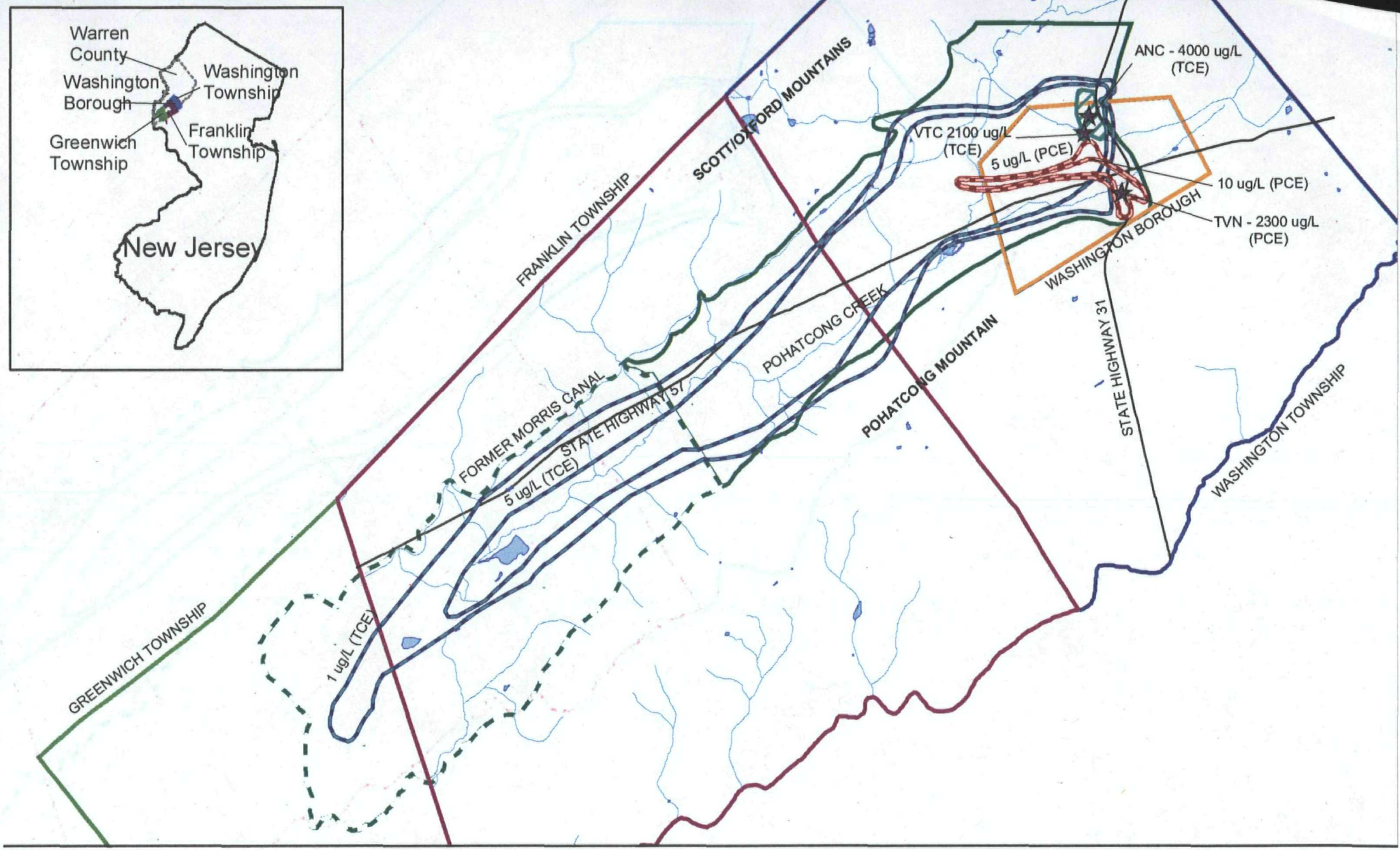
RI: Remedial Investigation. A study of a facility that supports the selection of a remedy where hazardous substances have been disposed or released. The RI identifies the nature and extent of contamination at the facility and analyzes risk associated with COPCs.

TBCs: "To-be-considereds," consists of non-promulgated advisories and/or guidance that were developed by EPA, other federal agencies, or states that may be useful in developing CERCLA remedies.

USEPA: United States Environmental Protection Agency. The Federal agency responsible for administration and enforcement of CERCLA (and other environmental statutes and regulations), and final approval authority for the selected ROD.

VOC: Volatile Organic Compound. Type of chemical that readily vaporizes, often producing a distinguishable odor.

Water Table: The water table is an imaginary line marking the top of the water-saturated area within a rock column.



Legend

- PCE Isoconcentration (Approximate Location)
- TCE Isoconcentration (Approximate Location)
- Waterways
- Road Centerlines
- Pohatcong OU3 Study Area
- Groundwater Sample Point
- Franklin Township
- Washington Borough
- Washington Township
- Greenwich Township
- Pohatcong OU1 Study Area
- Pohatcong OU2 Study Area

Note:

VTC = Vikon Tile Corporation
ANC = American National Can (PPPI)
TVN = Tung Sol Tubing

N

0 0.5 1 2 Miles

Figure 1
Pohatcong Valley Groundwater Contamination Site
Distribution of TCE and PCE Plumes

500203

Attachment B

Public Notice

Warren Hills teachers opt for pay freeze

AGREEMENT NOT FINAL. Union would be first in county to agree to move aimed at helping budget.

BY STEPHEN J. NOVAK
The Express-Times

The Warren Hills Regional School District is poised to become the first in Warren County to have its teachers agree to a wage freeze for the coming school year, the district's education association announced in a news release Thursday afternoon.

Gov. Chris Christie has been pushing for educators statewide to forgo raises for the year in an attempt to ease the property tax burden on residents.

The Warren Hills Education Association met Wednesday to discuss the district's proposed cuts in its $32 million budget, which includes the elimination of an undetermined number of teaching positions.

"At that meeting, we came to a consensus that in light of the current economic climate, we anticipate accepting a pay freeze pending the recommendations of the collective bargaining units, which are currently refining the details," association President Nancy Nelson said in the news release.

The association also asked that voters support the district's budget in the April 20 school elections to avoid further cuts. The district is already planning on eliminating middle school sports programs.

The Associated Press reported Wednesday that teachers in 17 of New Jersey's 590 school districts have agreed to a freeze.

Hunterdon Central Regional High School is the only other district in the area where teachers have made the agreement. Many districts have seen administrators and support staff take the freeze.

North Hunterdon-Voorhees Superintendent Charles M. Shaddow is the latest administrator to announce such action for the 2010-11 school year. Shaddow's contract expires in 2015 and raises are determined annually by the school board, the district said in a release.

The school board there has been negotiating with all three of the district's unions. It recently came to an agreement with the administrators association and signed a contract with the supervisors association.

The agreement with the administrators — which includes principals, assistant principals and athletic and district directors — includes a wage freeze for the coming school year.

For the supervisors association, which includes department heads, a 3 percent annual salary increase will be offset by concessions in other areas and will not increase the district's budget, according to the release.

The board is in negotiations with teachers, whose contract expires June 30, the district said.

Reporter Stephen J. Novak can be reached at 610-258-7171, ext. 3542, or snovak@express-times.com. Talk about issues in your town at lehighvalleylive.com/forums.

Accusations no surprise to suspect's former coach

EAST STROUDSBURG'S Angelo Borzio says he saw trouble ahead.

THE POCONO RECORD

Washburn

News that authorities are investigating allegations of drug use by Brad Washburn came as no surprise to his former wrestling coaches at East Stroudsburg University.

Angelo Borzio, the school's wrestling coach in 2000, said Washburn was talented, but was one of only two competitors he ever kicked off the team in his seven years of coaching.

"I think he was a troubled kid," Borzio said. "He didn't have a lot of respect for authority."

Gary Kessel, Borzio's assistant in 2000, said Washburn had problems with teammates and drugs.

"He was a gifted wrestler, but he always had problems," Kessel said of the former Bangor Area High School teacher's aide and assistant wrestling coach.

Police charged Washburn with drug possession Wednesday and are investigating to determine if he used drugs with students. The investigation follows the death of Gina Lyn Riso, a 24-year-old biology teacher at Bangor, who died in December of a heroin overdose in Washburn's Bethlehem apartment.

Police believe some students may have used drugs with Washburn on school property. No charges have been filed.

"I wasn't surprised," Kessel said of the report. "When I heard he was coaching, I was like, 'Maybe he grew up.' When I heard (of the drug charges), it was like, 'Nope, he didn't.'"

Continued from B1

ELECTION:
Crowded primary races

council. Sitting council members Jeanine Gleba and David Higgins will face a former councilman, Dale Parichuk; planning board member Justin Jewell; and two other challengers in Jerry Brown and Robert Torres.

Former Greenwich Township Mayor Deborah Pasquarelli will go against incumbent Committeewoman Tanya L. Segal and recreation board Chairman Daniel Perez for two seats.

In Mansfield Township, the race for two seats will be among four: incumbent Committeeman Robert Jewell, land use board Chairman John Barton, retired police officer Michael Clancy and Brad Smith.

Warren County's fourth contested primary race is in Belvidere, where council President Robert F. Claussen will face Harold Hess and John Clemmer.

Hunterdon County

In Hunterdon County, Holland Township has two races in the primary election.

Incumbent Committeemen Edward Burdzy and Kenneth Vogel face challenger Anthony Roselle for two seats. The race for a one-year unexpired term pits Raymond B. Krov against Thomas Scheibener.

Alexandria Township incumbent Committeeman Harry C. Swift Jr. is challenged by Barbara Daniello.

Four people seek two terms on Clinton Township Council — incumbents *Spencer Peck and Dawn Apgar* against Harmen Voss and John Lazarus.

East Amwell Township has Doreen Holley, Tim Mathews and John Seramba running for two spots.

Hunterdon County's Franklin Township also has two terms up for grabs between incumbent Committeewoman Linda Jacukowicz and challengers Vigdis Austad and Susan Campbell.

Two borough council seats are the prize in Glen Gardner where Michael Gronau will face incumbent council members Steven Yaros and Linda S. Rifino.

The county's only Democratic primary contest, in High Bridge, is between incumbent Councilwoman Mary Murdock, Gwen Bartlett-Palmer and Victoria Miller for two spots.

Incumbent James L. Burke faces Carmine DeSapio for one term on the Kingwood Township Committee.

Lebanon's two seats will go to Barbara "Bonnie" Schmidt, James J. Pittinger or John Knoble.

Lebanon Township also has two spots on the township committee for incumbent Jay Weeks, Francis J. Morrison or Ronald S. Milkowski.

A seat on the Readington Township Committee will go to either Donna Simon or Mark Berry.

Three are competing for two places on the Tewksbury Township Committee — incumbents William Voyce and Robert Hoffman Jr. and Louis DiMare.

Rounding out Hunterdon's municipal primary races is West Amwell Township, where Zachary Rich and John T. Marshall are competing for one committee seat.

One county-level race, for Hunterdon County sheriff, has been narrowed to three competitors, with Ralph Scott's withdrawal from the contest, according to the county clerk's office. No reason was given for the decision, the clerk's office said.

Continued from B1

GREENWICH:
Tax increase in store for township

opportunity," Adams said. Emiliani said she agreed that the effort by the committee was half-hearted.

"We cannot shrink away from the challenge this governor has placed before us," she said after the meeting.

Adams and Emiliani had proposed cutting all operating budgets in the township by 20 percent to combat a substantial loss in state aid.

Mayor Tanya Segal said Adams was "grandstanding" and failing to mention the hardships faced by the committee. Among those were the $81,000 loss in state aid under Gov. Chris Christie's fiscal year 2011 budget proposal, an 18 percent hike in health care costs and contracted salary increases with the police and department of public works.

Committeeman Bruce Williams said all other municipal employees have forgone a pay raise for the second year in a row.

Williams and Segal said the township risked reducing the quality of life if services were gutted.

"Those are the services our taxpayers are expecting here," Williams said.

Chief Financial Officer Grace Brennan said the township would need to eliminate $380,000 from the $4.2 million budget proposal to satisfy the challenge by Adams and Emiliani to keep the tax rate flat. The budget is already less than last year's $4.7 million budget.

Brennan said the township had made reductions this year in several areas, including utilities, legal services, administration and engineering.

Besides those cuts, $100,000 is being pulled from the township's roughly $1 million sewer surplus account to prevent a higher tax increase.

Adams attacked that move as one committee members had agreed on last year to avoid after taking $200,000 from the surplus fund.

"We took money from that sewer only because we all agreed across the board, that we would begin repaying those monies this year," Adams said. "It is a reserved account. It is not meant to be raided."

Segal acknowledged that she was hesitant to dip into the sewer fund, but said she changed her mind based on the advice of township experts.

"Because there is only so much you can squeeze from a rock," Segal said.

Reporter Sarah M. Wojcik can be reached at 610-258-7171, ext. 3631, or swojcik@express-times.com. Talk about issues in your town at lehighvalleylive.com/forums.

Continued from B1

CONTRACT:
Warren County OKs social services pact

upon retirement for all future employees, Marvin said. That policy was put in place *for nonunion employees two* years ago, and the county hopes to get every union in the county to agree as well, he said.

The county remains in contract negotiations with five of its nine unions, Marvin said.

"I think we got a very good deal," Marvin said.

A majority of union employees chose the three-year contract over a two-year contract offered by the county, said Alyssa Lugg, president of Communication Workers of America Local 1071. Pay increases would have been the same under the two-year deal, but retroactive health care contributions would have dated to June 16, 2009, Lugg said.

At an April 6 meeting, 35 members voted for the three-year contract, five voted for the two-year deal, and five rejected both proposals, Lugg said. TASS employees protested the contract stalemate in early February outside their Belvidere office.

The workers wanted to end the long-standing fight and have the protection of being under contract in 2010, Lugg said. Workers were afraid of potential layoffs and furloughs, similar to those proposed for state employees under Gov. Chris Christie's fiscal year 2011 budget, she said.

The two sides are preparing to return to the bargaining table in a few months to start negotiations for the next contract. Lugg said the union hopes to reinstitute health benefits for future retirees.

"I'm satisfied the process is over," said Lugg, who said workers were relieved to have a contract in place. "I hope things go better in the future."

Reporter Bill Wichert can be reached at 610-258-7171, ext. 3570, or bwichert@express-times.com. Talk about issues in your town at lehighvalleylive.com/forums.

Continued from B1

FARMLAND:
Open space tax remains for 2010

After going back and forth over a potential reduction in the county's open space tax, county freeholders agreed Wednesday to maintain the tax at 6 cents per $100 of assessed property value. The tax is anticipated to provide slightly more than $8 million in revenue this year.

The freeholder board had been planning to reduce the tax by one penny for a savings of nearly $1.4 million, but Freeholder Director Rick Gardner changed his position late last month.

Pointing out how individual taxpayers would have only seen minimal savings, Gardner said without a permanent funding source at the state level, county dollars may become the only money available.

"It's a countywide program and it benefits all citizens ... and ultimately is about the quality of life in Warren County," Gardner said Wednesday.

County Freeholder Angelo Accetturo voted for this year's budget but said he supported a 1-cent reduction in the open space tax to provide relief to struggling municipalities. Several municipalities had requested that the open space tax be eliminated for a year to help them cope with state aid cuts, he said.

That decrease would not damage the county's open space fund, Accetturo said. Accetturo noted that the economic climate and pressure to preserve land has changed since county residents last voted on the open space tax in 2002.

"Today, you don't see that pressure on home building and there's not a race to buy the property like there was in 2002," Accetturo said.

County Freeholder Everett Chamberlain argued that now was an opportune time to leverage county dollars to buy property and make the money go further than in 2002.

Chamberlain criticized municipalities for trying to conceal municipal tax hikes with a county open space tax reduction.

"To hide an increase in a municipal tax or to allow an adjustment there without ... people knowing there's an increase, I think is misguided," Chamberlain said.

Reporter Bill Wichert can be reached at 610-258-7171, ext. 3570, or bwichert@express-times.com. Talk about issues in your town at lehighvalleylive.com/forums.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY INVITES PUBLIC COMMENT ON THE PROPOSED OPERABLE UNIT 2 REMEDY FOR THE POHATCONG VALLEY GROUNDWATER CONTAMINATION SUPERFUND SITE

The U.S. Environmental Protection Agency (EPA) will hold a public meeting on April 28 at 6 P.M., at the Washington Borough Municipal building, located at 100 Belvidere Avenue, Washington, NJ 07882, to discuss the preferred remedy for the Operable Unit 2 (OU2) portion of the Pohatcong Valley Groundwater Contamination Superfund Site. The preferred remedy, which is described in a Proposed Plan, includes the implementation of a remedy to address groundwater contamination in the OU2 portion of the Site. Based upon an evaluation of five alternatives, EPA recommends Alternative 2b: Monitored Natural Attenuation, Institutional Controls, and Public Water Supply Connection as the Preferred Alternative for the OU2 portion of the Pohatcong Valley Groundwater Contamination Site.

Before selecting the final OU2 remedy, EPA will consider oral comments presented at the public meeting and written comments received on or before May 17, 2010.

Copies of the complete Proposed Plan and the Administrative Record for the site are available at the following locations:

Warren County Health Department
c/o Kevin Cavotta, Health Officer
700 Oxford Road
Oxford, NJ 07863
Hours: Monday–Friday: 8:30 am – 4:30 pm
Telephone 908-475-7960
Fax: 908-475-7964
Website: http://www.co.warren.nj.us/healthdept/
Email: kcavotta@Co.Warren.NJ.US

USEPA Region 2
Superfund Record Center
290 Broadway, 18th Floor
New York, NY 10007-1866
Hours: Monday – Friday, 9 a.m. – 5 p.m.
Telephone: 212-637-4308

Written comments should be sent to:

Stephen J. Cipot
Remedial Project Manager
U.S. EPA, Region 2
290 Broadway, 19th Floor
New York, NY 10007-1866
Telephone: 212-637-4411
fax 212-637-4429
email: Cipot.Stephen@epa.gov

Pat Seppi
Community Involvement Coordinator
U.S. EPA, Region 2
290 Broadway, 26th Floor
New York, NY 10007-1866
Telephone: 212-637-3679
email: Seppi.Pat@epa.gov

For further information, please contact Pat Seppi, Community Involvement Coordinator at 212-637-3679.

The complete Proposed Plan can be viewed at:
http://www.epa.gov/region02/superfund/npl/pohatcong/OU2ProposedPlan

500205

Attachment C

Public Meeting Transcript

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
- -x

RE:

POHATCONG VALLEY GROUNDWATER
CONTAMINATION SITE

- -x

April 29, 2010
6:00 p.m.

100 Belvidere Avenue
Washington, New Jersey

A P P E A R A N C E S:

ROBERT ALVEY, Hydrogeologist

WANDA AYALA, Community Involvement Coordinator

STEPHEN CIPOT, Remedial Project Manager

JOHN MASON, Contractor

CHUCK NACE, Risk Assessor

KIM O'CONNELL, Superfund Manager

MS. AYALA: Good evening, everyone. My name is Wanda Ayala, and I'm Community Involvement Coordinator filling in for Pat Seppi, the actual coordinator for this site.

We are gathered here today to present the proposed plan for the Pohatcong Valley Groundwater Contamination Site; specifically, for Operable Unit 2.

The proposed plan is a document used to facilitate public involvement in the alternative selection process. This document presents EPA's preliminary recommendations concerning how best to address contamination at the site, presents the five alternatives that were evaluated, and explains the rationale for the preferred alternative.

We are here to receive public comments, and EPA relies on public input to ensure that the

concerns of the community are considered in selecting an effective alternative. The public comment period for this proposed remedy started on April 16 and concludes on May 17.

We are required to receive public comments, and federal regulations mandate that we have a transcript of this meeting to help capture your input. All comments will be duly noted by our stenographer, Linda, who is here to record this session.

Some quick ground rules. First, I'd like to ask everybody if you have a cell phone, if you could put it on vibrate so it doesn't disrupt the proceedings.

When asking questions, please state your name clearly so the stenographer can input it into the transcript.

And now I'd like to introduce you to the EPA team. We

have Steve Cipot, who is the remedial project manager for the site; Kim O'Connell, who is our Superfund manager; Robert Alvey, who is the hydrogeologist for the site; and Chuck Nace, who is the risk assessor. And we also have our contractor John Mason present.

And now I'd like to turn it over to Steve, who will walk you through the plan.

MR. CIPOT: I'm Stephen Cipot, again, the project manager for the site. I've been on the site since about 2002, June or so.

We're going to be going through the proposed plan for Operable Unit 2. And we have a lot of activities that have preceded Operable Unit 2, and I'm going to get through those as quickly as possible. We can answer specific questions on those at the end.

There's also a handout which

is the actual proposed plan that you can pick up in the back that's more detailed than the presentation.

Quickly, we'll be going through the DEP and local actions, EPA actions, summary of different investigations, the assessment of the risk that we conducted, the feasibility study.

The feasibility study is a report that describes different potential cleanup alternatives for the site, and that's documented in a report which led to this proposed plan.

Then the proposed plan, and then the path forward, which is where we are today. This is the public comment period. We'll be taking public comments, we'll be looking at them and addressing them, and then we'll either take the proposed remedy and document that in a record of decision which

makes it the final cleanup remedy for the site or we might be altering that based on public comments.

Again, that will be in a record of decision for Operable Unit 2 to document the remedy, and we hope to have that in September of this year.

And then we have a question and comment period.

The way the site developed was that in the late 1970s, TCE and PCE contamination was discovered in two public water supply wells. They were the Dale Avenue Well and the Vannatta Street Well.

In 1988, 1989, the DEP made water connections to mostly the Borough part of the site. And then in other areas of the site where water is -- where people are not connected to public water, the DEP has been maintaining POETs,

which is short for Point of Entry Treatment Systems, which are treatment systems that are put on individual wells to intercept contaminants before they go into a residential water supply.

The DEP roughly maintains about eighty or a few more than eighty POETs right now, mostly in the downgradient part of the site. We'll get to that.

EPA became involved in March 1989. The site was listed on the National Priorities List, which began EPA's activities.

We had at that time one operable unit for the site. We developed an RI/FS. 1999 to 2005, EPA conducted field work. We put together a record of decision in 2006. We had a public meeting like this one in 2005 at the Technical College. We came up with a record of decision in 2006.

We have two remedial actions

and remedial designs -- a remedial design first, then remedial action -- based on the Operable Unit 1 record of decision. That's to address the separate source areas; one source area primarily for TCE, and a couple smaller local source areas for PCE with separate designs.

Up to about 2002 to 2004, the DEP was separately sampling additional residences downgradient of our OU1 area and found that there was contamination being discovered at residences in that area of the site, and the State was hooking people up to point of entry treatment systems.

So, because of that, we expanded the site into a second operable unit, which began in 2006 to the present. It also involved environmental investigations, residential groundwater sampling, and vapor intrusion sampling and

mitigation.

We developed an OU2 FS, which I mentioned looks at different cleanup alternatives, describes the cleanup alternatives, and we put together this proposed plan.

And we also have a third operable unit, which we can get into at the very end, that's called Operable Unit 3. It's to deal with the source area for TCE primarily, which is up in the Borough. And we have a work plan for that.

This is a description of the site. Here we are in New Jersey; everybody knows where we are. Washington Borough is up here. You've got Operable Unit 1 comes in here, along this outline. That was the first study I talked about.

Operable Unit 2 goes downgradient and follows along the

valley, more or less along Pohatcong Creek here. Here's the Scott Oxford Mountain, or part of the highland, and the Pohatcong Mountain here.

This is the entire study area of the Operable Units 1 and 2, and we have a third operable unit up in the Borough, which is primarily the source areas of the TCE contamination.

Okay. Geologically speaking, it's only important as a point of reference because it defines the aquifer and the type of -- the geometry of the valley. It's an elongated valley. It's bounded by the -- pretty much Cambrian metamorphic and igneous rocks, the Scott Oxford Mountain and the Pohatcong Mountains.

It's flanked by two thrust faults, which we're not going to get into. One thrust fault which goes through the middle of the

valley, though, called the Karrsville Fault we found to be rather significant in that it helps to aid contaminant and groundwater migration from the Borough part of the site, where the sources are, and it helps to facilitate groundwater and contaminant migration downvalley.

The OU1 study was conducted, field work was conducted, between 1995 -- the study ended in 2005. The major findings were that TCE groundwater contamination existed through much of the OU1 area. It was elevated at or and adjacent to what we call the former ANC, American National Can facility. We believe that to be the major TCE source of the Borough.

The large plume extends with decrease in general concentration from the source area through Operable Unit 1, and downgradient continues to spread in diminishing

concentration into Operable Unit 2 area.

There's also a PCE groundwater source area, pretty much here in the Borough. It's a couple little dry cleaners over catty-corner to us here, they're two sources for PCE, and there's another larger source a little bit further down on Route 31, which we think is the major PCE source.

As far as the plumes go, the TCE is a much larger plume. PCE is pretty much contained to the Borough.

This is a blow-up of the Borough. This is the PCE plume coming off this way going towards the Dale Avenue Well, and the larger TCE plume is in the red. This ends in the Borough and would continue on the scale way down that way. We'll have a better map for that later.

In 2006, we developed a

record of decision, which was basically hot spot pump and treat for the two separate -- TCE and PCE -- hot spots within the Borough with MNA, which stands for monitored natural attenuation, of the rest of the plume outside of the treatment hot spot areas.

We held a public meeting for OU1 in August 2005, we developed a ROD in July 2006; again, to treat the separate TCE and PCE hot spots through extraction, treatment, and recharge with downgradient MNA.

We're in the two separate remedial designs right now. TCE started in 2008 and PCE started in 2006 and we're a little farther along for PCE.

The OU2 RI/FS started also 2006. The purpose was to take the data from our OU1 RI/FS, take additional data from the County studies and State studies downgradient, and then fill in

data gaps in the information, characterize the hydrology and the nature and extent of groundwater contamination in the OU2 area, identify and evaluate potential sources of contamination -- we already knew several sources existed in the OU1 area -- perform a screening level of human health and ecological risk assessments, and prepare reports of the findings; remedial investigation report and the EFS report.

Okay. This is just very quickly a seismic cross-section. We did quite a few studies in an area along what we call Asbury-Broadway Road here. This is the Franklin School.

We ran a seismic line. We wanted to find the Karrsville Fault going through the middle of the valley. We suspected it existed based on some vapor intrusion studies we had run in

the area, and we wanted to confirm it. Seismic is just the tool to do that.

This area here, it's computer processed, but that's a very highly chopped up zone, two to three hundred feet wide. That's the Karrsville fault, more or less along Pohatcong Creek, and that's the preferential pathway.

What we found when we put wells in, here's the Asbury-Broadway Road area where we ran the seismic, we located the fault, we put wells along the fault up here, and we followed trace -- the fault exists at Edison Quarry, where it's known to be at the surface, travels along and veers through this way and this way.

We put another well within the fault zone here since we believe it to be the preferential pathway. To define the contamination, we put a couple

wells on the sides of the fault, and we also evaluated in this area two potential source areas.

One of the source areas, we had already looked at in the Operable Unit 1 study but we wanted to come back and make sure we didn't miss anything. So, we put a well here, which is downgradient of the sources. The water would go this way if these were sources. And we put the wells to intercept anything there. We didn't find any contributions from those two sources.

Okay. We did a lot of residential well sampling. We sampled at least 250 to 260 residential wells in different phases. We sent out access agreements. We can only sample those wells where people give us permission to sample. If we don't get permission, we don't sample.

So, we did this in phases,

we sent out letters at different types, and tried to sample everybody that we could, and we scheduled appointments. The total up through March of 2010, we sampled another 56 residences. And that's an ongoing study.

We also conducted vapor intrusion sampling. To try to explain that, vapor intrusion is potential for contaminant vapors that are coming from groundwater to percolate or move through the soil and enter a breathing space of a house.

That's a potential for the site we wanted to evaluate because we're dealing with volatile organic compounds. And volatile means just that; they're volatile. Like gasoline is volatile if you spill it on the ground, or even in water it will volatize above or below ground. And when below ground, it can volatize through

the ground and reach the surface.

So, vapor intrusion sampling meant we went back into both the OU1 areas and OU2 areas, we looked at residences and public schools, day cares, to see if there were any vapor intrusion issues.

This is just a quick summary for the OU2 area. We're not going to deal with OU1 now.

Basically, we did a phase study. We conducted what we call two removal actions, where we had found the potential existed at three properties; one was a school, two were residences. We remediated the school and one house. And on the second house, the homeowner remediated themselves, independent of us.

U2 RI summary, we talked about the geophysical study, we talked about the monitoring wells. We put seven new wells in and we sampled some existing wells. We

did the phased residential sampling, we did the vapor intrusion sampling.

And we put all that together and prepared a report called the remedial investigation report. It's a public document. We have it in our office and there's also a copy that's at -- what we call at the public information repository, which is the local health department in Oxford.

They have a copy, they have it on CD, and I believe they're giving it out for a nominal fee; maybe a few dollars or ten dollars. So, if you want a copy, you can go there and get it.

In the OU2 area, this is the Asbury-Broadway Road here, the end of the OU1 area is here, OU2 is here. This is more or less the plume in the OU2 area.

I'll show you the whole presentation in a minute, but

there's relatively lower level concentrations in OU2. Roughly between five and ten appear along Asbury-Broadway Road. We had our highest hit along the fault here around 30 PPB on Asbury-Broadway Road. The rest, this area, it's five to ten parts per billion micrograms per liter, goes down into Greenwich, and it basically dissipates to nondetect.

Anywhere in this zone here, we consider either people are impacted or threatened by TCE ground water contamination. TCE was the only site-related contaminant we found down there, really.

Putting the two studies, OU1 and OU2 together, this is the plume, we looked at this part and went down here. That was the previous slide. This is the other area, OU1. The red is a blow-up of this slide that continues,

although we reversed the colors for some reason.

But that's the PCE plume here, much lower concentrations, OU3 is up here. The sources, the highest areas of TCE contamination, groundwater contamination, they're up here. It's above two thousand parts per billion in groundwater. There was one at four thousand or above up here in groundwater. And it just continues to go and dissipate to nondetect down here in Greenwich.

OU2 major findings. Again, it's a dispersed plume throughout OU2, with decreasing concentrations the farther away you go. We didn't find any additional TCE source areas, we didn't find any TCE hot spots, or what we would call a hot spot or higher concentrations that would indicate additional sources.

The hydrogeology is

influenced by fractures, karstic -- we have a lot of karstic development here -- and dissolution pathways and a fault known as the Karrsville Fault running through the middle of the valley. The Karrsville fault is the major preferential pathway where groundwater pretty much shoots down that fracture.

The OU1 and OU2 study areas are hydraulically connected; same geology we're dealing with, same aquifer, and the spread is going towards -- downgradient means water flows from high to low. And, topographically, if you think of a hill, water is going down that hill towards, ultimately, the Delaware River is down there. And that's basically the contamination is continuing to spread through OU2.

We did the baseline human health risk assessment. It's a

four-step process utilized to assess site-related human health risks and hazards for reasonable maximum exposure scenarios; looked at hazard identification, exposure assessment, toxicity assessment, and risk characterization.

And then when that's done, the risks, there are numbers that are computed. They're compared to acceptable cancer risk range of one in ten to the minus six. That's one in a million, to make it a little easier to understand. That's called a point of departure.

And the risk, where it falls in ten to the minus four, or one in ten thousand, if you have a risk that's one to ten thousand or basically below, say, if you have two in ten thousand, you have to take an action. That's mandatory. If you have a risk in the range of one to ten to the minus four, or

one to ten to the minus six, you can take an action; it's not mandatory, but you can based on certain site specific conditions.

We also compared the hazards to an acceptable hazard index of one. And we have a risk assessor here, and he can get into the specifics of what that means at the end of the question period.

Okay. Risks are evaluated for potential exposure pathways. These are the pathways we looked at. It's also described in the proposed plan.

Current and future adult and child residents, we looked at ingestion, dermal contact -- which is contact with skin -- and inhalation, and untreated tap water from the regional aquifer.

We looked at current and future industrial workers, again for ingestion, dermal contact, and inhalation, and untreated tap

water.

We looked at current and future adult and youth recreational. This one, we added surface water and sediment in case somebody's fishing or swimming in the streams.

And we also looked at current future adult agricultural worker for inhalation.

Okay. For the regional aquifer, the risk for TCE was above the point of departure. It's basically -- what this is going to say is it's between one to ten thousand to one in a million. That's roughly the cancer risk.

For regional aquifer and private wells, they exceed the State and Federal maximum contaminant levels. That's a given. The State level for TCE is one part per billion; the Federal is five.

A number of wells in OU2 area exceed dead one, a number exceeded five. Those are legal promulgated standards, your drinking water standards.

Risks and hazards for agricultural workers was acceptable. That's basically spraying water on to fields. We didn't come up with anything unacceptable for risks.

When we put this together, we determined that it's best to take an action to restore the aquifer to its intended use as a potable water supply.

For surface water and sediment, we didn't find anything above our criteria, no State or Federal standards were exceeded in sediment or surface water.

Nonsite-related hazards. There were some other contaminants occasionally found; thallium, arsenic, cobalt. Occasional hits.

They're not site-related.

They're indicative of general background where one well would have it and a few wells in hundreds of samples taken and there's no discernible pattern. We see that at a lot of our sites.

Screen level ecological risk assessment. Basically, we gave a quick summary. We didn't find any ecological impact of contaminants from groundwater. Groundwater is discharging to surface water, but where it's found the levels are either nondetectable or so low it's below ecological criteria. We didn't see any action needed to protect the environment in those instances.

Now we go to the OU2 feasibility study, which looks at the alternatives.

In order to develop alternatives, we used ARARs, which are Applicable or Relevant and

Appropriate Requirements. It's a legal term, it's actually in the law. That's a promulgated standard that's in the law. It's like MCL or State drinking water standard. It's something you have to achieve by law.

PRGs are Preliminary Remediation Goals. RAO, Remedial Action Objectives, we looked at. All for groundwater, because we didn't find any other medium of concern. This allowed for basically a more streamlined FS because we already knew we were dealing with groundwater. We didn't have soils in this operable unit. We finalized the FS April of this year, and that's what we're here to discuss.

We looked at a number of alternatives. These are the alternatives we evaluated and we would like your comments on. They start on Page 12 of the proposed

plan. It's a thirty-day comment period, so you can send in the comments also.

By law, we have to look at no action as a basic comparison. It's very easy to screen out because it wasn't protective, so we really don't need to say more on it.

We have Alternative 2A that we developed, which consists of MNA, Monitored Natural Attenuation, institutional controls, IC.

Institutional controls are State standards, like a well restriction area or classification exemption area. A CEA, deed restrictions, development restrictions, whatever, would fall into institutional controls.

And that consists of private wellhead treatment, which are the POET units we talked about. That would be connecting everybody up

to POETs, basically, in the OU2 area.

Present worth cost is $6.6 million. That's the main part.

Alternative 2B consists the of MNA, institutional controls, and public water supply connection. It's similar to 2A except instead of POETs, the main component is connecting people up to public water. POETs would still be used for people who are maybe too far from the public water supply.

That present worth cost is $15,040,000.

Alternative 3A is in-situ treatment, which I'll explain in a minute, private wellhead treatment, which are the POETs, and MNA, which are the same as the other components.

In-situ treatment was looking at a type of treatment to knock down the contaminant

concentrations. And we looked at chem-ox type of treatment, where a reagent would be injected in a portion of the aquifer where the concentration of contaminants were the highest.

The problem is we're dealing with pretty disburse contaminants. We don't really have a hot spot. So, the hot spot we chose was along the fracture zone and the fault zone along the Karrsville Fault up by the Asbury-Broadway Road, that blue area on the seismic. That fault is several hundred feed wide.

Injection wells would be put in, a reagent would be put in, which would react and oxidize the TCE. It would take about a year to bring the contaminant levels down. It's a one-time application. POETs are also involved in that one.

So, the present worth cost

was $8,200,000.

Alternative 3B is very similar to 3A. In-situ treatment, it's the same as 3A, public water supply connection instead of POETs, which is hooking people up to public water supply, and MNA.

The present worth cost is $16,590,000.

Alternative 4 is -- was an entire plume extraction and treatment and reinjection and public water connection.

And we looked at that, and we also looked at it during Operable Unit 1, but we didn't like it during Operable Unit 1 because besides the cost -- $46,610,000 -- it's something that is potentially harmful to the aquifer.

I think we looked at thirty extraction wells, extracting a total of nine thousand gallons per minute, and it was potentially

detrimental to the ecology and to the aquifer, with potentially drawing up surface streams by Pohatcong Creek. And it could lower the water table, where people who were on private wells, their wells might need to be redrilled.

And it's not worth the ecological damage when you went through that. And in terms of cost, the cost is extremely high.

So, we looked at these alternatives, and we did something in part of the evaluation; we came up with EPA's preferred alternative. It's Alternative 2B. It's monitored natural attenuation, institutional controls, and public water supply connection.

We liked it for a number of reasons. We felt that operation and maintenance and long-term protection of health was far

superior for water line versus POETs because we're looking at potentially decades and decades of maintaining POETs and hundreds of POETs.

POETs are generally not considered a permanent part of a remedy. There's potential for contaminant breakthrough, there's potential for POET breakdown, and you can get breakdown products coming out of your POET as well.

There's a lot of operation and maintenance. They have to be changed out at least once a year, they have to be sampled at least once a year. I think the DEP might be sampling some of them between two and four times. It's very labor intensive.

Water line supply is a permanent source of safe drinking water. Nondrinking water would have to meet State and Federal standards.

There are two public water supplies currently in existence. There's Aqua New Jersey, which operates in Phillipsburg, which is at the other end of the OU2 area, it actually comes in a little bit into the OU2 area. And American Water currently covers a little of the OU2 area but from the Washington Borough end.

So, we have this big area in the middle we have to during design, if this were to become the accepted ROD remedy, we would work during design with both water companies to see what is the most feasible and efficient way to connect people up between the two water companies.

Approximately ten miles of water lines were estimated to be necessary that went into the costs that you see or saw for the alternative.

Okay. This is the OU2 area,

these are the water lines that come down, this is OU1 area, this is New Jersey American, water line comes down here, and Aqua New Jersey territory here. So, OU2 is right in the middle.

Okay. I hope we can have some good questions.

MS. AYALA: Please state your name clearly so Linda can hear you.

MR. SHRIVER: Kurt Shriver.

I'd like to know what your definition of outliers constitutes.

MR. CIPOT: Outliers was a term I used for POETs that would be used -- outliers was used in the sense that if a water line were to go in in the main areas --

Maybe a good slide would be the OU1, OU2 area slide. That one.

This is the OU1 area, this is OU2 area, the water company

Aqua New Jersey is here, New Jersey American is here.

There are a couple of developments that clearly -- and roads that clearly would be within the path to be hooked up; down in Greenwich, Edison Quarry area, these roads. Water lines can easily go down those roads and hookup the bulk of people relatively quickly. I think we're looking at about two years once the design is complete.

Outliers would be -- there's a lot of farmlands in this area that would be -- this whole area here, there are farms out there. They would be considered the outliers. We looked at up to eighty, roughly -- for cost purposes, eighty POETs might be necessary to be maintained in those, quote, outlier areas. It's not well defined right now.

MR. SHRIVER: I was asking,

obviously, a selfish question. I live on Good Springs Road, which is about where that line runs. So, I was wondering if you were considering that an outlier or not.

MR. CIPOT: If we go back to that slide, John.

MR. MASON: Good Spring Road is right there.

MR. CIPOT: Is that it here?

MR. SHRIVER: Yes.

MR. CIPOT: You might not be an impacted area. You might not be an outlier. You'd be beyond the outlier.

Mostly the threatened and impacted area would be roughly in this area. We don't exactly know where in all instances the lateral extent is. We have more control here because there are a lot of wells that we sampled. That's the Edison Quarry area, we have good control here.

In this area here, we don't have a lot of control. There are nondetects up here, for example. Historically, we'd have to during design do more sampling, maybe put in more wells, to better define where that line is.

MR. SHRIVER: May I ask a final follow-up question?

MR. CIPOT: Sure.

MR. SHRIVER: This is the extent of the threatened area now.

What do you perceive to be the potential for that area to grow over time?

MR. CIPOT: What we found out through the OU1 study, the plume is roughly at steady state. It doesn't mean it's not spreading, but it's not spreading or extending in an appreciable manner.

What we have been finding is that over the years, some residences within this area that

weren't contaminated are contaminated now. And we also found in this sampling in the last year and a half some residences that were contaminated are no longer contaminated.

And the State has been starting to take some of those residences off of POETs. And that's kind of the maintenance issue with POETs we want to avoid with water lines, is who goes on, who goes off POETs when. We feel the permanent solution would be water lines.

But within that area, we don't expect the plume to spread much beyond that area. It's pretty much nondetect down here. Our farthest well, down here, was nondetect. It's relatively stable within it, with some variations within the plume.

MR. SHRIVER: Thank you.

MS. FILIPOVICH: Linda

Filipovich. I also live on Good Springs Road.

The last part of his question, you talked about the dissipating down towards the end of the area there.

Does that just stay in a stable state or does it...

MR. CIPOT: Well, what does that mean, dissipating?

MS. FILIPOVICH: Does it just end there or it would only continue further if there was additional contamination?

MR. CIPOT: We continually have contamination coming in from OU1. But what's happening is it's continually being diluted by all the water coming that's coming into the system also.

MS. FILIPOVICH: Okay.

MR. CIPOT: The whole process, as you go further from the source, it just continues to get diluted. You have more fresh

water coming into the system, rainwater, for example.

MS. FILIPOVICH: It may never continue any further because of that dilution?

MR. CIPOT: We do not expect it to move very far. We haven't seen that yet in over ten years now.

MR. ALVEY: The farthest downgradient where we are where it is nondetected, we'll continue to monitor those wells and take samples to ensure that.

MS. FILIPOVICH: What about the source?

Has the source been contained?

MR. CIPOT: That's a good question. The source has not been contained at this point.

There are two components to dealing with the source; one is the contaminated groundwater, and the other is the source material

itself, what's in the soil or whatever that's leaking. And the groundwater part is being addressed by -- remedial designs, we call them.

This is the source for the TCE. We're currently involved with the company or what we call potentially responsibility party, PRP, in a design phase for putting in an extraction treatment and recharge system around that hot spot here which should go in within the next two years. We hope to have the design finalized this year.

MS. FILIPOVICH: That was the American Can site?

MR. CIPOT: Yes.

We have a slide for that area, in case people want to see that in a little bit more detail.

It's an old facility that started operations in the early fifties. It was called American

National Can. It's now owned by Pechiney Plastics Packaging, Inc. That's called the OU3 area right now.

We're developing a work plan to study the soils. We believe a lot of the contamination -- this is the OU3 area, this is Route 31 going north, 57 would be down here. We're about -- let's say we're about here. This is the old ANC plant.

Under state investigation in 2005, 2006, the company went in and drilled a number of borings within the plant, and a source area was located here. As part of our investigation is, we found little sources here, and this is our OU3 study area.

MS. FILIPOVICH: There may be additional sources, but nothing --

MR. CIPOT: No, no other substantial sources have come out

of the study so far.

MS. FILIPOVICH: I'm sorry, I don't want to monopolize.

I mean, I've lived in that community my entire life.

Has there ever been any connection or have you done any studies connected to the High Point?

High Point, which would be down water, it would be coming into the fault area that you described.

MR. CIPOT: Here's the Borough here, High Point Landfill is over here.

MS. FILIPOVICH: That fault area is right on that Asbury-Broadway Road that runs up to the...

MR. CIPOT: The High Point Landfill is being handled by the State, and there are a number of different contaminants there. We have not been finding any of the

High Point-related contaminants in our study area.

It's also in a geologically different area, where the aquifer in the highlands appear to be pretty distinct or not really connected to the aquifer that runs down the center of the valley. And it's different rocks and geology.

So, we haven't been seeing that connection.

MS. FILIPOVICH: So, the main contamination area off the Pohatcong Creek, it's more than likely that, as this gentleman over here wanted to know, that the Good Springs Road area could be coming from springs -- the water supply would run down to the creek and may not be contaminated.

MR. CIPOT: We haven't taken samples up there.

Our contamination here --

MS. FILIPOVICH: Is mainly

along the creek.

MR. CIPOT: -- is really along the center line of the valley, not up in the -- this is the Pohatcong Mountain here. It's not up in here, and it's not up on the Scott Oxford --

MS. FILIPOVICH: Good Springs Road is about three-quarters of a mile from the school.

MR. CIPOT: The flow is right along the center of the valley, northeast, southwest.

We do have some control. We do have wells. We could be putting in more wells if we think there are data gaps that need to be addressed during design for the remedy.

And as Rob Alvey, our hydrogeologist, mentioned, there would be continual monitoring. That's the monitored natural attenuation part of the remedy.

It would be ongoing year after year for decades based on our modeling. We looked at projecting fifty to sixty years out, possibly. Modeling is very rough, but we looked at that far ahead.

Yes?

MS. CATALLA: My name is Terri Catalla.

I wonder if that alternative will also connect the schools to the public water as well.

MR. CIPOT: Yes, with any impacted area.

You first, then we'll get to you.

MR. WALD: My name is Brook Wald, Stewartsville.

This Alternative 2B, this connection, what's the cost to the homeowner for that?

MR. CIPOT: The cost to hook up is zero. The Government would pay the cost.

And we'd also like to close

the well, and we would pay for closing the well.

MR. WALD: So, you bring this pipe in off the street to my house, digging up the yard and all that, you guys pay for all that?

MR. CIPOT: Right, restoration of your property.

MR. SHRIVER: Grass seed, all that?

MR. CIPOT: Yes.

You would be responsible after that for the monthly water bills.

MR. WALD: One more question from me.

This concentration in one slide, you said it was five parts per UG, and down where I'm at it's about one part, and you talked about dissipation.

Whatever increase where that five, where it is now farther up, is it possible it will come down toward...

MR. CIPOT: It could. It is possible.

This here is the line you're roughly talking about coming down. It could come down a little bit farther, yes. But once we start to conduct our pump and treatment, up here especially, we'll be cutting off the source. That's the purpose of the pump and treat, is to cut off the groundwater source.

And then we'll be addressing the actual source itself. So, once you're up here, then it will take -- once you cut off the source, it will take a while, decades, for all this water to move down, but it will be continuing to diminish over time.

You had a question.

MS. DiMARCO: Joann DiMarco.

I live in the effected area, and I have no VOCs in my water. I had my water tested in '99 by you

and 2002 and two months ago. There are no VOCs, not TCE, not PCE. There are neighbors around me who do have POETs because of contamination.

My question is would I have a choice to accept the public water but continue to use my own well because it has no VOCs?

I would choose to do that. I would like to go on record as saying that.

And I know of some people, my other neighbor especially, has no VOCs in his well and he would prefer to be able to use his well, as well as being connected to public water when they are doing it so there would be -- as long as they're putting the lines in, just in case in the future VOCs may turn up in the well.

Would we have that option?

MR. CIPOT: There's two parts to your question.

MS. DiMARCO: Yes, it is.

MR. CIPOT: We don't intend to force people to close their well. We'll have to look at it because there are some local ordinances that might come into play.

We're not in the business of condemning wells, but we do want to protect public health in the long-term. And the only way really to ensure for the present homeowner and then future homeowners -- because it has to be something that is maintained through subsequent owners -- is to make sure a well is closed and can't be used.

Because if somebody comes in after you, they might say: Oh, there's a well here. Let me fill my pool.

Then it's a problem if it becomes contaminated because nobody is really regulating it.

The County and State health departments, for people with private wells now, they do recommend people sample their wells. And this is for all the State private well drinking parameters, which include VOCs. But a lot of people don't because it's expensive. So, a lot of people don't, so that cost would be -- that would be an obligation.

Plus, if you want to sell your house, we've dealt with Superfund sites where people say: You want to sell your house, you have to hook up because we don't want to deal with that.

That's a possibility too you might have to face in the future.

MS. DiMARCO: Could there be that scenario to accept the public water to be hooked up to it but not use it and continue to use the well that has no VOCs in it for my own consumption if I continue to

have it monitored, you know, yearly?

MS. O'CONNELL: The Government wouldn't continue to monitor. The remedy would be you would.

MS. DiMARCO: I wouldn't want to drink VOCS so I would monitor. And I have been since we found out about that.

MS. O'CONNELL: Our preference is to seal the wells because that's what cuts off exposure. Exposure could cause potential public health problems, so our preference is to hook up the water and seal the wells.

That's our preference. That's what, if we proceed with this remedy, we would ask people to do because we think that's the most protective.

We're not really planning to take the wells or force the sealing of wells. That's sort of

not what we want to do. But our intention would be to try to have all the wells sealed because that's the best way to protect the public health.

You might sell the house and somebody might not sample, and the wells that are not contaminated within that area could easily show up with a couple of parts per billion one year or they may never.

You know, it's sort of sporadic. We sort of have a handle on the plume, it's sort of stable, but it's a little threat if you have a neighbor with a low hit and somebody with a hit next to that. Your wells might be on a different fracture and one well might be five feet deeper. It's hard to know why, but your well could be considered threatened even if not impacted, and it could become impacted.

So, we'll deal with, you know, people on an individual basis as we go through, but we would be requesting under this alternative the community to, you know, hook up to water and seal wells.

We understand it's a large area and there are different people with different types of opinions, but that's what our preference would be for those reasons.

MS. DiMARCO: You're saying that's your preference, but are you saying absolutely you're going to say no to someone who would have the option that I'm presenting to you or will I have that option?

I would just like to get it clear.

MR. CIPOT: I think you would have the option to go onto public water or not, but what we

would want to do, though, is if you want public water, we would want to arrange to seal your well at the same time so we don't have to, you know --

MS. DiMARCO: But I would like to propose that the option that I'm suggesting, yes, the person may accept public water but may also continue to use their well as long as it shows no VOCs or other contaminant.

MR. MASON: Steve, that would be something you'd have to look at engineering.

I don't know -- you'd have to have two water lines entering your house and the wells --

MS. DiMARCO: Although I would be paying for my well set-up. I would be accepting public water like everybody else is accepting, so that's no extra cost to you. I would be paying for my wells.

MS. O'CONNELL: How would you be using --

MS. DiMARCO: Just like farmers who have a well that they're using who will be hooked up to public water too, because they will be able to use their wells to irrigate.

Am I correct?

MR. CIPOT: Those are irrigation wells. They would not be covered. Residential wells, business wells, commercial wells, that's what we're dealing with, not irrigation wells.

But I don't know, we'd have to look at during design if we run into irrigation wells also used as residential wells -- that's a good point -- we'd have to look at that during design.

MS. DiMARCO: I'd like to go on record as offering that as an option for people.

MR. CIPOT: Okay.

MR. HADLEY: Frank Hadley, New Jersey American Water.

To answer your question, from the standpoint of public water utilities, they cannot run a well and public water service to the same location.

If you used it as a separate irrigation well, not connected to our piping in any possible way, that's one thing. But you can't have both going to the same residential location because it can create a backflow situation.

MR. CIPOT: Oh, yeah.

MR. HADLEY: If you had your service and well turned on, it could accidentally get to our public water supply.

MS. DiMARCO: What if you had two separate systems?

MR. HADLEY: All new faucets? Anywhere with a faucet, you have to have two of them in your shower, in the bathroom. You

can't have two in the same place.

MS. DiMARCO: What if it was closed off, if I did not accept the public water but all the plumbing came to my house for future hookup?

MR. HADLEY: That's up to them. It wouldn't be physically hooked up by us.

MS. DiMARCO: Not hooked up, but all the stuff would come to the house but not the connection.

MR. HADLEY: No meter.

MS. DiMARCO: No meter, no connection, so that if in the future VOC came into the water supply, that could be hooked up at that time.

Would that be possible?

MS. O'CONNELL: We have in the past where people didn't want to be hooked up and there is a water line constructed in the front of the house, they provided their own hookup later.

MS. DiMARCO: That would be good.

MS. O'CONNELL: If there is a water line going down your street and you choose not to hook up, the Government would not be hooking up people for free for an extended period of time. It would be in the construction period, and after that people could always choose to hook up.

My understanding is that is three to four thousand dollars, something like that.

MR. HADLEY: It depends on how far your house is off of where the main is.

When water comes in and puts in a service, we put it right to the curb and we put a vault in, and that's where the meter goes. The homeowner puts the service into the house.

They're offering to put that service not only for us but also

for you to go into the house. If I understand what you're saying, they might not give you the hookup to your home.

MR. CIPOT: How far are you from the road?

MS. DiMARCO: Would it come to the house?

Would that be an option?

MR. CIPOT: No.

We would only do it to the street?

MS. O'CONNELL: We do it to the street, and you could hook up later, but it could cost you several thousand dollars depending how far back your house is.

It would cost -- I guess the average cost is a few thousand dollars.

MR. HADLEY: You can't say. The contractor would have to tell you that.

MS. DiMARCO: They would not be willing to connect it to the

house for future hookup.

Is that what you're saying?

MR. CIPOT: Correct.

It would just be during this design period when we're looking to obligate the public money, we need to know how much and work with the water companies. And we need to know who we're hooking up, and develop contracts with contractors and say specifically who's being hooked up.

So, it would have to be during that period.

MR. MYERS: David Myers, Stewartsville.

Is it not true that her solution IS really at the hands of her local town planning board; and, therefore, strictly local officials will decide as to whether or not a local town ordinance will require one type of hookup and not both?

MR. CIPOT: Local

authorities have the power to do that. That's outside of what we would have the authority to do.

If the local authority -- if I understand you correctly -- says you can't have -- they pass an ordinance, it goes into law, that says you can't have what this lady was describing, then that's a local issue and they would deal with it or prevent it or put restrictions on it.

Our remedy is simply to hook people up. We can do that, and that's what we would work with the water companies to do. Whether or not there are existing wells that may or may not be hooked up later, that's a local issue that we would not get involved with.

MR. MYERS: That's why you can really satisfy her with a yes or no --

MR. CIPOT: That's partly true.

MR. MYERS: -- because it's a local town planning board problem.

MR. CIPOT: It could be.

MR. MYERS: The other question that might be relevant to what she's concerned about is what would be the cost of buying water as opposed to having a POET?

What's the difference economically to an individual homeowner?

MR. CIPOT: You mean a monthly water bill?

MR. MYERS: Yes.

MR. CIPOT: That depends on your water usage.

I'm not sure if there's an average in this area for local residents that Mr. Hadley might be able to...

MR. HADLEY: I can't. I don't have the actual cost.

MR. MYERS: It could be as much as $50 a month?

MR. HADLEY: That's possible, yes.

MR. MYERS: What's the operation of a POET cost?

You have them running right now in the valley.

What do POETs cost the individual homeowners?

MR. ALVEY: We looked at costing about eighty POETs, and it came to two hundred something thousand a year if we were to do about eighty. Just break that down.

But the State has different sampling and change-out procedures that it depends on what the change-out is, how many POETs a year, how many samples --

MR. MYERS: Not for the State, but for the individual homeowner who has a well and a POET.

MR. CIPOT: If we maintain the POET, the cost would be our

cost as part of the remedy, not the residential. If you're maintaining your own private, POET then I'm not sure.

MS. O'CONNELL: POETs in the area are being maintained by the State of New Jersey right now.

MR. MYERS: That's of no cost to the individual homeowner?

MR. CIPOT: Correct.

MR. MYERS: So, you get a well and POET without a monthly bill?

MS. O'CONNELL: They're there now as temporary options because there's no options for public water. That is the only way to protect public health at this time for wells that are impacted.

MR. MYERS: Okay.

So, that means when you have a public option, then the town council may ordinance a required public attachment.

MS. O'CONNELL: That's possible, but that's really a local issue.

Our remedy is to try to cut off the risks, so our remedy would be to put the water line in and encourage everybody to hook up to the water and have their wells sealed. The locals may require it. You know, we will work with the local officials, but we will not tell them what ordinances they must pass or not.

MR. MYERS: And your recommendation would probably be followed by them by ordinance.

MS. O'CONNELL: Possibly.

MR. MYERS: May I ask two questions more? and then I'll leave you alone.

As a former American Can employee, has that ground been capped as the High Point Sanitation property has been capped?

MR. CIPOT: At the old facility, no, there's no cap or there have been no -- nothing like that, no.

MR. MYERS: The whole facility was not the original dumping ground. The original dumping ground was near the railroad tracks.

MR. CIPOT: We did find some contamination there. We don't have that slide.

MR. MYERS: The slide you had, was that bigger oval inside the interior of the building?

MR. ALVEY: Underneath it.

MR. CIPOT: It's underneath the building.

MR. MYERS: That's what I thought the circle represented.

MR. CIPOT: Yes, that was the main manufacturing, the area that we found to be a former manufacturing part of the plant where they used specific types of

washers that used TCE.

But we're always interested in information, other areas, to look for contamination. There was the old railroad track. This one goes to the plant. We found some contamination there.

MR. MYERS: That was a barrel dump at one time.

MR. CIPOT: There?

MR. MYERS: Yes.

MR. CIPOT: That low area there, yes, we did find it pretty deep.

The track also went up this way, and that track was pulled.

MR. MYERS: Right.

MR. CIPOT: We didn't really find anything above remedial levels up there.

MR. MYERS: Is the building that you're looking at where the contamination is underneath the original 1950s building?

MR. CIPOT: Yes, we believe

that's part of the original building.

And then it was expanded in several areas. This is a later area up here, and there were later expansions.

MR. MYERS: The expanded areas and above.

Because it was my impression from many, many years ago that degreasing of toothpaste tubes made out of lead -- this is way back in the day when toothpaste tubes were made of lead and that the degreasing of an actual manufactured toothpaste tube was the source of that contamination instead of something like washers.

MR. CIPOT: Well, washers, if I use that term, that's the machine. They were called Wax-all Washers. That had TCE that washed the tubes.

MR. MYERS: Okay. Now I understand what you meant by

washers. I thought you meant the rubber thing you put in your sink.

MR. CIPOT: I was too abbreviated. It's my fault for the misunderstanding.

MR. MYERS: You've answered my questions. Thank you.

MR. HADLEY: Our rates in the neighborhood are $6 change a thousand. Typically, homeowners use around four thousand.

So, it's ballpark. If you're watering your lawn a lot or not, for example. Typically, you'll see somewhere around $25, $30 a month.

MR. MYERS: Typical?

MR. HADLEY: Yes.

MR. DRAMA: David Drama, Aqua New Jersey.

When he talks about $25, $30, that includes the usage as well as the meter charge. I don't think there's two separate charges, that you'll get $25 plus.

I'm can tell you I'm an outdoor user as well. Seven thousand gallons a month is $37.75. That's a lot of water, by the way, to use a month. It should probably about two-thirds of that.

MR. MYERS: That's not just drinking water, that's effluence water as well, toilet water?

MR. HADLEY: That's everything that goes through your home, watering the lawn, the washer.

MR. CIPOT: That's good information we don't have to relay back.

MS. SLAVIN: Jalene Slavin.

You said it would take about two years for everything to be done once the plans were approved.

So, realistically, what kind of time frame are we looking at?

MR. CIPOT: If we go roughly September this year that we have a

record of decision, then we would take a couple of months to get into design. Design in about a year and a half, then another -- construction, possibly maybe two and a half, three years.

MS. O'CONNELL: Probably at least three years.

MS. SLAVIN: Three years from now.

And how is it determined who gets them first?

Is it worst case scenarios or just the easiest connections?

MS. O'CONNELL: That would be in the design. That would all be detailed and worked out in the design.

MR. CIPOT: It seems to make sense you would start before the connection already with existing waters companies and work out, but I don't know how that would work at this point.

MR. BUSH: Dave Bush.

Will new homes built in the OU2 area be allowed to connect to the public water?

And if so, do the two water companies have adequate supply to meet future buildout in the area?

MR. CIPOT: Two questions there.

The first part of the question is during the design period, if the new development went in and they were able to work it into the design, that would be the intent because it's in the planning phases or being built or whatever.

And the answer is we would try and work them into the plans. We have to obligate public money, we have to secure it.

The second part of the question, I'm not quite sure I understood, but once that period is done and we're done, it would be like now, if a developer

develops after the State put in the water lines in '88 and '89, the State didn't come back and hook everybody up. It would be similar to that.

The second part of your question, could you rephrase it a little.

MR. BUSH: If both water companies have adequate supply to fulfill other people in the future.

MR. SLEEPER: I'm Alan Sleeper with New Jersey American Water that serves the Washington area.

Right now, we're going or we're talking to DEP about getting their wells drilled for our system here, so we will increase our capacity. We have an application in front of the Highlands Commission, and, hopefully, they'll give us an exemption for the well and we'll proceed with

getting permits.

So, our goal is to have our wells drilled so we'll have more supply.

MR. GIROLAMO: David Girolamo, Aqua New Jersey.

We had would be in the same situation and we are looking at additional wells currently in the lower section of our franchise area.

So, capacity should not be an issue going forward in the future.

MR. CIPOT: Thank you.

MR. McELROY: Jim McElroy.

You said the State standard is one part per billion but the Fed's is five.

Why the difference?

MR. CIPOT: They're based on complicated risk scenarios.

Chuck might be better able to answer, but the State did their own risk studies, and the State

came up with slightly lower numbers, but I don't know the specifics.

Chuck?

MR. NACE: The Federal number also takes into account engineering controls and costs. Because if we set the Federal standard, then all of the states in the United States need to meet that.

So, things need to be taken into account because there are some states that have more difficulty treating water because of where they are or how they get their water.

So, it's a cost-benefit analysis in addition to the health. And some of the states are allowed to have stricter, higher standards if they choose.

I don't know the actual specifics between the one and the five, but I do know that the

Federal takes into account more things than the state sometimes does.

MR. McELROY: Second question is I read the Commissioner of EPA in Washington announced you were going to change the rules on those -- I think I asked you on the telephone.

MR. CIPOT: Yes.

MR. McELROY: Did you hear any more of that, if it will go higher or lower?

MR. CIPOT: For you, we have to meet the more stringent of the State or Federal standard. So Federal is five, your standard is the State standard that we would have to accept.

In New York, they've accepted five, so I have to live with five in New York. I would consider you fortunate that your state uses one, but that's the standard we would have to meet,

the more stringent of the State or Federal.

MR. McELROY: So, it doesn't really matter what the EPA does.

MR. CIPOT: I can't see Federal standard going below one, but that's beyond me. I'm totally out of that loop. I don't know if Chuck has any information.

I'm not sure what it would pertain to, but we're looking at one as the State promulgated standard, unless the State changes it, which we haven't heard anything about.

Yes, sir?

MR. KENNY: Fred Kenny.

I have three garden ponds that I have fish in, koi. It's about maybe two thousand gallons, little better than that.

If I have to hook up to that water, I lose my fish.

MR. CIPOT: Why?

MR. KENNY: Chlorine.

The water line goes past my house right now, and I'm not hooked up to. I'd like to keep my well. I'll run a separate line for outside water for my pond if I have to.

What's the water companies' idea on that, or even yours?

MR. CIPOT: We won't force you to hook up.

MS. O'CONNELL: You said you want to hook up your house?

MR. KENNY: But I will still use my well, put a separate line to take the water down to the ponds.

MR. ALVEY: In a sense, an irrigation well that a farmer would have.

MR. KENNY: Right.

MR. ALVEY: Not for private consumption.

MS. O'CONNELL: Again, our preference is -- that water may have low levels of TCE, so when it

comes out of the ground, there could be some exposure to humans. Anybody could get exposed to that water, so our preference, again, would be to seal it.

We're not saying we'll make you seal it. We'll have to talk to you when the time gets closer.

MR. KENNY: I would run a separate line period.

MS. O'CONNELL: I understand.

You have to also understand if the well is contaminated, there's a potential for exposure to anyone; Yourself or anyone else who would be exposed to that water. So, that's what we're trying to cut off, so that would be our preference.

We're not here saying we'll come to your house and force you to seal your well, but that's what we're telling you, like we told this woman, that our preference is

to get rid of any points of -- potential points of exposure. So, we'll tell you the same thing.

But whether that could be done, possibly, but, you know, again, our preference is to cut off all potential points of exposure.

MR. KENNY: Right now, the water line is thirty feet from my house, and I haven't hooked it up since they put it in there ten, fifteen years ago.

MS. O'CONNELL: I don't know if you would have any local -- there might be some local issues that come into play there as well, but I don't know.

MR. CIPOT: How often do you fill your pond?

MR. KENNY: Almost every day.

Probably put in A couple hundred gallons every day just from evaporation. I have 1,400

gallons in one pond.

MR. CIPOT: It's a valid concern, and we have it as part of the record. We'll have to work some of these things out.

MR. KENNY: I have fish that have grown up from babies in there. I just don't want to get rid of them.

MR. CIPOT: I understand. Thank you.

Yes, ma'am?

MS. DAVIS: Kathy Davis.

I have a question regarding in your summary, you state -- and it's obvious that's why you're doing the public water supply -- TCE concentrations are higher than 21 micrograms per liter, which exceeds the State and Federal.

MR. CIPOT: That was our hot well in this area.

MS. DAVIS: So, that's the reason you're doing the public water.

What does this mean, noncancer risks exceed the EPA target HI of 1.0?

What does that mean?

MR. NACE: I'm Chuck Nace. I work on those numbers all the time.

HI, that stands for hazard index. And that's -- we look at cancer risk, we look at that in a different way than at things that don't cause cancer.

And for noncancer, we look apartment the concentration that is in the water and we try to figure out how much water and someone would drink and get what their dose would be that they would be consuming.

And then we compare the dose they would be consuming to a value that we know is safe, that we haven't seen adverse effects in animals that have been exposed to that compound. And if the ratio

of those two values is greater than one, meaning what you're ingesting is greater than what that value that we think is safe would be above one, we would say you have a noncancer hazard index that's greater than our value of one.

We want to make sure whatever you're drinking is below the value we feel is safe, and that would put you below one.

MS. DAVIS: Thank you.

MR. CIPOT: The benefit we feel of hooking people up to public water is you have to think, too, that the level is one, we find detects, we found a number of detects in residential wells below one which I currently the State is not putting POETs on. So, there is minor exposure.

Just because you're not above the magic number of one and you're not getting a POET, that

doesn't mean tomorrow, next week, or some other time it will jump above one.

It's not just exposure from drinking, but exposure from inhalation and showering, which oftentimes is more acute and absorbed by the body quicker than drinking. It goes in the eyes, you breathe it in, and it goes throughout the system quicker.

So, public water would eliminate not just any -- it would eliminate any potential contaminants that people might be exposed to now but who aren't getting POETs. So, that's an issue, too, that we would like to address and we think it's important to do it that way, with public water supply connections.

And there are a few other contaminants out there -- metals, thallium -- which causes cancer that could be naturally occurring.

POETs may not deal with those the way they need to be dealt with. So, there are other factors that we looked at, not just TCE or being above one. So, I wanted to just point that out also.

MS. DiNARDO: Pat DiNardo. We moved here from Union County in '06.

Could you show me Stewartsville Road in New Village on your map?

And will we be getting public water on that street?

We had our well tested twice by the EPA.

MR. CIPOT: Okay. It's this big one here.

What is the question?

MS. DiNARDO: Will we be getting public water there?

MR. CIPOT: That's a main road that would be -- you have to run water lines down main roads. I'd have a hard time seeing it not

going down that road. But that's the intent, yes.

MS. DiNARDO: Where is that POET head, the creek?

MR. CIPOT: It's hard to see.

See the light blue line here, Stewartsville Road. It comes down here, swings around -- follow the arrow or the light -- and it comes up here.

MS. DiNARDO: I didn't realize we were in the middle of that red.

MR. CIPOT: Yes, we've had hits there.

MS. DiNARDO: Our neighbor told us we were in the red zone.

MR. CIPOT: There's another term that the State used to use. It's red line or red zone. That's kind of an old term. We might have it on one of the earlier slides.

That was a term the State

used. They called it a red line area, where in '88, '89, people were supposed to be hooked up to public water back at that time in the OU1 area up here. They called it a red line area. But we don't use that term, and it doesn't apply down here.

I'm not sure what you're hearing. We just used red on the map. I think this is the first time we showed the map. So, it just happenings to be red. We sometimes use red and colors that stand out.

But it doesn't refer to that red line, if that's what you were talking about, if that helps.

MS. DiNARDO: I guess.

They say people get strange if they drink a lot of water.

MR. CIPOT: This is the NJ DEP well restriction area that the DEP put in. Here's Edison Quarry. My understanding was that was what

used to be referred to as a red line area.

I'm not sure -- that's before my time. I don't know if anybody goes back that far.

MR. KENNY: The first time they put the water lines down Franklin Township, it was Edison, Good Spring Road, and the canal bed. That's where they considered, I guess, the red line area.

MR. CIPOT: Some of it looks like it was the old canal.

MR. KENNY: That's where we were told.

MR. CIPOT: Okay, some of it.

Did I answer your question?

MS. DiNARDO: Yes.

I hate to lose my well.

MR. CIPOT: I know you had a question.

MS. GREENER: My name is Kelly Greener.

Just for the record, I'm happy we're going to public water because I live -- the Edison Quarry is in my backyard.

Eight years ago, our numbers were very high for TCE back then. So, I'm very happy to be going to town water.

MR. CIPOT: Thank you.

MS. SCORTINO: I'm Michelle Scortino.

Was the Edison Quarry tested, the water in there, and what did they find?

Like, the vapors from there, is it harmful?

Everybody has children that live around there.

MR. CIPOT: That's a good question.

Edison Quarry is big body of water. The Karrsville Fault is this red line. The Quarry is partly formed by the fault.

And my understanding is the

quarry was mined by a company that Thomas Edison founded to mine cement. He was a person who developed a lot of patents, and he mined cement, developed that quarry -- that's why it's called the Edison Quarry -- and the quarry was mined until they hit a large fracture and water gushed in and couldn't be controlled. And they must have hit one of the main fractures.

We did take samples in Edison Quarry. We took them in the first study, OU1 study. We took them at different depths in the quarry. We did find some TCE contamination. It tended to be closer to the surface which indicated there's no source. People didn't dump barrels in there. We had concerns that -- we had heard reports that it might be somehow a historical source.

But we found low levels,

below ten -- and I'd have to go through the old report -- nondetect to very low levels.

Chuck Nace did a dispersion model to look at those concentrations as they would volatize off the lake water, and we looked at the distance to residential houses.

We appended that study -- well, the conclusion was there was nothing above our risk numbers for exposure. And we did append that study to this RI report, and there is a copy of that at the Health Department.

I believe they're making copies for people. If not, you can contact me and I'll send you have disk of the RI report. It's all in the RI report. And it's got all these complicated numbers, though, let me tell you.

(Laughter)

MR. CIPOT: Not that easy to

digest.

MS. COONEY: Christine Cooney.

I also live in the hot spot there. I'm happy that we're getting public water also.

I have a question. You mentioned in an earlier slide about the vapor intrusion, how it was a school and two homes.

What school was that?

MR. CIPOT: That was the Franklin School on Asbury-Broadway Road.

MS. COONEY: Okay, where my son goes to school.

And what did they find there?

MR. CIPOT: Levels of TCE that were pretty much at the border of low, very low to acceptable risk. And we had the option of continuing to monitor the school or take a conservative approach and remediating.

And we opted to take a more conservative approach, and we put in what's called a vapor mitigation system. And that is a system that has basically piping that goes through the slab at various points. I forget the exact number; there might be fourteen, but it's some number of fans and pipes that are vented outside the building that intercept the vapors before they were to come into the building.

The higher hits were under the slabs.

MS. COONEY: And how often is that monitored, and who maintains that?

MR. CIPOT: The school maintains it now.

We finished our remediation about a year ago, we did our testing, and everything tested fine. It's all now on the -- it's being maintained by the school.

They have to watch the pressure levels.

MS. COONEY: Is that something that's regulated, that the school has to do, with all these budget cuts?

MR. CIPOT: It's like a homeowner, if they have a radon mitigation system, it's a very similar type of system. You would have to maintain that also. It's a similar set-up.

MS. COONEY: And once we go to the public water, if that's the proposed plan, how often is all this still going to be monitored; the land, the vapor, the soils?

My concern is, too, we have all the groundwater.

Does anybody monitor the soil?

Is it safe for gardening in the backyard?

MR. CIPOT: We don't have any surface or soil sources

anywhere in the OU2 area. The soil sources are back up here in OU1, around the facilities.

Vapor intrusion is a potential concern anywhere between the plume area. We will continue to monitor occasionally as we develop the remedy. We'd have to determine where and how long that would need to be done.

But the school, these boxes here are the areas of the school and the houses that had vapor samples on Asbury-Broadway Road. That's also along the Karrsville Fault and that's closest to the OU1 area, where concentrations were highest.

We did take some samples in this area and also a couple of samples way down here, vapor samples, and we didn't find anything of concern.

Most of the concerns so far are these areas. The boxes show

where we took samples too. These also are -- sorry, we're off the map.

In the OU1 area, we did a remediation in the Borough related to a PCE source area because it went beyond or very close to the source.

We're not seeing very high levels, though, here either because you're not close to a source. But we will be monitoring.

MS. COONEY: My last question, have there been any studies down -- because I know a lot of friends and neighbors in and around my area have developed different types of cancers.

Has there been any testing?

MR. CIPOT: The Department of Health and the Agency for Toxic Substances and Disease Registry is updating their public health assessment for the site. It's a

draft document right now.

They will have their own public comment period on that, but they are looking into those type of studies.

A Department of Health person is here.

MR. PULLIAM: Glenn Pulliam, State Department of Health.

We have looked at this data, we've drafted what's called a public health assessment document. It's currently being reviewed by ATSDR, the Agency for Toxic Substances and Disease Registry. They are under the CDC, Centers for Disease Control, and our Commissioner's office.

We hope to release that some time this June, which we will hold a public meeting for.

MS. SLAVIN: Jalene Slavin again.

Where does the data come from?

MR. PULLIAM: We compile data from what EPA supplied to us from both the remedial investigations; the RI reports from 2005 and 2008, plus what they had compiled from the local health department, the private well testing data.

MS. SLAVIN: So, if someone become ill in the last few years, came down with cancer, whatever, had cancer, they would have to tell you in order for you to know.

MR. PULLIAM: No, that would be a separate assessment, which is called a cancer incidence report. And we're going to be looking into that.

But what we first like to do is present our findings from the PHA and get comments from the residents, which, again, should be sometime in mid-June.

MS. SCORTINO: I'm curious, in Toms River, there's that one

cluster of Toms River.

MR. PULLIAM: Exactly. And that's how this process has developed too. We develop the PHA, we'll present that hopefully in June. It will also have a thirty-day comment period where you can voice those concerns, and then we can address that in a future document.

MR. MYERS: Would there be particular types of cancer that these chemicals would be causing?

As opposed to, say, a brain cancer, they'd be causing specific types.

MR. PULLIAM: That's what they look at.

Typically, with PCE and TCE, you see studies conducted are typically kidney, liver, and lung cancers are associated with those compounds.

MR. CIPOT: Thank you.

Yes, ma'am?

MS. DiNARDO: Pat DiNardo again.

What about eating fish?

My husband catches and eats fish from the Pohatcong Creek.

Is it all right to eat these fish?

MR. MASON: For the chemicals such as TCE, we haven't seen levels in the water that would accumulate or be in the fish.

I believe the State has a statewide advisory for mercury in fish for all fresh water, so there may be -- that would be an advisory that you may need to look at.

It depends on the type of fish you're eating, but I would check the New Jersey Regulations. They put out a booklet every year that has water bodies that are listed for contaminants in fish.

MS. SCORTINO: Thank you.

MR. ZELLEY: Bob Zelley.

Your plan is about $15 million.

Can you confirm the funding is in place?

MR. CIPOT: We don't have the funding in place.

First, we have to have a remedy, record of decision for this Alternative 2B, then we would have to go and secure money.

MS. O'CONNELL: Also, we have a responsible party that we will look to negotiate an agreement and try to get private funding for this.

So, we have a responsible party --

MR. ZELLEY: Did you say the source has been removed or partially or not removed?

MR. CIPOT: Not removed.

MR. ZELLEY: Five years ago, I went a hearing in August to hear the presentation, and you talked

about the source would be removed very shortly. And you gave the same kind of answers; no funding, you were going to the responsible party for that. Five years have gone by, no funding, it still hasn't happened.

I just want to throw out to the public that live in that area, the plan looks very nice and it's excellently done, but without a funding source, we may be here five years from now having same discussion.

MS. O'CONNELL: We have Superfunds. There's a fund that's available when there's not an option for a private settlement from a private party. We prefer to get private dollars from responsible parties for clean-ups. When that is not possible, there is a fund.

This clean-up hasn't occurred yet, but we are deep into

remedial design, which is -- millions of dollars is spent on remedial design, which is coming closer to completion in these areas.

It's unfortunate, the groundwater is very deep and we're looking at fractures. The geology is pretty complicated, but we are making a lot of progress. And we are spending both Federal and private dollars currently on the two remedial designs going on in Operable Unit 1 for the PCE plume and TCE plume.

MR. CIPOT: For the TCE plume -- and probably the one you're mentioning that went back to 2005 -- we are expecting a draft design report to be submitted to us within the next two months. That's the current schedule.

We are fairly far along. We've drilled a number of wells.

That said, they're very expensive; we're several million dollars in that design. We've been doing pump tests up in the Borough. That's another slide which we'll come back to.

But we've been putting in a number of wells to find the best location to pump test our initial wells to see where the actual extraction wells should be located. So, we want to achieve a certain -- both concentration of contaminants and a high enough extraction rate or yield from the wells to make them efficient wells to capture the contamination.

Because there's fractured flow, we're literally facing the situation where you can have a pretty high contaminant well and a very short distance away a low contaminant well. And the only way to do that --

MR. ZELLEY: I'm a

hydrogeologist, so I understand this.

I just want to get a sense, is this realistically going to happen in the next several years --

MR. CIPOT: Yes, it should happen.

MR. ZELLEY: -- or the money won't be there?

MR. CIPOT: I can't guarantee that.

MR. ZELLEY: How about level of 75 percent certainty or any kind of confidence?

MR. CIPOT: We're talking about millions of dollars that I can't guarantee.

MR. ZELLEY: $15 million.

MR. CIPOT: That's the intent.

MR. ZELLEY: The water companies need to know also for calculations of capacity and what they're doing with respect to what

allocations are at the DEP.

MR. CIPOT: That's a different issue than the source issue.

MR. ZELLEY: It has to be done in concert because it's no good if you have the pipelines but not capacity to flow the pumps. So, they should have them done in concert.

MR. CIPOT: Okay. I understand.

MR. WALD: Brook Wald again. The funding source Mr. Zelli mentioned, is that A Federal funding or State of New Jersey?

MR. CIPOT: No, it's not State of New Jersey. It's Federal and a combination of private party or potential responsible party funding.

MR. WALD: Okay. Thank you.

MS. O'CONNELL: When we do construction, not the design portion but the construction

portion, if the project is Federally funded, the State contributes ten percent.

However, since we have a private party who's responsible here, we will look to them first to implement the remedy in full, and then no Federal or State dollars would be used.

MR. CIPOT: Our preference is to use private money so we don't have to expend, but that has to go through the process, we have to work with the company on that, we have to approve a design, and that's where we are now.

MR. WALD: Okay. Thank you.

MR. MYERS: Wouldn't it be a realistic assumption that the contamination from the two dry cleaner situations in town, where the access to rainwater is effectively capped by buildings and parking lots to a large extent, would that not indicate

that capping of the site in American Can would be very beneficial and a good use of the money?

You could just go in there and dump a couple of tons of concrete over top the site or pave it.

MR. CIPOT: Well, not necessarily.

We didn't get to that part of the study, but most of the source appears to be under the building, which, with that thinking, act as a cap, but we're still seeing a lot of contamination.

MR. MYERS: You don't have any drilled holes in the building removing water?

MR. CIPOT: Not at this point.

That would have to go through -- it's an operating company right now. We have to

further -- those were initial wells or test wells and borings to find the contamination. It would have to be defined to such an extent that you have enough data to do an engineering study to say what's the best way.

There are different technologies. You could use chemical oxidation by putting a reagent in the ground to react, soil vapor extraction by putting deep wells in and sucking the contaminated vapors out.

There are different ways to approach it and there are also big cost differences. That would all have to be done in that phase Operable Unit 3 through an FS. We're not at that point now.

We have a work plan that will be finalized to figure out the best way to go at it and most efficiently expend money to do so in the short test period of time,

but --

MR. MYERS: Isn't it true that since the plume is at least 35 years old, at least, and moving steadily but slowly, wouldn't it be sensible to cap the source, irregardless of the conditions of American Can or the people who own American Can at this time, so that, as you say, the volatiles do decrease over time and distance, wouldn't it be proper to spend some of this money in that area, irregardless of what those people think?

MS. O'CONNELL: That will be looked at, but, as Steve said, the area of highest contamination is under the building. So, in a way, it has a cap on it, yet it's still acting as a source.

That is an option that may be looked at eventually, capping, but we might compare it to a more active remediation that might

destroy the contamination in place and that might be better than capping. But once we fully define the whole area, see how big it is, how deep it is, how extensive the contamination is -- and that's what's ongoing now -- then we can look at capping versus in-situ treatment versus any other options and decide which is the best.

MR. MYERS: The Lincoln Avenue limit to this contamination as defined is well around 25 years ago, bringing the end of this pollution at a place on Lincoln Avenue in Washington, and then the delineation at Whites Road occurred as much as fifteen years ago, at least fifteen years ago.

The wells in that town were capped fifteen years ago around about, roughly speaking, and that can be a conservative estimate. The continuation of this plume down the valley has been allowed

to continue without capping the source or going after the source of the contamination.

MS. O'CONNELL: You need to understand the reason that the project was approached that way is that we didn't know where the source was and then looked for the plume. What was discovered first was the plume when the groundwater contamination started showing up at the two different municipal supply wells.

MR. MYERS: Yes.

MR. CIPOT: Where was it coming from?

And, of course, there was numerous possibilities since there's a number of industries and TCE is such a common industrial solvent and PCE is common solvent. So, there was a lot of possibilities.

MR. MYERS: Right.

MS. O'CONNELL: So, as we

started studying the plume to see how big it was, it went on and on. It's a very large plume. So, we looked at forty different facilities.

MR. MYERS: Yes, I know this.

MS. O'CONNELL: That's what took a long time. We thought there might be a number of contributing facilities.

But what turns out, it was one facility that we could identify as being the primary source of contamination for the entire valley. If we found the facility first, we would have studied and addressed it first, and that's a great thing to do.

But in this particular case, we were looking at the groundwater plume and trying to figure out where it was. We had to select a remedy while we were looking for a source. But we still need to

fully determine the extent of the contamination there to determine the best option.

It's often optimal to cut off the source and then address the groundwater plume, but in this particular case that wasn't the case.

MR. MYERS: The source was known twenty years ago.

MR. CIPOT: Actually, we did not know the source until 2005, and that's what the purpose of the OU1 RI/FS was. That's when we documented the source as being the ANC facility.

It might have been general knowledge, but until we started poking holes in the ground between '99 and 2005 and the State went in and forced the company to do it underneath the building in 2005 or so, we did not know where that source was.

In fact, if you were at the

2005 public meeting we had, we suspected that the source was under the building, just because we were working back that way.

This is a hard slide to see, but all these little red dots, squares, there are over a hundred facilities that we looked at investigating. Nobody said oh, we cased the contamination. We screened a hundred, we came down and actively physically investigated 40 or 45 in OU1, and kept tracing the contamination back with groundwater samples, soil samples, looking for the hits.

And we didn't do that until we documented that in 2005 in our RI.

MR. MYERS: What about the meeting that occurred ten years ago in Stewartsville that discovered this plume along the old Hart farm out on the very end

of Good Springs Road and where the remediation at that time was mostly the use of these POET things?

There was a meeting just like this in Stewartsville, it must be ten years ago, attended by even some of the persons from government in Belvedere.

And the houses that were discussed at the time was this chemical was discovered in the housing development. I can't think of the name of it, but it's near the baseball park, near Stewart Stecker Baseball Park.

Pacesetter, that was discussed in Stewartsville a decade ago, at which time the contamination site was known to be Washington, American Can.

MR. CIPOT: Well, it wasn't -- nothing was known. There's a lot of information, as you say, people who work at the

plant and, you know, people talking to people saying oh, we think it was there or whatever.

But we actually didn't take samples on the plant property, EPA, until -- well, between '99 and -- 2005 is the RI. Before 2005.

MR. MYERS: I remember that the question was also the large contributor could have been Tung-Sol. That's another building in the center of Washington.

MR. CIPOT: We believe that's the primary PCE source, not so much the local two dry cleaners. They were past historical sources.

We did a very good study in the parking lot between 57 and back this way, just over by where that building is, and we found contamination but not enough to remediate there.

So, we continually worked

our way back, and we're now at the former Tung-Sol facility.

MR. MASON: Steve, just also to mention, as far as capping for American National Can site, we're not just finding TCE in top upper parts of the soil. Since it was dumped and it's a liquid, it's in the soil; in some cases, down near where the water. So, capping it won't necessarily keep it from getting into the groundwater and continuing to plume.

That's why we're looking at extracting some of the higher portion --

MR. MYERS: But you capped the Belvedere Landfill for the purpose, High Point Landfill for that purpose --

MR. MASON: Landfills are different. They have contaminants at or near the surface and the water percolates through and comes out. So, we do cap landfills.

Part of the solution for American National Can may be to cap parts of it, but right now we have deep areas that are sources that capping wouldn't -- it may keep rainwater from going down through it, but it's already in contact with the groundwater, so we have to find a way to get those high concentrations of source materials away from the groundwater.

MR. MYERS: Having realized that the contamination is under the building, I realize now for the first time that the reason why you did not dig up the barrel dump site and just call an end to the situation. I didn't realize that the drainage system inside the building was being used to eliminate the degreasers.

MR. CIPOT: I just want to pick up on Chuck's part, just to remind you that the building

should be a cap in some sense, but the depth to groundwater -- the contamination exists at different levels between the surface and about a hundred feet down is the groundwater, which is an awful lot of potential source material to have to deal with. And regardless of whatever pseudocap the building is serving as, it's not that effective.

So, there are other engineering controls that are more active that might be more effective or would be more effective in a shorter term than the cap.

As you say, if that's been in the system for decades -- and we think it was between probably beginning fifties to roughly the end of the seventies or early eighties is the period of operation -- you have, as you said at least thirty years and it's

still continuing to feed the groundwater there. There are other engineering options that have to be looked at, but the depth to groundwater is a very big complicating factor. Plus, there's an operating facility there also.

Yes, sir?

MR. McELROY: Jim McElroy again.

I live on Stewartsville Road at the border of Franklin Township. I live in Franklin Township.

In 2002, Franklin Township sponsored a well test. It was point six nine. That was seven years ago. Last year, EPA come out and did the test again. It was point nine. Now, I'm waiting for this year's test to come.

If it comes over one, is EPA or the State going to put in a POET, or do I have to wait?

MR. CIPOT: Who sampled your well?

MR. McELROY: EPA.

MR. CIPOT: You have to excuse me. We sampled almost three hundred. I don't remember your name.

MR. McELROY: That's okay.

MR. CIPOT: But we would refer -- if you're at one part per billion or above -- we refer all results to the State and local county also, but the State is the operating party right now that is putting in POETs. They would put in POETs if you're at one or above.

You're receiving something. You're not above one, and that's the problem that we would have if you don't have a water line, in general. That's why -- we wouldn't have to worry about when you're sampled or when you miss a sampling or we can't contact you

to sample for decades out to do that.

MR. McELROY: I understand that.

But Mr. Zelli said from Stewartsville -- this was seven years ago. Now we're still --

MR. CIPOT: We're still dealing with it.

MR. McELROY: We're still dealing with it.

I work in Somerset County, and we dealt with a Superfund site down there. It took them seven years and we finally got the water. Negotiation with the companies that were responsible and with the water company and the municipality...

So, we're not going to see this in two years.

MR. CIPOT: We're not saying two years at all.

MS. O'CONNELL: It would be at least three, we're saying --

MR. McELROY: Best case scenario --

MS. O'CONNELL: -- until the water line goes in, if that's the remedy selected, everybody's wells should be sampled yearly and POETs will be maintained and we will continue to sample your wells. And if the State puts the POETs on, they're going to be maintained until the water line hookup goes through.

And it will be a number of years before the water line could be installed.

MR. CIPOT: Yes?

MR. KENNY: Fred Kenny.

On your three factors here, there's one I see that isn't on here. That's the Brass Castle Fault.

MR. CIPOT: We didn't find anything there.

MR. KENNY: That was supposed to be one of the

contaminants when they originally went in to put the water line in.

MR. CIPOT: We looked at that. We didn't find anything there. That was looked at in Operable Unit 1.

MR. KENNY: They were dumping in the creek. I heard that personally from somebody.

MR. CIPOT: We try to follow up on those types of leads also.

Yes, sir?

MR. ZELLEY: I was the Mayor of Greenwich for several years during that period, and we were concerned about '98, '99 about the issue. I believe your team or someone did come in in about 2000 to give a presentation.

And we actually went through a cost-benefit analysis with Aqua and did a cost of bringing water to the Pacesetters in the 115 homes and talked about it in Township committee one night

probably around 2000 due to the fact that we had guessed that the plume would reach Pacesetters.

That was about twelve years ago. I just wanted that on the record.

Also, regarding the slab, I'm working on a Pepsi-Cola plant cleanup right now where there's about five thousand gallons of product under the floor slabs. It prevented the migration and slowed it up okay, but it never would have been remedied unless we pulled the whole building down, took the concrete out, and actually had to remove it. Otherwise, the cleanup would have been probably at least a hundred years with pump and treat. We actually had to rip the place down.

So, I agree capping it is not the same as a landfill. A landfill has a different profile,

leaching is different. This is very highly concentrated carcinogenic compound and chlorinated.

I just wanted to confirm what you said about Greenwich because I remember that, and my former neighbors also remembered it.

MR. CIPOT: Maybe you worked on it locally, but EPA was nowhere near --

MR. ZELLEY: It was eleven, twelve years ago, but it was an issue and we had maps, we went to the water company, did analysis, trying to be proactive.

The outcome was the residents at the time, they didn't want to hook up to the water because it wasn't there yet.

MR. CIPOT: There was an environmental committee that mentioned something to me, yeah, I do remember -- you might have been

at the 2005 meeting.

MR. ZELLEY: I was, yes.

MR. CIPOT: Yes.

There was some type of something that -- EPA wasn't part of that.

MR. ZELLEY: Were the Freeholders made aware of the meeting tonight?

Last time, they were all here.

MR. MYERS: There were freeholders at Stewartsville.

May I make one other mention?

This pollution I'm talking about here with you guys was detected all the way to Carpentersville in the 1980s. Carpentersville is along the river at the end of the fracture that you're talking about, all the way down to the Delaware River.

MR. CIPOT: That might be -- you're in Phillipsburg?

MR. MYERS: No, actually, it's five miles south of Phillipsburg. This is Easton Express article and photographs of people who had their well sampled near the Bear Aggregates Quarry in Carpentersville itself.

MR. CIPOT: That would be off of our map here. That's beyond our --

MR. WALD: It's beyond the scope of the plan.

MR. CIPOT: It's not part of our problem, fortunately for us. We do have a big problem, though. It's a big plume, nine or plus miles.

MR. MYERS: That line that you're talking about follows not only the Greenwich, Stewartsville, New village, Broadway quarry system but it goes straight down through where ShopRite is and follows a straight line to the Alpha Quarry, right down to

Carpentersville.

That's a straight line. That's probably the delineation of the fault.

MR. CIPOT: We have clean wells down there, so we're not worried about that far, several more miles down.

We have contamination in a lot of places.

MR. MYERS: It was the same chemical related to the same -- in the article in the paper --

MR. CIPOT: That's an extremely common chemical. In the forties, fifties, it was manufactured by the hundreds of thousands of tons. There was a big push to manufacture and find uses for it and that's a very common -- both of them are very common contaminants.

MR. MYERS: Okay.

MR. CIPOT: That's what we find at most, I think, Superfund

sites.

MR. MYERS: It just follows the line of the limestone quarries.

MR. CIPOT: Yeah, okay.

MS. FILIPOVICH: Linda Filipovich again.

I just was curious to know, I know that there are two existing ends to the water line in Franklin Township that was put in back in -- was it the late eighties they brought the water line down there?

MR. CIPOT: Right.

MS. FILIPOVICH: And you're arguing well testing within that Franklin Township area.

Previously, the residents had the opportunity to ask for testing to be done.

Are those the people that are getting the testing?

MR. CIPOT: We are not going by that, no.

We tried to sample or test every well for every residence that would give us permission. We tried a massive mailing. I think we mailed initially 650 letters; we get a lot back and we try it again.

I understand a number were returned and we didn't for whatever reason get everybody, but that was the intent, was to sample everybody. And then you have to read the letter and sign the access agreement and send it back.

The State has also been doing testing to service POETs. They were initially doing testing and the Warren County Health Department was doing some. Now, that sounds like you might have been asked through one of those groups --

MS. FILIPOVICH: No, I remember going to a meeting in the Franklin Township Municipal

Building, I think about the PCE. I'm not sure whether it was 2005 or whether it was -- when it was.

But what I'm wondering is before you do a final design, will additional people be asked to test to determine that design?

MR. CIPOT: That's a good question.

I think our intent is to hook up everybody within the impacted or threatened area first, without the need for testing --

MS. FILIPOVICH: Because you already know, basically, because of the wells you're testing.

MR. CIPOT: That's the way we've been trying to proceed in the Operable Unit 1 area for people we find that are not hooked up. There have been a few.

That's the route we're trying to go, but it makes sense to hook people up and not test.

MS. FILIPOVICH: I assume

your design is going to be based off where the existing water line comes from.

MR. CIPOT: That has to be all worked out, but, in general --

MS. FILIPOVICH: Along that area.

MR. CIPOT: If we hook people up, why would we spend the several hundred to thousand dollars to sample when we're going to hook people up?

People might need to be tested. It takes a while to put in a water line, and a POET might be a temporary measure before a water line goes in. That would have to be worked out.

MS. FILIPOVICH: Are there certain companies that do the testing that are related to your study?

MR. CIPOT: We don't use companies like that.

We send it -- we've been

sending it to EPA's lab in Edison to do the analysis. The State has -- might use a different laboratory, and the Health Department I think might be recommending certain local companies that they might have made arrangements with for cost purposes and bulk.

But we don't work that way. We've been using the EPA lab in Edison. It doesn't mean we won't in the future, but it's just easier for us to send everything to one place, so far. And we've been sending EPA people out to do --

MS. FILIPOVICH: So, somebody at the County Board of Health might -- where would you get information to have the water tested?

MR. CIPOT: You can contact the Warren County Department of Health Officer, and the name is on

the front of the sheet, and the name is Kevin Cavotta.

MR. CAVOTTA: That would be me.

We have a list of labs, certified New Jersey labs, if you want.

MR. WALD: Brook Wald again. Final comment from me.

We've been throwing a lot of dates and timelines around tonight -- and I just want to support you. I agree with you that Alternative 2B is the way to go.

But this site, this was on your NPL back in 1988.

MR. CIPOT: This is true.

MR. WALD: In the context of things, I mean, Warren County Department of Health it says here, identified 79 impacted wells in 1985.

So, in the scheme of things, it's been a long time.

MR. CIPOT: Yes, it has.

MR. WALD: So, if you can get it all hooked up, great.

MR. CIPOT: Thank you.

I see two more.

MS. DiMARCO: You mentioned the municipal supply wells.

Their water analysis, are they free of VOCs, the source wells that we will be getting public water from?

MR. CIPOT: They have to meet -- before the water is delivered to a residence, it has to meet the State or more stringent of the State or Federal standards.

MS. DiMARCO: Do they?

MR. CIPOT: They have to by law.

They test according to State standards.

MS. DiMARCO: Straight from the well?

MR. HADLEY: Straight from

the well -- well, it's treated.

MS. DiMARCO: How?

MR. HADLEY: One is treated through carbon contactors and one is aeration.

MS. DiMARCO: For what?

MR. HADLEY: My two wells are Dale and Vannatta.

MS. DiMARCO: So, the wells that you're talking about that will be supplying us with public water do have VOCs in them.

MR. HADLEY: In the raw form, and it's removed.

MS. DiMARCO: And I have a well that has no VOCs in it. So, I will be getting water from a well that has VOCs.

MR. HADLEY: No, it's not in the system.

MS. DiMARCO: When it gets to me it won't, but initially it does.

MS. O'CONNELL: In this situation, you don't know what

will come out of your well. TCE is under where you live and it could get into your well.

When you're getting public water from a municipal supply there's extremely stringent state testing requirements an standards that have to be met and demonstrated on a regular basis to the State. That's why it's protected.

But you're right, I understand what you're saying, but what we're saying is we're looking at overall public health, and that can be assured for most contaminants through a public water supply.

MS. DiMARCO: But you are agreeing with me that the wells that will be supplying the public water do initially have VOC in them.

MR. CIPOT: Not the --

MR. GIROLAMO: David

Girolamo.

We don't have those issues. Our wells are located in a different area, for clarification. I don't want it to be on the record that all water wells are contaminated.

MS. DiMARCO: But some.

MR. CIPOT: Thank you.

MS. O'CONNELL: Water provided to residents through public municipal supply is sampled regularly and is sampled to assure it's meeting all State standards.

Water from a private well in an area that is threatened or impacted doesn't have that guarantee with it, and that's the difference.

MR. CIPOT: This water I was drinking is from the well downstairs. I filled up my water bottle.

MR. HADLEY: Every two weeks we sample for VOCs. It's

mandated. And we have nondetect.

MR. CIPOT: If you sample once a year as a private resident, which is a lot, the next day you can come up with contamination and it could be contaminated for six months or eight months and then you could take another sample a year later and come up clean.

The contamination is -- we call it steady state, but it's impact on a local level varies. And we've seen that with contaminated residential wells that were contaminated in the past are now coming up nondetect or clean and wells that were clean in the past are coming up contaminated and have to go on POETs.

There are variations within the plume because groundwater moves; it moves sideways, it's pulled one way because somebody's pumping over here a little harder,

maybe this house is or this house is, and it's drawing some contamination. Or you're drawing harder because you're filling up a pool or watering the lawn more or you're bringing in something you weren't bringing in before. If you sample in the winter, maybe you're not pulling as hard because you're not watering the lawn.

There's a lot of variation and we can't predict, and that's the problem with a plume of this type.

MS. DiMARCO: I have another part to that question.

If you put a disinfectant called chlorine in the water as well --

MR. HADLEY: All water companies do.

MS. DiMARCO: -- how does that effect the septic system?

MR. HADLEY: It does not.

MS. DiMARCO: We're told not

to put chlorine in our septic system.

MR. HADLEY: The levels in there are not going to effect your septic system. We have very low levels compared to someone pouring chlorine down the sink.

MS. DiMARCO: Nobody would do that.

MR. HADLEY: You're talking about two different things.

MS. DiMARCO: So, the chlorine that's in the water wouldn't effect my septic system?

MR. HADLEY: No.

MR. MYERS: Do I understand that you filter the PCE and the TCE out of the Washington water system?

MR. HADLEY: Yes, we do. Actually, one goes through carbon contactors and one goes through what's called aeration.

It's a stripper channel. Water goes up, and as it filters

down -- going to your point -- that's why you don't see it in surface water, because it's lifting out of it.

So, by putting it down a stripper channel, it's removing those volatiles --

MR. MYERS: That's down here next to Yeoman's?

MR. HADLEY: Yes.

MR. MYERS: Why couldn't someone put -- in another Superfund site I've seen down in Milford, they use a pond with aerating lily pad-like things into it.

Is that something -- I'm sorry, I'm talking to the wrong guy.

MR. HADLEY: Okay.

MR. MYERS: Is that not something that could be done with the big quarries that we have around here, floating lily pads to aerate the water and eliminate

some of the chemical, or is that not practical?

MR. CIPOT: It is aerated. It's a big surficial body of water, and it is dissipating. The concentrations are not high enough to do anything.

MR. MYERS: Thank you.

MR. CIPOT: There's no risk to take care of there.

One more question in the back.

MR. LIVY: Al Livy, Washington Township.

Is the apparent facility, the Pechiney facility, being monitored for vapor intrusion to protect the health of the workers?

MR. CIPOT: Not currently.

I think it's in the works. I'm not handling the Operable Unit 3 part. I think it's in the work plan, but I'm not totally sure.

MS. O'CONNELL: Yes, it is. It's coming up this year.

We're taking more samples out there, soil samples, and we'll be doing some work there.

MR. CIPOT: It looks like there's no more comments.

MS. O'CONNELL: If anybody hasn't signed our sign-in sheet, we use that to update our mailing list for future mailings. So, if you haven't, we'll ask you to do that on your way out so we can make sure we keep our mailing list up-to-date for any future communications.

MR. CIPOT: And thank you. Great turnout.

MS. O'CONNELL: Thank you.

(Time noted: 8:13 p.m.)

C E R T I F I C A T E

STATE OF NEW JERSEY)

) ss.

COUNTY OF HUDSON)

I, LINDA A. MARINO, RPR, CCR, a Shorthand (Stenotype) Reporter and Notary Public of the State of New Jersey, do hereby certify that the foregoing transcript, taken at the time and place aforesaid, is a true and correct transcription of my shorthand notes.

I further certify that I am neither counsel for nor related to any party to this action, nor in any way interested in the result or outcome thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this 1st day of June, 2010.

Linda A. Marino

LINDA A. MARINO, RPR, CCR

Attachment D

Written Comments

AQUA

Aqua New Jersey, Inc.
10 Black Forest Road
Hamilton, NJ 08691

T: 609.587.5406
F: 609.587.0689
www.aquanewjersey.com

April 26, 2010

Stephen Cipot
Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway
19th Floor
New York, NY 10007

RE: Availability of Water Service for
EPA Superfund Drinking Water Project in
Greenwich Township, Franklin Township,
Washington Township, and Washington Borough,
Warren County, New Jersey

Dear Mr. Cipot:

Aqua New Jersey, Inc. has a protected franchise to supply water utility service to Greenwich Township granted by municipal ordinance approved by the New Jersey Board of Public Utilities. Aqua is capable of serving additional water customers in Greenwich Township that are currently on private wells as part of the on-going EPA Superfund Project referenced above.

Aqua New Jersey, Inc. is also capable of serving additional customers in Franklin Township, Washington Township, and Washington Borough that need to convert from private wells to a public water supply system in cooperation with the on-going EPA Superfund Project. Aqua is interested in working cooperatively with the EPA and local officials to ensure a safe water supply is available to the people of these communities.

Please feel free to contact me to discuss this matter further. My contact information is shown above or you can reach me via e-mail at shmitchell@aquaamerica.com. Thank you.

Sincerely,

AQUA NEW JERSEY, INC.

Scott H. Mitchell
Director of Corporate Development

AQUA

Aqua New Jersey, Inc.
10 Black Forest Road
Hamilton, NJ 08691

An **Aqua America** Company

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Stephen Cipot
Remedial Project Manager
US. Environmental Protection Agency
290 Broadway, 19th Floor
New York, NY 10007

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500359

Warren County Health Department

Peter Summers
Health Officer

700 Oxford Road
Oxford, NJ 07863
Phone: 908-475-7960
Fax: 908-474-7964

May 3, 2010

Stephen Cipot
Remedial Project Manager
Southern New Jersey Remediation Section
U.S. Environmental Protection Agency
290 Broadway, 19th Floor
New York, New York 10007-1866

RE: Preferred Alternative for Operable Unit 2 (OU2) of the Pohatcong Valley Groundwater Contamination Site (Site).

Dear Mr. Cipot:

The Warren County Health Department supports EPA's proposal to implement Remedial Alternative 2b- MNA, Institutional controls, and Public Water Supply Connection as the best way to ensure the safety of the drinking water for residents in OU2 of the Pohatcong Valley Superfund Site. The expansion of nearby public water supply systems is an effective long term solution to the problem and will provide safe drinking water for residents in the impacted area.

Thank you for the opportunity to comment on this application. If you have any questions, please feel free to contact me.

Sincerely,

P.B. Summers

Peter B. Summers
Health Officer

cc: Steve Marvin, County Administrator
Kevin Cavotta, CEHA Coordinator

500360

WARREN COUNTY HEALTH DEPARTMENT
700 Oxford Road
Oxford, NJ 07863

UNITED STATES POSTAGE
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Mr. Stephen Cipot, Remedial Project Manager
Southern New Jersey Remediation Section
U.S. Environmental Protection Agency
290 Broadway, 19th Floor
New York, New York 10007-1866

10007$1866 C014

500361

Franklin Twsp Superfund
Waide, Kevin M. [ITSUS]
to:
Stephen Cipot
05/11/2010 03:11 PM
Cc:
Pat Seppi
Show Details

History: This message has been forwarded.

Stephen,

I live on Lauren Drive in Franklin township, NJ (New Village). My understanding is that the EPA is planning to remediate the impact to homeowners by extending public water lines into our area and hooking up our homes. I am not opposed to this. However I have had my well tested every year for the past 15 years and I have never had any VOC's detected. **Will I be allowed to retain my well water along with the public water hookup?** It do not see the benefit to capping a clean well. I would be happy to submit to ongoing water testing by the EPA, or I could just forward the EPA the yearly results that I obtain on my own.

Regards, Kevin Waide.

May 10, 2010

Stephen Cipot, Remedial Project Manager
Southern New Jersey Remediation Section
U.S. Environmental Protection Agency
290 Broadway, 19th Floor
New York, New York 10007-1866
Telephone: (212) 637-4411, Fax: (212) 637-4429
Email address: Cipot.Stephen@epa.gov

----------OR----------

Pat Seppi, Community Involvement Coordinator
290 Broadway, 26th Floor
New York, New York 10007-1866
Telephone: 212-637-3679
Email address: Seppi.Pat@epa.gov

RE: Proposed Plan for Operable Unit 2 Pohatcong Valley Groundwater Contamination Site

I totally disagree that Alternative 2b is a proper method to deal with the OU2 groundwater contamination issue. The expense of extending the water supply 10 miles to replace an estimated 320 private potable wells cannot be justified. It would place an additional financial burden on these remediated households in that they would be forced to pay water bills, even agricultural users, and the study clearly states that there is no risk from irrigation, yet these wells would also be destroyed.

The statistics are skewed to support spending Super Fund monies. A prime example of this is the evaluation of Risks to Residents. This risk is stated as 3.3×10^{-4}, but the summary reveals that the risk from site-related compounds is only 3.5×10^{-5}. Note that the ultra-conservative risk assessment used here states that "Cancer risks that exceed 10^{-4} indicate that a remedial action should be taken. Cancer risks calculated between 10^{-4} and 10^{-6} indicate that a remedial action ***may be warranted under certain circumstances***." I don't see that type of circumstance is present.

Chlorinated public water carries its own risks. Chlorine reacts with naturally occurring materials to produce halogenated VOCs and other potentially harmful disinfection byproducts (DBP). These DBPs are often more toxic than the TCE being targeted here. EPA guidelines limit DBPs to 80 µg/L at the testing sites. Supplemental chlorination stations are required for long runs of water distribution as would be the case in the proposed forced connection to public water. Therefore the substitution of public water will very likely expose residents to even higher risk, given that **only** 3.5×10^{-5} of the 3.3×10^{-4} risk would **not** be present in public water, but additional risk associated with DBPs **will certainly be present**. The oversight of not including an assessment of total risk from public water in the study is only one component of the flawed logic used to recommend proposal 2b.

There are also quality of life issues that have not been addressed. Residents at the end of water supply lines usually experience inadequate water pressure and increased sediment. The entire community would be inconvenienced for the two years estimated to complete this installation.

Forcing residents to destroy properly functioning wells and infrastructure and join the public water system makes no scientific or economic sense. Flawed logic aimed at creating a case to grab funds that should be dedicated to improving, not degrading, quality of life should not be allowed to push through this proposal.

The only action that make sense is a severely modified Alternative 2a, where ongoing monitoring is continued and POETS are voluntarily placed on private wells that exceed the federal guidelines of 5 µg/L. The study accurately reveals that the contamination originated in OU1, was found in the 1970s, has and is being remedied there, and will be self-correcting by the 2070s. Within the time involved in studying, approving, and destroying private infrastructure, the threat and risk will continue to decline naturally. These funds should be applied to a project of much higher risk and should be dedicated to improving, not degrading, quality of life.

Judi Roggie
201 Watertower Rd
Stewartsville NJ 08886
jaroggie@ptd.net
908-454-2176 (home)
with copies to elected officials

Comments on Pohatcong Valley OU2 Plan

Jack A. Eckert to: Stephen Cipot 05/13/2010 01:36 PM

Stephen Cipot, Remedial Project Manager
Southern New Jersey Remediation Section
U.S. Environmental Protection Agency
290 Broadway, 19th Floor
New York, New York 10007-1866
Telephone: (212) 637-4411, Fax: (212) 637-4429
Cipot.Stephen@epa.gov

RE:Proposed Plan for Operable Unit 2 Pohatcong Valley Groundwater Contamination Site

The plan relies too little on the risks of man-made CVOC contaminants as originally intended and too much on hypothetical risks of natural materials that can also be found in public water. It also fails to mention that higher levels of similarly-hazardous CVOCs will permanently exist in public water due to chlorination. Oxidants like chlorine not only disinfect, they can also react with natural materials to produce CVOCs, other halogenated organics, and inorganic halates. These recurring disinfection byproducts are often more hazardous than the declining CVOC groundwater contaminants.

Accordingly, I oppose the EPA-preferred mandatory alternative 2b that seeks the wholesale destruction and replacment of an entire groundwater infrastructure with a public water system that has not been shown to be safer. Furthermore, its nearly $44,000 per well capital costs, maintenance charges and inconvenience far outweigh the small groundwater CVOC risk involved. I also reject the other mandatory alternatives except 'NO ACTION'. I might however support a limited voluntary program involving individual well treatments or public water connections to already-existing nearby mains but only if CVOC contaminants are shown to significantly exceed EPA's standard, preferrably at or near its current public water haloform standard.

Jack A. Eckert, PhD Chem MIT
201 Water Tower Rd
Stewartsville, NJ 08886
(908)454-2176

Pohatcong Valley Groundwater Contamination
Dave Dech
to:
Stephen Cipot
04/30/2010 01:04 PM
Show Details

History: This message has been replied to and forwarded.
Stephen,

I would like to thank you for a very informative presentation last night. I was there and should have introduced myself to you after the meeting but I had to leave right away.

I was thinking about some things afterwards and I have few questions:

1 The Franklin School had vapor intrusion and two other residences. Why would the Franklin School have such a high level of intrusion that it needed to be remediated? Could there have been another source of contamination where the school was built?

2. Do you have another map showing the boundaries of OU2 that I can refer to so that I can see where exactly the OU2 boundaries and plumes are located?

3. Wouldn't the installation of the water lines be of highest priority? If I heard correctly, you said that if contamination exceeds the standard in a residence, a POETS would be installed and used until the public water line is installed. Wouldn't it be more cost effective to run the line immediately? $14 million is a drop in the bucket compared to the federal budget and it would be well spent to protect public health.

Thank you

David K. Dech
Planning Director

BARNES & THORNBURG LLP

Suite 4400
One North Wacker Drive
Chicago, IL 60606-2833 U.S.A.
(312) 357-1313
Fax (312) 759-5646

www.btlaw.com

May 17, 2010

Stephen Cipot
Remedial Project Manager
Southern New Jersey Remediation Section
U.S. EPA, Region 2
290 Broadway, 19th Floor
New York, New York 1007-1866

Re: Comments of Pechiney Plastic Packaging, Inc. on Operable Unit 2 Proposed Plan and Updated Comments on Remedial Investigation and Feasibility Study, Operable Unit 2, Pohatcong Valley Groundwater Site

Dear Mr. Cipot:

The United States Environmental Protection Agency ("U.S. EPA") issued its Proposed Plan for Operable Unit 2 ("OU2") of the Pohatcong Valley Groundwater Site ("Site") on April 16, 2010. That issuance initiated a thirty (30) day public comment period. With this submittal, Pechiney Plastic Packaging, Inc. ("PPPI") is providing its comments on the Proposed Plan within that thirty (30) day period. We have also included our comments on the Remedial Investigation and Feasibility Study for OU2 as those documents are the basis for the conclusions presented in the Proposed Plan for OU2 and therefore must also be resolved before an appropriate final remedial selection can be made. It is our understanding that all of these comments will become part of the official U.S. EPA administrative record for OU2 and the Site.

Comments on the Proposed Plan for OU2

1. On page 2 of the Proposed Plan, U.S. EPA makes the statement that the PCE plume is limited to the OU1 portion of the Site. While the data clearly demonstrate that the PCE plume has an origin in OU1 wholly distinct from the TCE plume, the data do not show that the PCE impacts are restricted to OU1. The regional groundwater impacts in OU2 do include PCE which may have been transported with groundwater from OU1. In addition, since TCE, is a natural breakdown product from the degradation of PCE, some of the TCE present in OU2 groundwater could have originated as PCE in OU1. U.S. EPA provides no basis for its assumption that the PCE detected in OU2 is not related to the independent PCE sources in OU1.

2. On page 2 of the Proposed Plan, U.S. EPA states that the RI work for OU1 began in the early 1990's. In the opening of the next paragraph, U.S. EPA states that the RI/FS activities started in 1999. The contradiction should be corrected.

3. On page 3 of the Proposed Plan, U.S. EPA states that NJDEP sampled 80 residential wells in OU2 from 2002 to 2004 and that TCE was detected above New Jersey and Federal standards in "a number of these wells". Based on the data made available to us, less than a quarter of the wells sampled by NJDEP showed TCE in excess of the more stringent New Jersey standards and only four percent were above the Federal drinking water standards for TCE. Similarly, in 2009, U.S. EPA sampled 204 residential wells in OU2 and TCE was detected at concentrations above the Federal MCL in only three of those wells (1.4% of the total) and at concentrations above the New Jersey standard at only 33 (16% of total). Based on these statistics supplied by U.S. EPA, it appears that TCE is not present at concentrations above the more stringent NJDEP standard in more than 75% of the wells sampled in OU2. This information should be clearly provided in the Proposed Plan so that the public better understands the limited nature and extent of TCE impacts in their area. The Proposed Plan should be clear in stating that the majority of wells were unimpacted as the U.S. EPA, NJDEP and Warren County data has demonstrated.

4. In its Proposed Plan, U.S. EPA draws various conclusions as to the sources and extent of the TCE impacts based on residential well sampling. However, as stated at page 3-6 of the final RI for OU2, no information about the residential well construction, well depth or integrity was available to U.S. EPA. Therefore conclusions drawn about regional groundwater conditions or sources from residential well data are premature at best.

5. On page 4 of the Proposed Plan, U.S. EPA states that negotiations to have a "PRP" perform the RI/FS for OU3 were not successful. In the interests of clarifying the record in this matter, that PRP offered to complete the RI/FS for those portions of OU3 for which it could arguably have potential liability. However, U.S. EPA rejected that offer and insisted that the PRP agree to perform the RI/FS for the entire OU3 area including other independent properties for which the PRP has no potential liability or relationship under CERCLA. That insistence is contrary to CERCLA itself, as well as the recent Supreme Court decision in *Burlington-Northern & Santa Fe Railroad Company v. United States*, 129 S.Ct. 1870 (May 4, 2009).

6. On page 5 of the Proposed Plan, the U.S. EPA states that the Karrsville Thrust Fault provides a preferential flow pathway between OU1 and OU2. If it is assumed that is the case, it is useful to note that the Karrsville Thrust Fault is some distance sidegradient to the PPPI property in OU1. Therefore, the Karrsville Thrust Fault is not acting as a significant groundwater conduit from the PPPI property location through OU1 to OU2.

7. On page 5 of the Proposed Plan, U.S. EPA includes a description of its findings in surface water samples from the Edison Quarry. According to U.S. EPA, the finding that TCE concentrations were higher at shallower depths is indicative of a regional groundwater, rather than a more localized, source of TCE. That conclusion is not supported by the available data, however. TCE is heavier than water. Therefore, if the TCE found in the Quarry water samples

were solely from regional groundwater, it would be expected that the more elevated levels would occur at the deepest or middle depths corresponding to the depth of the groundwater infiltration into the Quarry excavation. The U.S. EPA cited fact that higher levels were detected at shallower depths would imply an overland runoff or other shallow overburden source for at least some of the TCE found. The data is simply insufficient to use as proof that no local or alternative source of the TCE beyond the regional groundwater exists.

8. On page 5 of the Proposed Plan, U.S. EPA states that "the occurrence of TCE in the Karrsville fault is due to migration from the OU1 Study Area." By omitting any reference to potential local sources, this statement implies that all of the TCE in the fault originated in OU1. The data provided by U.S. EPA are not sufficient to reach this conclusion. The minimal efforts by the Agency to identify and characterize potential source areas in OU1 were perfunctory, at best, and the OU2 RI is notable for the absence of any soil sampling at potential source areas (PSAs) and the very limited groundwater sampling program at PSAs. Due to the absence of any serious attempt to find sources of TCE in OU2, the U.S. EPA cannot credibly assert that no sources are present and that the only sources are in OU1.

9. On pages 5 and 6 of the Proposed Plan, U.S. EPA summarizes vapor intrusion work and indicates that TCE vapor mitigation measures were necessary for 2 residential structures and 1 public school. However, the highest residential indoor air TCE concentration presented in the RI Report is 11 ug/m^3 and corresponds to a cancer risk of only 9 x 10^{-6}, which is well within the acceptable risk range of 10^{-6} to 10^{-4}. The highest nonresidential indoor air TCE concentration presented in the RI Report is 3 ug/m^3 and corresponds to a cancer risk of only 5 x 10^{-7}, which is lower than the low-end of the acceptable risk range. Although EPA cited these indoor air concentrations in the RI as the basis for taking vapor mitigation measures in a Removal Action, neither of these concentrations constitute an unacceptable risk based on EPA's own assumptions regarding TCE toxicity and reasonable maximum exposures to indoor air. In fact, no TCE indoor air concentration presented in the RI Report corresponds to an unacceptable risk given U.S. EPA's own assumptions and criteria.

10. On page 6 of the Proposed Plan, U.S. EPA concludes that two facilities (Vitaulic and T&M Pallets) "investigated" as source areas in OU2 have not contributed to groundwater impacts. That conclusion is based on the results of sampling in one well assumed to be downgradient of both. However, as U.S. EPA has also explicitly acknowledged, the Valley groundwater flow regime is a complex one. To reach the conclusion that neither formerly industrial property is a source of groundwater impacts based on one data point flies in the face of that complexity. This is particularly true, when onsite conditions at the facilities point to their being potential sources. Furthermore, U.S. EPA fails to explain why its investigation of source areas in OU1 generally involved multiple soil, soil gas and/or groundwater samples while, in contrast, its investigation in OU2 only involved one groundwater sample. Nor does the U.S. EPA explain why additional groundwater samples were not collected from existing wells located closer to the probable source areas for at least one of the source areas identified. Both PCE and TCE were detected in a soil sample and onsite groundwater samples at the Vitaulic property during the OU1 Remedial Investigation. In that Report, U.S. EPA concluded Vitaulic was

"considered to be a contributing source of chlorinated VOCs to regional groundwater." (Page 5, OU1 Remedial Investigation Report). Now based on only one offsite data point, U.S. EPA decides otherwise.

11. Beginning on page 7 of the Proposed Plan, U.S. EPA presents a summary of its human health risk assessment for the OU2 groundwater. It is important to note, that all of the potential carcinogenic risks identified are within the U.S. EPA defined acceptable risk range of 10^{-6} to 10^{-4} even with the very conservative assumptions used by U.S. EPA. In addition, the hazard index for volatile organic compounds is below one once the non-Site related constituents are excluded. In addition, the vast majority of wells tested contained TCE at below the Federal drinking water standard. The great majority of the population in OU2 faces no unacceptable risk from the presence of TCE in some of the groundwater within the area based on U.S. EPA's own conservative risk assessment and its own published drinking water standards. This fact should be clearly stated in the Proposed Plan.

12. On page 9, U.S. EPA includes a "Summary of Risks to Residential Receptors" discussion. Within that discussion, U.S. EPA notes that the portion of risk related to TCE, "the only Site-related compound, is 3.5×10^{-5}." As noted above, this risk level is within U.S EPA's generally acceptable risk range of $10^{-4} \times 10^{-6}$ for the Superfund program.

In addition, as part of this discussion, U.S. EPA notes that the Hazard Index for OU2 exceeds 1 solely due to non-Site related constituents which may be naturally occurring. Under U.S. EPA's own Risk Assessment Guidance documents, naturally occurring constituents would not be indentified as constituents of concern for inclusion in a baseline risk assessment. In keeping with U.S. EPA guidance, the Hazard Index evaluation should have been limited to TCE and consequently the hazard index should have been identified as well within the acceptable range.

These same issues exist in U.S. EPA's discussions of the potential risks to Industrial Workers on the same page of the Proposed Plan.

13. Also on page 9, U.S. EPA discusses the sampling of twenty-two wells, fourteen of which had treatment systems already in place. The Agency then goes on to state that TCE was detected in thirteen of those wells, all at concentrations in excess of State or Federal standards. However, no information is provided as to whether the wells sampled were those with treatment systems or not, or whether the samples were collected before or after the treatment systems. Therefore, this information provides the public with no clear understanding of conditions at the twenty-two wells other than the fact that nine of the wells had no TCE detected. In addition, the inclusion of these data and exclusion of data from all of the other wells sampled is arbitrary and appears to be based on the fact that these wells were included in the Risk Assessment. Since the discussion does not provide any information about how these wells were used in the Risk Assessment, there seems to be no reason for including these data in the Proposed Plan other than to overstate the potential groundwater risks in OU2.

14. On page 10, in the Summary section, U.S. EPA again alludes to the fact that non-cancer risks associated with groundwater ingestion exceed 1. Again, that calculated risk results from non-Site related, naturally occurring constituents, and should not be repeated as a basis for implementation of a remedial action under CERCLA. Repeating this potential risk conclusion creates unnecessary public concern and does not comport with U.S. EPA risk assessment practices and guidance.

15. On page 12 of the Proposed Plan, U.S. EPA makes a statement that monitored natural attenuation will take 67 years to bring OU2 groundwater to the 1 ppb level for TCE. Based on a review of the final RI/FS for OU2, we understand that that time period was calculated based on a model. However, it is not clear that the remedial action underway in OU1 was taken into account. Instead, U.S. EPA makes repeated statements about the OU2 groundwater TCE concentrations being at a steady state and apparently incorporated that assumption into its monitored natural attenuation model. Since data collected in OU1 show that the TCE concentrations are decreasing and not in a steady state condition, and the remedial action being implemented in OU1 will further decrease TCE concentrations, the steady state model assumption is not technically defensible. Consequently, the 67 years is likely to over-estimate the monitored natural attenuation period and should be revised.

16. Also on page 12 of the Proposed Plan, U.S. EPA begins its description of its proposed selected Remedial Alternative 2(b). That Alterative includes an approximately ten mile extension of water mains so that all homes within OU2, estimated at 320, not currently connected, would be connected to the public water supply system. The capital cost for that remedial alternative is listed as $13,992,000.00 with this water connection plan representing the most significant portion of the estimate. However, U.S. EPA is without the legal authority or a technical basis for selection of that approach to alternative water supplies in OU2.

Under CERCLA, U.S. EPA may require or implement remedial actions to address releases or threatened releases of hazardous substances. However, proposing to require that alternative water supplies be provided to homes with wells shown to be unimpacted is not within that authority. As held in *United States v. Bell Petroleum Services, Inc. et al.* 3F 3rd 889 (Fifth Circuit, 1993), provision of alternative water to homes not shown to be impacted was arbitrary and capricious. In that case, the administrative record included no information that anyone was actually drinking chromium impacted groundwater. Here, the administrative record relied upon by U.S. EPA includes information that demonstrates that people are <u>not</u> drinking TCE impacted water. The judicial precedent mandates that the proposed remedy be re-evaluated so that clean wells are not required to be provided with alternative water connections or POET's unless and until monitoring shows TCE is present over the identified remedial objective.

U.S. EPA's statements about the nature of the hydrogeology in OU2 are likewise inconsistent with the Agency's concept that all wells, even those tested to be clean, are threatened. For example, in Section 4-4 of the final RI Report for OU2, the U.S. EPA concludes that fractures away from the Karrsville Thrust Fault are **not** conduits for flow. Therefore, wells away from that Fault would not be threatened by the impacted groundwater. In addition, in the

Executive Summary of the final FS, U.S. EPA states that "the TCE plume is not expected to significantly migrate beyond the current limits and is not expected to significantly affect additional non-impacted areas." (page v, final OU2 Feasibility Study) Also in the Feasibility Study, the Agency stated "there may be some residences within the OU2 Study Area that are not impacted by the groundwater contamination and are not immediately threatened. (emphasis added) (page 4.3, final OU2 Feasibility Study). Given those conclusions, no alternative water supply would be necessary or appropriate for wells where TCE was not detected above 1 ppb.

Further, U.S. EPA dismisses the use of POETs for all but the most remote wells saying they are not a long-term solution. However, POETs have been used and/or approved by U.S. EPA at numerous other CERCLA Sites as the appropriate approach to impacted water supplies over time. NJDEP itself has already installed POETs on at least 80 wells in OU2 with the expectation that those systems will be maintained for an indefinite period of years.

The proposed remedy is also inconsistent with the U.S. EPA's approach in OU1 of this same Site. U.S. EPA has now adopted an approach to the remaining wells in OU1 that provides for sampling, and if TCE impacts over the remedial objective are found, consideration of whether connection to an existing water main or installation of a POET is most cost-effective. The same approach should be included in the selected proposed remedial action for OU2. Otherwise a technically baseless distinction is being made between OU1 and OU2 which would again constitute arbitrary and capricious action by U.S. EPA.

Finally, U.S. EPA itself has acknowledged that it is without CERCLA or other statutory authority to require the provision of alternative water supplies for unimpacted wells. When specifically asked about this issue, Region 2 publicly stated it had no authority to provide alternative water for unimpacted wells at Superfund Sites. Similarly, at the Ellsworth Industrial Park Site in Illinois, U.S. EPA again confirmed its lack of statutory authority to undertake such a response action. Given these clear statements of U.S. EPA's own view of the scope of its statutory authority, the proposal to require alternative water for unimpacted wells is *ultra vires* action on the part of U.S. EPA.

17. On page 14 of the Proposed Plan, U.S. EPA begins its discussion of remedial alternatives. This discussion is notable for its failure to consider the impact of the approved remedy currently being implemented in OU1, immediately upgradient of OU2. There is no technical justification for considering the OU2 remedy in complete isolation from and without reference to the OU1 remedy. Since that remedy is approved and is being implemented, the Agency should assume that the remedy will have an impact on future groundwater concentrations in OU2. If one accepts the U.S. EPA assertion, for purpose of this comment only, that the source of all of the TCE in OU2 is OU1 and that it flows from source areas in OU1, the removal of the contaminated water at the source area(s) can be expected to have a major impact on TCE concentrations in a relatively short time period. Any remedial action selected for OU2 must reflect this fact.

18. On page 17 of the Proposed Plan, U.S. EPA proposes installation of approximately ten miles of water mains throughout OU2 where no public water distribution system currently exists. The cost for U.S. EPA's proposed preferred remedial alternative is estimated at $15,040,000.00 (present worth). Yet, residential groundwater sampling in the most southern portion of OU2 has demonstrated that of the approximately seventy-five wells sampled, no more than approximately one-third contained TCE in excess of New Jersey's drinking water standard. (*See* Figure 5-2 of final Feasibility Study). In addition, U.S. EPA's own monitoring wells, RHR and SMS, did not contain any TCE above applicable standards. To require the installation of a multimillion dollar water main system to address this clear minority of impacted wells in an otherwise clean area is not cost-effective and would therefore be inconsistent with the National Contingency Plan.

This same issue colors U.S. EPA's proposed remedial selection throughout OU2. As noted above, less than a quarter of the tested residential wells in OU2 showed TCE concentrations in excess of the New Jersey drinking water standard. Even fewer, approximately 4% showed a TCE exceedence of the Federal MCL. In a setting where no public water distribution exists, those wells can and should be addressed through the installation of POETs. The U.S. EPA proposed selected remedial alternative is simply not a cost effective or necessary remedial choice.

19. On page 17 of the Proposed Plan, U.S. EPA identifies alternative 2(b) as its selected remedial approach for OU2. That selection is based on an assumption that impacted groundwater will continue to migrate from OU1 to OU2 exchanged. However, assuming for purposes of this comment only that that is the case, other remedies such as alternative 2(a) would be as protective at far less capital and overall cost. To select a more costly remedy is inconsistent with the National Contingency Plan criteria and therefore a contravention of CERCLA.

20. As noted previously, alternative 2(b) does not meet the National Contingency Plan criteria of reduction of contaminants through treatment, short-term effectiveness or implementability as well as alternative 2(a) targeted at impacted wells would. As U.S. EPA acknowledged on its Proposed Plan, alternative 2(a) is protective of public health and the environment, would remove contaminants from groundwater at the point-of-use and would take about half the time of alternative 2(b) to implement. (*See* pages 14 and 15 of the Proposed Plan.) On page 16 of the Proposed Plan, U.S. EPA further acknowledges that alternative 2(b) would be more difficult to implement initially than alternative 2(a). The required balancing of National Contingency Plan criteria weighs in favor of alternative 2(a) rather than the proposed selection of alternative 2(b).

21. On pages 17 and 18 of the Proposed Plan, the U.S. EPA notes that it would consider Clean and Green technologies to address the groundwater conditions in OU2. Yet no such technologies were evaluated in the final FS for the OU2. Before a remedial alternative is selected for OU2, consideration of such green technologies should be completed.

22. Given the results presented in the final OU2 RI/FS, the remedial alternative derived from the Feasibility Study which best meets the National Contingency Plan criteria is as follows:

- Monitored natural attenuation;
- Sampling of potable wells and provision of POETs to those found to be impacted in excess of the 1 part per billion TCE objective;
- Periodic monitoring of both POETs to demonstrate effectiveness, and other potable wells to demonstrate that water quality remains below the TCE remedial objective;
- Installation of additional or replacement POETs as needed to maintain potable water at or below the TCE remedial objective; and
- Institutional controls (CEA and/or expanded well restriction area).

This remedial approach, which is similar to that reviewed as alternative 2(a) in the Proposed Plan, would be as protective as the proposed selected alternative 2(b), while being more cost-effective, and implementable in a less disruptive and shorter time frame. It too relies on the proven technology of point of use treatment units thereby meeting the U.S. EPA's preference for active treatment over other remedial approaches. Therefore, in accordance with the National Contingency Plan, precedent and the U.S. EPA's own descriptions of its statutory authority, this approach must be viewed as the preferred remedial alternative for OU2. Adoption of this remedial approach would allow the implementation to proceed in a more timely and cost-effective manner.

Comments on the Remedial Investigation Report
General Comments

23. The RI Report does not include any source investigation work. No soil samples were collected at any property within OU2 to see if that property were contributing to the Site groundwater conditions. OU2 includes an approximately 6.5 square mile area (4,200 acres) of mixed industrial, commercial and residential development. Given the multitude of past uses for trichloroethylene ("TCE"), and the presence of industrial/commercial facilities in OU2, it is more than likely that one or more locations in OU2 is or was contributing to the groundwater impacts. Yet, no potential source areas ("PSAs") were investigated through soil sampling as part of the OU2 RI. This is particularly problematic given the U.S. EPA's statements on pages 1-1/1-2 and 1-6 that one of the purposes or focuses of the RI for OU2 was to identify/understand the sources of groundwater impacts in the OU2 Study Area.

Further, Task 3 of the EPA's Statement of Work for the OU2 RI describes soil and sediment sampling to be done in OU2 to fill data gaps. The fact that potential source area soil sampling in OU2 was planned by the Agency and its contractor CH2M Hill, but never performed, makes the final RI and its conclusions even more questionable.

24. The U.S. EPA noted that the Victaulic Company of America ("VCA" or "Victaulic") property located in the midst of OU2 was a possible sources of chlorinated volatile organic compound groundwater contamination based on the limited work done during the RI for Operable Unit One ("OU1"). The history of operations on this property included a zinc plating and hot-dip galvanizing process, discharge of process wastes into a 1,500 foot long open tunnel in the basement and use of an infiltration/percolation lagoon. During the OU1 RI, four soil gas samples, two soil samples and three groundwater samples were collected. Volatile organic compounds ("VOCs"), including TCE and elevated metals were detected in both the soil and groundwater sampled at this property. All of the samples were collected on the eastern side of the property; no sampling of any kind was done on the western or downgradient half of the property. Based on this initial sampling, the U.S. EPA nonetheless concluded that this property was a probable source of groundwater impacts.

As part of the OU2 RI, the U.S. EPA installed a monitoring well at the intersection of Quarry Road and Lenape Trail in a location that is presumed to be downgradient from the Victaulic facility. TCE was not detected in the one sample collected from that well and, based on that alone, the U.S. EPA decided the Victaulic property was not and had not been a source of groundwater impacts. It is not clear why the U.S. EPA failed to re-sample the wells that are actually on or adjacent to the Victaulic property during the OU2 investigations. These data are clearly more relevant to evaluating a known PSA than data collected from an area that is presumed, but not demonstrated, to be downgradient of the possible source area. Given the complex hydrogeology and the minimal sampling done, it is simply not possible to eliminate this property as a source of regional groundwater impacts based on one groundwater sample, particularly one that is not located at the PSA itself. In addition, U.S. EPA used this one groundwater sample to eliminate T&M Pallets as a possible source area, thereby compounding the inadequacy of its investigative approach.

25. Two other U.S. EPA-identified PSAs are located within the OU2 acreage. Broadway Restoration and Feilbach Welding Service are both located in OU2. Neither one of these properties was sampled in either the OU1 or the OU2 remedial investigations though each has an industrial past involving the use of solvents. Despite that lack of sampling, the U.S. EPA indicated that there were no source areas in OU2 and eliminated each as a potential source of groundwater impacts without any discussion of these properties. Based on the information available to the U.S. EPA, no reasonable technical basis exists to reach that conclusion.

26. Other properties, such as the Warren Control, Warren County Vocational School and Brockway Plastics property, were also disregarded in the OU2 RI as possible source locations based on no or inadequate characterization. For those properties where any soil samples were collected during the OU1 RI, the samples were limited in number and depth; for others, no samples were collected at all. As noted above, no soil sampling at all was done at any locations during the OU2 RI. For an approximately 6.5 square mile area of mixed industrial, commercial, agricultural and residential use, U.S. EPA assumed no source areas for one of the most commonly found volatile organic environmental contaminants in the country based on almost no data.

27. The OU2 RI included analysis for twenty-seven volatile organic compounds, in addition to TCE and tetrachloroethylene ("PCE"), metals and semi-volatile organic compounds. The Site groundwater constituents of concern had already been defined as TCE, PCE and their natural breakdown products based on the OU1 RI work. The extent of the Site itself is defined by the detections of TCE and/or PCE in groundwater according to U.S. EPA. Therefore, no technical basis existed for disregarding the historical data and sampling for all of these constituents. On page 1-6 of this RI Report, U.S. EPA states that the RI was "...not intended to sufficiently or to fully characterize the nature and extent of contaminants other than TCE and PCE." Given that statement, the analysis of samples for a full range of VOCs, SVOCs and metals is arbitrary and unnecessary.

28. The reported data in the RI for OU2 primarily consisted of sampling of residential or other private wells. However, no information is included in the RI as to the depth of any of these wells, the well construction or boring details. U.S. EPA acknowledges this shortcoming at page 3-6 of the RI report. It is not possible to understand anything about the integrity of the wells or what strata is being sampled at any given location based on the available information in the final RI. Instead, U.S. EPA simply assumes that all of the well samples represent the regional groundwater with equal validity. Such an assumption is not technically defensible.

29. A portion of the OU2 RI work involved vapor intrusion sampling. However, the justification for such sampling is not clear in the document. In most areas, the detected levels of volatile organic compounds in the ground water do not support the conclusion that a risk of vapor intrusion would exist. This is especially true in areas where the detected TCE concentrations were consistently measured as being below the Federal and State MCLs. U.S. EPA guidance views Federal MCLs as protective for the vapor intrusion pathways. Further, while the RI assumes that each subslab or indoor air finding of TCE is caused exclusively by groundwater impacts, information to eliminate other alternative sources on a property-specific basis is not provided in the Report.

30. The RI for OU2 places great reliance on its characterization of the Karrsville Thrust Fault as a preferential flow pathway for groundwater from OU1 to OU2 and as a mechanism to move TCE from the alleged source areas in OU1 to OU2. This assertion is based on essentially one comparison of two data points – the one well drilled along the fault and another well drilled same distance from the fault. These data cannot be extrapolated to the entire fault zone or to all of OU1 and OU2. In addition, the U.S. EPA's map (Figure 2-1), which is based on geologic studies of the area, shows that the Fault does not extend anywhere near the source areas that the U.S. EPA has alleged exist in OU1. Therefore, if U.S. EPA contends that the source of TCE contamination must be connected to this Fault, then another source of contamination must exist along the Fault and at least a mile or more north and west of the previously U.S. EPA-alleged source areas.

31. The analyses of samples from domestic wells are the single largest dataset in the RI and the most critical data for evaluating and determining the remedy selected in the FS. Given the critical nature of these data, it is difficult to understand why the RI provides so little information on these wells. Information such as the depth of the wells, the open hole or screened interval, and the location of the sample in relation to any testament systems or holding tanks is not provided. In addition, as noted elsewhere in these comments, the table summarizing the sampling results (Table 6-19) is not in the RI. All of these data should be presented in the Report. Well construction data are readily available for many of these wells because drillers have been required to file permits and logs with the NJDEP for all wells constructed since 1947. In addition, the WCHD may have copies of some of these well records. No statement is made in the RI as to whether U.S. EPA attempted to obtain any of this critical information.

Specific Comments

Remedial Investigation Report

32. On page v of the final RI Report, in the second paragraph, the U.S. EPA states that drilling and groundwater flow/quality testing through the fault zone at the OU1-OU2 boundary revealed a permeable water-bearing zone that promotes migration of contaminated groundwater along the hydraulic gradient from OU1 to OU2. However, it should be noted that these conclusions were drawn based on the comparison of two data points. Given the heterogeneity of the subsurface materials, the conclusions drawn based on this very limited comparison cannot properly be extrapolated to the fault zone as a whole. Additionally, the EPA states that TCE concentrations in groundwater collected during packer testing and sampling at this location reached 31 ug/L. Based on the data reported in Table 5-2, TCE concentrations up to 33 ug/L were reported.

33. On page 2-2, the U.S. EPA indicates that the main industrial facility within the OU2 Study Area is the VCA property; however, no discussion of any investigation of this company as a PSA is provided in the RI. Additionally, no other industrial facilities or other PSAs are included in the OU2 RI report, other than a mention of the existence of T&M Pallets. As to that property, no description is given of its period or type of operations in the OU2 RI and no onsite investigation was done.

34. On pages 2-3, 2-5 and 4-3, the U.S. EPA acknowledges the impact on groundwater flow patterns caused by the presence of karstic features, such as dissolution and voids in the development of preferential pathways. However, the Agency focuses much of the discussion and the Conceptual Model for the Site on one pathway located along the Karrsville Thrust Fault. There are insufficient data to conclude that this Fault is the only significant pathway for groundwater or TCE migration in OU1 and OU2.

35. On page 2-5, there is a typographical error in the last sentence. The word "continue" should be "continues".

36. On page 3-2 of the RI, U.S. EPA states that monitoring wells were installed in the first-encountered groundwater zone either at the overburden/bedrock interface or within the bedrock. This statement again highlights the Agency's apparent assumption that any and all groundwater in OU1 and OU2 is connected. No attempt has been made to differentiate between TCE in overburden groundwater which may be related to local sources and TCE in deeper bedrock zones, which may be related to the presence of TCE regionally as well as to localized sources.

37. On page 3-3, the U.S. EPA includes a list of wells installed during the OU2 investigation and indicates that "the three character site designation follows each name." However, the name of only one well location is included in the table, while abbreviations are provided for the others.

38. On page 3-7, there is a typographical error in the third line. The word "collected" should be "collect".

39. On pages 3-8 and 4-5, the U.S. EPA states that a synoptic groundwater elevation survey was conducted. However, the data presented includes measurements collected more than three months apart on August 13, 2007 and November 27, 2007 without consideration of seasonal climatic conditions that could influence the data. The word "synoptic" implies that all data points were collected at the same point in time and are therefore comparable. Measurements collected more than 3 months apart cannot be considered synoptic.

40. The U.S. EPA begins a review of its vapor intrusion assessment activities on page 3-11 of the RI Report. Reportedly U.S. EPA assessed two public buildings and nine residences, and collected approximately 102 samples of subslab soil gas, indoor air and outdoor air. Very little, if any consideration seems to have been given to the location of the tested buildings in relation to the groundwater testing. Additionally, no information is included on the rationale for selection of vapor sampling locations, which, in several cases, are located in areas where groundwater concentrations of TCE were reported to be low and unlikely to cause elevated sub-slab and indoor air vapor concentrations. For example, several tested buildings were located in areas having only 1 ppb of TCE in the area wells. Such low levels of TCE would not warrant vapor intrusion testing and, in fact, the U.S. EPA identified no indoor air or subslab concentrations above applicable standards in those locations. In addition, the selection of these locations when many other areas with TCE groundwater concentrations above 1 ppb were not tested, highlights the absence of a clear rationale for the location of the sampling. Finally, to provide additional clarity to the Report, it would be helpful if the OU1 and OU2 vapor intrusion results were clearly differentiated.

41. On page 3-12, the U.S. EPA indicates that the samples were analyzed for VOCs, SVOCs, and inorganic metals. Yet, as previously noted in the Introduction (page 1-6), the U.S. EPA has stated that the focus of the RI is primarily TCE and that the RI was not intended to sufficiently or fully characterize the nature and extent of contaminants other than TCE. The Site was listed on the NPL and the Site boundaries are defined based on PCE and TCE detections. Sampling data from OU1 confirms that the only arguably Site-related constituents are PCE and TCE and their natural break-down products. Therefore, there is no technical justification for analyzing samples for parameters other than PCE, TCE and associated degradation products and natural attenuation parameters in this RI. The expense of analyzing samples for parameters other than PCE, TCE and associated degradation products and natural attenuation parameters should not be included in the investigation costs associated with this RI. Discussion of these potential contaminants should be the focus of a separate report since none of these other constituents has figured in the remedial considerations for OU2.

42. On page 4-2 and again on page 4-15, the statement is made that the American National Can ("ANC") site in Washington Borough has been identified as the source of the TCE concentration in OU1. The use of the phrase "the source" implies that the former ANC site is the only source of TCE contamination. The documentation presented to date does not justify this implication. Given the large areal extent of OU1 and OU2 and the ubiquitous use of TCE, it is more than likely that there are additional sources of TCE in both OU1 and OU2.

Also, as previously noted, the distribution of TCE indicates the presence of several different sources within OU1, including a source area upgradient from the former ANC property. As the U.S. EPA's own data demonstrate, other sources of TCE in the groundwater beneath OU1 exist. For example, sampling has shown elevated TCE in a well that is more than 700 feet upgradient of PPPI's property and over 1200 feet upgradient from the nearest source area identified by the U.S. EPA. In addition, past groundwater sampling has demonstrated elevated levels in locations not consistent with a plume originating at PPPI. The U.S. EPA's review of past uses in OU1 and OU2 has identified several other industrial operations that used and may have released solvents such as TCE in past decades. The U.S. EPA has simply disregarded all of that information in insisting that PPPI's property is the source in this OU2 RI.

43. On page 4-2, the U.S. EPA again refers to the source of the TCE groundwater concentrations in the OU1 Study Area as the former American National Can site. That statement is not supported by U.S. EPA's own data as summarized in the previous comment above.

44. On pages 4-2, 4-3 and page 4-5, the U.S. EPA provides its most complete presentation of its argument in support of preferential flow along the Karrsville Thrust Fault. The argument as presented in these pages appears to be primarily based on the relatively low flow encountered in one well, not on the Fault (RHR location) versus the much greater flow encountered at the ABR location that is on the Fault. While it is possible that there is preferential flow along this Fault, it is technically unsound to draw a sweeping conclusion about the nature of flow in the aquifer based on a comparison of fractures from wells at two locations. In addition, this argument completely ignores the impact on flow from the complex karst environment,

which, as the U.S. EPA acknowledges in other sections of the RI, includes solution features and voids that create preferential pathways. In all likelihood, there are a number of preferential pathways throughout OU1 and OU2 that are based on both faults and solution features. The data do not support placing such an emphasis on one particular pathway.

45. On page 5-1, U.S. EPA again lists the volatile organic compounds used as analytes for the OU2 RI. In addition, U.S. EPA states that metals and semi-volatiles were included for analysis as well. As noted previously, no technical justification exists for including this wide range of constituents in the characterization of TCE and PCE impacts in OU2. Nor were any of these data used in the FS in defining appropriate remedial alternatives.

46. On pages 5-1 to 5-2, the U.S. EPA states that dissolved contaminants in the groundwater from the OU1 study area would migrate with the groundwater to areas hydraulically downgradient from the release and impact water supply wells, and that the Karrsville Thrust Fault connects OU1 and OU2 and may provide a preferential pathway for contaminants to migrate in the overburden and bedrock aquifers. The U.S. EPA neglects to mention that migration of contamination is likely also influenced by pumping of public water supply and residential wells in the area. No pumping test data were included to show the extent of influence of these public supply or residential wells on groundwater flow patterns in the Operable Unit. In addition, although the RI acknowledges in several locations that the groundwater flows through a karst environment with many void features, the impact of these features and the potential flow pathways is not discussed.

47. Pages 5-3 and 5-4 includes a discussion of TCE results for the Asbury-Broadway Road wells. TCE was first detected in the overburden at a depth of 5 to 15 feet and in deep bedrock groundwater at 155 to 175 feet, but not in several water bearing zones in between these depths (30, 75, 95 and 100 feet). Additional sampling using packer tests resulted in TCE being detected at similar concentrations in all of the zones tested. The explanation that the U.S. EPA offers for this discrepancy is that under so-called "active conditions" during the packer tests more water flowed in to the wells than during so-called "passive conditions" during low flow sampling. According to U.S. EPA more TCE was present in these fractures when they were pumped and TCE was not present when they were pumped during low flow sampling. The U.S. EPA then concluded that the results demonstrate that TCE is distributed throughout the bedrock fractures with no vertical distinctions. This conclusion is apparently based on the premise that the packer test data are a more reliable indication of aquifer conditions at this well than low flow sampling. To accept the packer test data as more representative than low flow sampling contradicts standard U.S. EPA guidance and practices, as well as other sources on the interpretation of groundwater data. Low flow purging is considered to be the standard, state-of-the-art sampling method for collecting representative samples from fracture zones, while samples collected during packer tests are generally considered to be less representative data. In addition, there are a number of explanations for why the packer tests results differ from the "passive conditions" results. For example, the packers may not have properly sealed and resulting in groundwater from contaminated zones migrating into the packed zone along the open borehole. Another possible explanation is that the low flow sampling which used a CMT system that was

not used in other wells that were sampled was not conducted properly. The uncertainty surrounding the sampling conducted in this area suggests that the text should be modified to include a much more detailed explanation of the results, including a discussion of the very real possibility that the shallow TCE contamination was not caused by contamination in the regional aquifer, but was instead the result of a local source of TCE. The U.S. EPA has failed to investigate additional source areas that may be responsible for contamination of different water bearing zones in this area or OU2 as a whole.

48. On page 5-6, in the fourth full paragraph, the U.S. EPA asserts that since no CVOCs were detected in the groundwater sample collected from PVQUA01 during OU2 RI activities at a depth of 80-100 feet bgs, the data indicate that the VCA and adjacent T&M wooden pallet processing facility are not contributing and have not contributed to the TCE groundwater concentrations noted in the groundwater adjacent to the former Edison Quarry. The data presented are not sufficient to draw this conclusion. The U.S. EPA has not shown these facilities and their relationship to either this new well or any other wells on any of the maps and has not provided any information on these facilities. The Agency has also not provided any evaluation of current and historical chemical use at these PSAs in this report, and has not reported the results of any investigations of these properties. Additionally only one groundwater sample was collected from this well at a depth of 80 to 100 feet. The information provided in the final RI is simply inadequate to support the conclusion asserted.

49. On page 5-6, last sentence, there is a grammatical error. The phrase "they were" should be replaced with "it was".

50. On page 5-7, fifth paragraph, the measured depth for well MW-104A was not provided in the list of well depths.

51. On pages 5-7 and 5-8, the U.S. EPA describes its groundwater sampling program in OU2. A rationale for the selection of these particular wells for sampling and exclusion of some existing monitoring wells is not provided. In addition, it is inexplicable that the wells installed at and near the Victaulic facility during the OU1 investigation would not be sampled as part of this investigation. This is particularly true since the U.S. EPA claims that the Victaulic facility is not considered to be a source area based on sampling from a well installed at a presumed downgradient location. It is technically unsound to base a decision on the possibility of a source area contributing to the regional contamination based on one monitoring well that is presumed to be located downgradient, while ignoring and not sampling wells that are located much closer to and on the presumed source area.

52. On pages 5-10 and 5-13, the U.S. EPA describes the vapor intrusion assessment that it conducted from March 2006 to January 2008. However, the assessment, as reported, was not consistent with U.S. EPA's own 2002 OSWER Draft Guidance for Evaluating Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance) EPA-530-D-02-004 or the U.S. EPA risk assessment guidance in effect during this period, particularly the U.S. EPA's 2003 OSWER Directive 9285.7-53 regarding Human Health

Toxicity Values in Superfund Risk Assessments. For example, the U.S. EPA apparently applied residential screening values to non-residential buildings. The Agency apparently used the 2001 draft TCE inhalation toxicity value which was highly controversial, never finalized, and was withdrawn by the U.S. EPA prior to the start of the vapor intrusion assessment in March 2006. The soil gas screening levels used in the assessment appear to ignore both the U.S. EPA's 2002 draft vapor intrusion guidance on the use of the attenuation factors, as well as empirical attenuation factors that the Agency could have readily derived from the subslab and indoor air data it collected over the approximately 20 months of vapor intrusion assessment at this Site. In addition, no information is provided as to whether alternative sources of TCE such as ambient air or consumer products were taken into consideration. Sampling locations were not correlated with either higher groundwater VOC detections or shallower groundwater. Given the flaws in the assessment, it is impossible for the U.S. EPA to ascribe any "elevated" vapor levels to the regional groundwater conditions.

53. The OU2 RI Report, including Appendix K, did not provide a clear explanation for U.S. EPA's choice of vapor intrusion screening criteria or its basis for concluding that the TCE and PCE indoor air concentrations summarized in Tables 5-4 to 5-9 posed a threat to public health. As part of its review of the OU2 RI, ENVIRON calculated reasonable maximum exposure (RME) risks associated with the TCE and PCE indoor air concentrations reported by EPA, and compared the estimates of RME risk to EPA's acceptable risk levels.

ENVIRON's estimates of RME risks were calculated in accordance with current EPA risk assessment guidance. Specifically, the estimates were calculated using the inhalation unit risks for TCE and PCE that U.S. EPA used in the baseline risk assessment (see Table 6.2 in Appendix M of the OU2 RI Report), the current U.S. EPA guidance on inhalation risk assessment (Risk Assessment Guidance for Superfund, Part F), and U.S. EPA's standard default residential and nonresidential inhalation exposure factors, which are as follows:

Residential: 24 hours/day, 350 days/year, and 30 years
Nonresidential: 8 hours/day, 250 days/year, and 25 years

Using these U.S. EPA assumptions, the residential TCE indoor air concentration of 11 ug/m3 cited in Table 5-5 of the RI Report corresponds to a RME risk of only 9×10^{-6}. Similarly, the nonresidential TCE indoor air concentration of 3 ug/m^3 cited in Table 5-6 of the RI Report corresponds to a RME risk of only 5×10^{-7}, which is lower than the acceptable risk range. Neither of these TCE indoor air concentrations, which are the highest on Tables 5-4 and 5-9 of the RI Report, poses an unacceptable risk to public health.

54. While PPPI has no potential CERCLA liability with respect to PCE, Environ performed similar calculations for EPA's reported PCE findings. Those calculations show that the highest residential PCE indoor air concentration of 0.63 ug/m^3 on Table 5-5 of the RI Report corresponds to a RME risk of only 2×10^{-6}, which is at the low end of EPA's acceptable risk range of 10^{-6} to 10^{-4}. The highest nonresidential PCE indoor air concentration of 1.6 ug/m^3 on Table 5-6 of the RI Report corresponds to a RME risk of only 8×10^{-7}, which is lower than the

acceptable risk range. Like TCE, these PCE indoor air concentrations do not pose an unacceptable risk to public health.

55. ENVIRON also reviewed the TCE and PCE indoor air data summarized in Tables 5-4 to 5-11 of the OU2 RI Report and did not find any indoor air concentrations that pose an unacceptable risk to public health (i.e., risk exceeding 10^{-4}). (Note that the pairs of indoor air and subslab soil gas data in Table 5-6 are incorrectly labeled in at least rows 1 and 2, and in rows 5 and 6.) The highest RME risk associated with the TCE and PCE indoor air data on these summary tables is approximately 3×10^{-5}, which is well within U. S. EPA's acceptable risk range. Therefore, U.S. EPA's stated justification for installing mitigation systems as a removal action is not supported by its own data when conservatively evaluated. The OU2 RI/FS must be revised to reflect the appropriate risk evaluation so that further actions inconsistent with the National Contingency Plan are not implemented. In addition, TCE and PCE soil gas screening criteria of 5 ug/m^3 and 100 ug/m^3 should not be used to justify vapor mitigation or to guide future vapor assessments. The derivation of risk-based criteria and screening levels for these purposes is discussed in the next two comments.

56. Removal actions to mitigate vapor intrusion should be based on indoor air, rather than subslab soil gas data because indoor air data (after accounting for background sources of contamination) provide a more direct measure of exposure. Indoor air data should be compared to risk-based indoor air criteria that are calculated following current U.S. EPA risk assessment guidance. In particular, separate indoor air criteria should be calculated for residential and nonresidential assessments (*See* RAGs Part F, 2009). These criteria should be derived using inhalation toxicity values for short-term (*e.g.*, subchronic) exposure, which are more appropriate for evaluating the need for removal action. For example, the TCE indoor air criteria for determining if removal action is warranted for a residence should be 560 ug/m^3, which is calculated using U.S. EPA's standard default residential exposure factors.

57. To guide vapor intrusion assessments and to support vapor intrusion remedial action decisions, appropriate risk-based indoor air screening levels should be calculated first, and then used to calculate screening levels for subslab soil gas and groundwater using attenuation factors consistent with the U.S. EPA's 2002 draft vapor intrusion guidance or using empirical attenuation factors based on data collected for this RI. For example, the TCE indoor air screening level should be 60 ug/m^3, which is based on a target cancer risk of 5×10^{-5}, an URF of 2×10^{-6}, per ug/m^3, and U.S. EPA's standard default residential exposure factors. The target cancer risk of 5×10^{-5} is appropriate in this case because TCE and PCE are the only two Site-related carcinogens, and it would still ensure that the Site-related cumulative cancer risk will not exceed 10^{-4}. Using this TCE indoor air screening level, the TCE groundwater screening value would be 250 mg/L, which is based on U.S. EPA's generic groundwater attenuation factor of 0.001 and a Henry's law constant of 0.247 at the typical groundwater temperature of 13.5 °C in New Jersey. The TCE subslab soil gas screening level would be 600 ug/m^3 if calculated using U.S. EPA's generic subslab attenuation of 0.1. However, as U.S. EPA noted in Sections 5.7.2 to 5.7.5, the vapor intrusion assessment found that indoor air concentrations are generally 2 to 3 orders of magnitude lower than the subslab soil gas concentrations, which means that the subslab

soil gas attenuation factor should be 0.01 to 0.001 for this Site. Using the more conservative empirical attenuation factor of 0.01 would give a subslab soil gas screening level of 6,000 ug/m^3. Future vapor intrusion assessments at this Site should use these groundwater and subslab soil gas screening levels consistent with U.S. EPA's own guidance and practices.

58. On page 5-13, the U.S. EPA again asserts that the Karrsville Thrust Fault "extends toward the former American National Can facility, which was identified as the source area for TCE groundwater contamination in the OU1 Study Area". As previously noted, geologic mapping of this fault, as shown on Figure 2-1 of the RI shows that the Fault trace actually extends on a northwest-southeast trending line (paralleling the Pohatcong Valley) at a location that is at least 1 mile side-gradient from the former ANC site. The statement that the fault extends to the former American National Can facility is incorrect and misleading and should be deleted. Moreover, designation of the American National Can facility as "the" source ignores all of the evidence of other source areas in the Pohatcong Valley.

59. On page 5-13, the U.S. EPA asserts that Figure 5-3 "graphically shows the relationship between the Karsville Thrust Fault trace and the TCE groundwater concentrations." This suggests that the map shows a clear pattern of the highest TCE concentrations at the Fault trace and progressively lower concentrations away from the Fault trace. However, a statistical analysis of the data would be required to support this hypothesis because a visual examination of the spatial relationship between concentrations at individual wells that are presented and the Fault trace do not convincingly demonstrate this correlation. An examination of the isoconcentration lines for TCE also shows a less than convincing correlation. The isoconcentration lines do not appear to correlate with the Fault trace since the Fault trace is not parallel to the long-axis of the isoconcentration lines. In fact, the isoconcentration lines appear to follow the trend of the Valley more than the trend of the Fault. This suggests that the hypothesized correlation of TCE concentrations with the Fault trace may be more an artifact of the fact that the Fault is nearly parallel to the Valley (which helps control the trend of the flow) than the results of the TCE concentrations following the Fault trace. Finally, the presence of the results of the vapor intrusion (VI) studies at a large scale on the map is confusing at best. Since these VI data are on Figure 5-2, there is no need to repeat them on this figure.

60. Despite the OU1 RI findings of impacts at this property, the U.S. EPA concludes on page 5-13 that the Victaulic Company (VCA) property is not a source of TCE in the groundwater. This conclusion is apparently based solely on the results of a low flow groundwater sample collected from a single depth from the Quarry Road monitoring well (PVQUA01). As previously noted, in its analysis of the Asbury Broadway Road wells, the U.S. EPA dismissed the results showing the absence of TCE from low flow sampling under so-called "passive conditions" and accepted the results showing the presence of TCE from the packer test sampling under so-called "active conditions." When the "active conditions" samples at the Asbury Broadway Road contain VOCs, the U.S. EPA concludes the area was impacted all along and dismisses the "passive conditions" samples. In contrast, at the Quarry Road well, U.S. EPA accepts the "passive conditions" low flow sample data showing the presence of TCE and makes no attempt to collect samples under "active conditions" because it was not possible to conduct

packer tests. Here one "passive conditions" sample is taken from a well and the U.S. EPA concludes that not only the groundwater, but also the upgradient property is of no concern, while at another location the so-called "passive conditions" sample is considered invalid. Such arbitrariness is not technically defensible.

61. On page 5-14 and 5-15, the U.S. EPA presents a bulleted recitation of its groundwater sampling results for non-CVOCs. Once again, there is no appropriate technical rationale provided for the analysis of samples for these constituents in OU2 of this Site.

62. On page 6-4, the U.S. EPA acknowledges that releases of CVOCs may have occurred in the OU2 Study Area. However, despite that admission, virtually no source investigation work was done as part of the OU2 RI.

63. The Human Health Risk Assessment (Section 6-2) included VOCs, SVOCs, pesticides, PCBs and metals. Yet, the U.S. EPA acknowledges in the RI that, aside from TCE, PCE and their natural degradation products, these constituents are not Site-related and states in the final FS that none of these non-site related constituents would be addressed as part of their CERCLA response in OU2. Therefore, the expenditure of CERCLA dollars to evaluate these chemicals was unnecessary and inappropriate. Such costs are not consistent with the National Contingency Plan.

64. The conclusion of the Human Health Risk Assessment (Section 6-2) as to the TCE in groundwater is that the compound does not present an unacceptable risk, but as it is above New Jersey and/or Federal drinking water standards in certain sampled locations, remedial action is necessary. As noted above, the Human Health Risk Assessment also included many chemicals that are not site-related, which was not only unnecessary, but also creates a potential for misinterpretation or obfuscation of the very low Site-related potential risks. For example, the COPC's selected for sediment were metals and PAHs; that for surface water was the metal manganese. For groundwater, metals and pesticides and bis (2 ethyl-hexyl) phthalate (an SVOC that is often unintentionally introduced into the process of sample collection and laboratory analysis) were selected in addition to CVOCs. None of these constituents were the focus of either the RI or the FS for OU2 by U.S. EPA's own statements.[1]

65. On pages 6-26 and 6-27, the U.S. EPA indicates that the unacceptable human health risks in OU2 were driven by a few metals (thallium, arsenic, cobalt, iron and manganese) and not by TCE or PCE or their degration products. The only unacceptable hazard quotients ("HQs") identified through the risk assessment process are those for metals. In its discussion of residential and industrial worker risks through the use of groundwater, the U.S. EPA does not even mention the potential risk associated with CVOCs and attributes all of the significant risks

[1] In addition, on page 6-15 U.S. EPA states that background data was not considered in identifying constituents of potential concerns so that some of the metals which appeared to be elevated may in fact be present at background levels. Before proceeding to label constituents as "of concern" and complete a risk assessment on them, a determination as to whether they reflect background concentrations should have been made.

to various metals. This information concerning risks that U.S. EPA has acknowledged are not Site-related and should not have been developed as part of this RI, and should not be reported as characteristic of this Operable Unit. The U.S. EPA's approach to these non-Site related substances is misleading at best.

66. On pages 6-29 and 6-30, the U.S. EPA summarizes the results of the risk assessment and, once again, indicates that the only COPCs with risks that exceed U.S. EPA target risk levels are metals, and not CVOCs. The Agency again acknowledges here in the summary of the Human Health Risk Assessment that these metals are not related to the Site. This raises the question of why U.S. EPA selected these metals as COPCs for risk assessment in the first place.

67. On page 7-3 the U.S. EPA describes an imagined scenario involving TCE release and migration from the former American National Can property through a channel to nearby properties. This description fails to take into account that soils data developed through the New Jersey ISRA process demonstrated that TCE is not present in the soils along this so called channel. In addition, no evidence is found in the data to demonstrate vertical migration into the soils along this imaginary channel. Nor does visual observation show that a channel in fact exists in this area.

68. On pages 7-6 and 7-7, the U.S. EPA makes the assertion that the current concentrations of TCE in OU1 wells are close to the same concentrations as those found in 2002. While some of the wells, including the four cited by U.S. EPA have similar concentrations, most of the wells in the upgradient areas of OU1 where TCE concentrations are generally higher than in OU2, show significant decreases in concentrations between the sampling of 2000-2002 and 2007-2009. For example, a review of the data for monitoring well PVWLY08 shows an order of magnitude decrease between 2002 and 2009, when the most recent sampling was done. Other wells in this area show similar decreases. In addition, as shown on Figure 7-3, the most recent data from the Dale Avenue production well in OU1, also shows a long-term decrease in TCE concentrations over time.

69. U.S. EPA includes statements about the steady state of the TCE groundwater levels on pages 7-6, 7-7 and 7-12 of the final RI. The data do not demonstrate that such a steady state exists. (*See* the previous comment above.) PPPI agrees with the statement that natural attenuation is taking place in the Site groundwater. However, PPPI strongly disagrees with U.S. EPA's stated underlying assumptions. The measured decreases in groundwater TCE concentrations, particularly in the upgradient areas of OU1 where TCE concentrations are generally higher than in OU2, are indicative of attenuation. It is incorrect to create a scenario of an ongoing source equivalent to attenuation so that a functional steady state can be assumed as U.S. EPA has done. The groundwater data simply do not support that Site description.

70. On pages 7-12 and 7-13, the U.S. EPA presents its "Conceptual Site Model". That description states that the Karrsville Thrust Fault runs close to the OU1 source area. As previously noted, the U.S. EPA's map (Figure 2-1), which is based on detailed geologic studies of the area, shows that this Fault is actually located more than a mile to the north and west of the alleged source areas in OU1 that were identified by the U.S. EPA in the OU1 RI. In addition, no data have been presented suggesting that the Fault has any connection to those alleged source areas. Therefore, there is no technical justification for assuming that the Fault runs close to U.S. EPA's alleged OU1 source areas and the Conceptual Site Model needs to be adjusted to reflect this fact as well as the data collected to date.

71. The U.S. EPA's Conceptual Site Model states that there is a potential for groundwater to discharge to surface water. That potential may exist. However, it should be noted that the surface water and sediment have been sampled and VOCs have not been identified as a concern for either.

72. The table that reportedly shows the residential well sampling results (Table 5-19) is not included in the final RI Report. In addition, the tables that present the results of some of the RI sampling (in Appendix I) do not clearly indicate where the sample was taken, whether at the wellhead or at some other locations. Table 5-1 presents the results of the temporary well point sampling, but does not provide the depths for any of the samples. This information, which is critical to the evaluation of data, is not supplied in the text of the RI Report either. In addition, Figure 5.4 shows data from a number of sampling locations without differentiating depth or providing any additional information. The commingling of data from multiple sources (e.g., monitoring and domestic wells) may be justified if there is reason to believe the data are from the same aquifer. However, the OU2 RI fails to provide any technical justification for assuming that all of these data points are in the same aquifer. It also fails to distinguish between treated and untreated water samples for the domestic wells sampled.

73. Table 5-1 presents the results of the temporary well point sampling, but does not provide the depths for any of the samples.

Feasibility Study Report Comments

74. In its array of groundwater alternatives for the OU2 Feasibility Study, U.S. EPA assumes that all wells, whether impacted or not, will have an alternative water supply connection or POET provided. U.S. EPA is without the authority to require such remedial action for wells which are not impacted above the established Site ARAR-based standard. Wells found to have less than 1 part per billion (ppb) TCE in them do not require remedial action and U.S. EPA does not have the authority to undertake it pursuant to the Comprehensive Environmental Compensation and Liability Act. The cost figures used in the FS require re-evaluation once the un-impacted wells are deleted from the numbers of wells to be addressed.

75. The FS does not provide appropriate technical justification or internal consistency regarding the timeframes, number of extraction wells, and other features of the proposed alternatives. The U.S. EPA should provide a more detailed and technically sound justification for its alternative analyses.

76. Alternative 2(b) is not cost-effective since the cost of this remedy is not proportional to the overall effectiveness of Alternative 2(b) when compared to the overall cost and effectiveness of Alternative 2(a). The National Contingency Plan lists nine specific criteria for the selection of a remedial action, one of which is that the remedy must be cost effective. In accordance with the National Contingency Plan, the remedial action selected shall be cost-effective, provided that it first satisfies the threshold criteria (overall protection of human health and the environment and compliance with ARARs). Alternatives 2(a) and 2(b) both satisfy the threshold criteria. In fact, Alternative 2(a) provides effectiveness similar to that of Alternative 2(b), but at significantly lower cost. In accordance with the National Contingency Plan, costs that are grossly excessive compared to the overall effectiveness of alternatives may be considered as one of several factors used to eliminate alternatives.

77. Alternative 2(b), which provides a long-term alternate water supply by public water connections may be appropriate when: 1) the impacts from contaminants are expected to remain for an extended period of time; 2) it is determined to be technically infeasible to remediate the groundwater to meet the remedial action objectives (RAOs); or 3) it provides cost savings when compared to Alternative 2(a) that uses POETs to provide an alternative water supply. However, it should be clearly noted in the FS that Alternative 2(b) will not provide any significant difference in the long term protection of human health and environment when compared to Alternative 2(a). Therefore, given it higher cost, Alternative 2(b) should be eliminated from further considerations.

78. Alternative 2(b) may be desirable if there were an existing water main near the affected properties, and the water purveyor has the capacity to supply the impacted properties with water. However, the U.S. EPA failed to verify if the Aqua New Jersey Water Company or the New Jersey American Water Company has the capability to provide potable water to approximately 320 additional homes. This consideration is critical to the determination of implementability under the National Contingency Plan.

79. The FS does not provide any map depicting the location of the impacted residential well or other information (depth and construction) for these residential wells. It also fails to evaluate the option of replacing the existing residential wells with new supply wells screened into a deeper aquifer that may not be impacted. Replacement of the TCE impacted supply wells should be considered since connection to, or extension of, a water supply system is so prohibitively expensive that the replacement of the wells with deeper wells may be both cost effective and result in an of added protection to public health and environment that is equivalent to that provided by public water connections.

80. The U.S. EPA did not follow the Region 2 Clean and Green policy and the Executive Orders 13423 and 13513, which require a review of the sustainability criteria (e.g., Carbon Dioxide Emissions, Total Energy Consumed, Safety/ Accident Risk, etc.). The FS should utilize green remediation metrics or tools (e.g., Region 2 Green Remediation Measurements/Evaluation Metrics and AFCEE sustainability protocol). For example, implementation of Alternative 2(b) that involves construction of a 10-mile long water line and disruption to local communities should be analyzed to see if it is more energy intensive and is likely to generate more greenhouse gases than Alternative 2(a).

81. The selection of remedial alternatives in the FS and the Proposed Plan primarily focus on TCE, without consideration of other contaminants such as PCE (1 ug/L) and 1,2-dichloropropane (13 ug/L), which were detected in the residential wells located at 8 Herleman in Greenwich and House 13A, respectively. These contaminants should be considered in the evaluation of remedial alternatives because they may impact the effectiveness of the selected remedy.

82. On page iv of the Executive Summary of the FS, U.S. EPA states that concentrations of TCE in a significant number of the tested residential wells within OU2 exceeded the NJDEP drinking water standard. A map and table identifying the location and exact number of impacted residential wells should be provided with the FS. In addition, the term "significant" needs to be better defined to have any real meaning in this context. This is particularly true given the low percentage of total sampled wells that were in fact so impacted.

83. On page v of the FS Executive Summary, the U.S. EPA identifies the former American National Can facility as a "major" source of TCE to the regional aquifer. The U.S. EPA has no data on which to base such a statement. No assessment of the volume of TCE that the U.S. EPA alleges originated at the former facility has been performed, nor are data available to complete such an assessment. This unsupportable statement should therefore be deleted from the FS.

84. On page v of the FS Executive Summary, the U.S. EPA asserts that the former American National Can facility is upgradient of the Karrsville Thrust Fault. This statement is not supported by the data collected by the Agency, which shows that the former American National Can facility is, in fact, located over a mile sidegradient from the Fault.

85. On page vi of the FS Executive Summary, the U.S. EPA selected an ARAR of 1 ppb for TCE in groundwater. That ARAR was "used to establish media-specific concentrations of TCE in groundwater that will pose no unacceptable risk to human health and the environment". Therefore, any well found to have less than the 1 ppb level of TCE does not pose an unacceptable risk and does not warrant a response action. The US. EPA's remedial alternative descriptions and cost estimates need to be revised to reflect this fact as acknowledged by the Agency itself.

86. On page 1-5 of the FS, the U.S. EPA states that the Karrsville Thrust Fault extends to "near" the former American National Can property. That Fault has never been mapped at any location near that property, however. As previously noted, the U.S. EPA's map (Figure 2-1), which is based on detailed geologic studies of the area, shows that this Fault is actually located more than a mile to the north and west of the former American National Can property. The FS should be modified to accurately reflect the Site data.

87. On page 1-5 of the FS, the U.S. EPA states that since TCE concentrations in groundwater seem to be decreasing from OU1 to OU2, that all of the TCE migrated from OU1 to OU2. That conclusion is not supported by the Site groundwater data. The detected concentrations over the years do not exhibit a consistent plume character moving from one spot or area downgradient. The U.S. EPA did no sampling in OU2 to identify possible contributing sources and only minimal sampling in OU1. Therefore, the U.S. EPA is in no position to reach the conclusion stated at this point in the FS based on existing data.

88. On page 2-4 of the FS, the U.S. EPA again assumes that no sources of the TCE in the groundwater exist in OU2. That conclusion is grossly premature since the U.S. EPA has done almost no characterization work to determine if sources do in fact exist. Instead, the Agency has assumed the sources are all in OU1, while avoiding any sampling to test that assumption.

89. In its development of remedial alternatives in Section 4 of the FS, the U.S. EPA has assumed that 320 private wells will be given public water supply connections or POETs. This assumption is made despite the fact that about three-fourths of the wells tested to date have had less than 1 ppb of TCE in them. There is no reason to suppose that a significant percentage of wells still to be tested will not also have TCE concentrations below 1 ppb. This is particularly true since most of the wells tested are located in the center of the Valley where U.S. EPA would anticipate finding the greatest regional impact. As stated in previous comments, no remedial action is needed or statutorily authorized for these wells.

90. Beginning on page 4-5 of the FS, the U.S. EPA adds a remedial option of *insitu* hotspot treatment. *Insitu* oxidation is considered for an area at the boundary between OU1 and OU2. That artificial line has no meaning in actuality (i.e., no groundwater divide or barrier exists at that point). It is incorrect to view the area as a "source area" for the remainder of OU2 based simply on Agency created division between OU1 and OU2. As the U.S. EPA itself acknowledges, OU1 and OU2 are interconnected and the road intersection boundary is arbitrary. Applying an *insitu* treatment technology at the Asbury-Broadway Road areas would clearly involve injecting chemicals in *media res* with no valid technical justification. The FS should be revised to take into account the fact that the Asbury-Broadway Road line is an Agency-created convenience, rather than an actual aspect of the Site's hydrogeology. Remedial alternative development should be based on actual Site conditions, as opposed to artificial features.

91. On Page 5-6 of the FS, Section 5.3.2.3 refers to remedial alternatives that result in a reduction in TCE concentrations in groundwater near the soil source areas. However, the U.S. EPA has not identified any soil source areas in OU2. The area where the *insitu* treatment is expected to occur is not near any of the source areas identified by the Agency to date. Therefore, it is not clear how the proposed alternatives that are discussed could have any impact on any of U.S. EPA's postulated soil source areas.

92. As stated in comment 46 above, U.S. EPA has concluded that OU1 and OU2 are interconnected. Therefore, remedial benefits from the *insitu* treatment option contemplated under Alternatives 3a and 3b will not be effective long term, if at all, since it does not address OU1 groundwater contamination. Therefore, the long term effectiveness of Alternative 3a and 3b should be considered to be low through the FS evaluations.

93. On page 5-6 of the FS, Section 5.3.2.4, the U.S. EPA concludes that Alternative 3a and 3b will remove and treat "most" of the TCE. This statement is not supported by any analysis and has no technical justification given what is known about the Site as a whole.

94. On pages 5-7 and 5-8 of the FS, Section 5.3.2.6, the U.S. EPA fails to mention any other implementation issues with respect to Alternatives 3a and 3b such as limited delivery options for fractured bedrock.

95. On Page 5-8, Section 5.3.2.7 of the FS, the U.S. EPA correctly states that the capital cost of Alternative 2(b) is higher than that of Alternative 2(a), but significantly overestimates the long term O&M costs of Alternative 2(a). In estimating O&M costs for Alternative 2(a), U.S. EPA assumed the GAC filters associated with the POET system would need to be replaced at a frequency of once per household per year. This replacement costs represents almost 85% of the estimated annual O&M cost of Alternative 2(a). Carbon replacement frequency which depends on many factors including the level of contamination, water temperature, pH, water usage, and the presence of other constituents. Due to the relatively low TCE concentrations present in the wells in OU2 (most are below 5 ug/L) the carbon usage is likely to be considerably less than estimated in the FS. In addition, the vulnerability and potential maintenance of proposed water lines were not taken into consideration in estimating the O&M cost associated with Alternative 2(b). Therefore, while the O&M costs for POETs is higher than that for water connections, the U.S. EPA estimate of O&M costs associated with Alternative 2(a) is overly conservative and the comparison of the O&M cost for Alternative 2(a) and Alternative 2(b) in selecting one alternative over the other is biased and inappropriate.

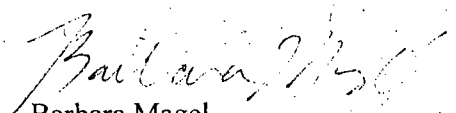
96. In Table 5-1 of the FS, the U.S. EPA concludes that Alternatives 2a and 2b will achieve the preliminary remediation goals ("PRGs") in approximately 30 years; that Alternatives 3a and 3b will achieve the PRGs in approximately 10 years, and that Alternatives 4 will achieve the PRGs in approximately 14 years. No technical justification is provided for these timeframe estimates.

97. In Table 5-1 of the FS, the discussion concerning the technical feasibility of Alternatives 3a and 3b should mention issues related to limited delivery options in fractured bedrock. In addition, the description for Alternative 3b appears to be an error.

Conclusion

For each of the reasons presented above, PPPI believes that the proposed selected remedial alternative requires re-evaluation consistent with CERCLA and the National Contingency Plan before a final remedial selection is made. Such re-evaluation, taking into account all of the National Contingency Plan criteria; groundwater data for OU2; and U.S. EPA precedent would support the selection of the remedial approach outlined in Comment 20 above. If U.S. EPA has any questions with respect to any of the comments included in this letter, PPPI is happy to discuss them further.

Very truly,



Barbara Magel

BAM:sam
cc: Frances Zizila

APPENDIX V Administrative Record Index

POHATCONG VALLEY GROUNDWATER CONTAMINATION SITE
OPERABLE UNIT 2
ADMINISTRATIVE RECORD FILE UPDATE #2
INDEX OF DOCUMENTS

3.0 REMEDIAL INVESTIGATION

3.4 Remedial Investigation Reports

P. 301917 - 303272 Report: Final OU2 Remedial Investigation Report, Pohatcong Valley Groundwater Contamination Superfund Site, Franklin and Greenwich Townships, Warren County, New Jersey, prepared by CH2MHill, prepared for U.S. Environmental Protection Agency, Region 2, April 2010, Revised July 2010. **(NOTE: This document is the final report and supersedes the April 2010 version.)**

Doc ID# 109635

4.0 FEASIBILITY STUDY

4.3 Feasibility Study Reports

P. 400098 - 400205 Report: Final OU2 Feasibility Study Report, Pohatcong Valley Groundwater Contamination Superfund Site, Franklin and Greenwich Townships, Warren County, New Jersey, prepared by CH2MHill, prepared for U.S. Environmental Protection Agency, Region 2, April 2010, Revised July 2010. **(NOTE: This document is the final report and supersedes the April 2010 version.)**

Doc ID# 109636

11.0 TECHNICAL SOURCES AND GUIDANCE DOCUMENTS

11.1 EPA Headquarters

P. 1100001 - 1100041 Report: Final OSWER Directive Number 9200.4-17P, Use of Monitored Natural Attenuation at

Doc ID# 107231

Superfund, RCRA Corrective Action, and Underground Storage Tank Sites, prepared by United States Environmental Protection Agency, Office of Solid Waste and Emergency Response, April 21, 1999.

APPENDIX VI State Letter of Concurrence

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

Mr. Walter Mugdan, Director
Emergency and Remedial Response Division
U.S. Environmental Protection Agency
Region II
290 Broadway
New York, NY 10007-1866

Re: Pohatcong Valley Groundwater Contamination Superfund site
Record of Decision

Dear Mr. Mugdan:

The New Jersey Department of Environmental Protection (DEP) completed its review of the "Record of Decision, Pohatcong Valley Groundwater Contamination Superfund Site, Operable Unit Two, Franklin and Greenwich Townships, Warren County, New Jersey" prepared by the U.S. Environmental Protection Agency (EPA) Region II in September 2010 and concurs with the selected remedy to address groundwater contamination from the Site and private potable wells impacted in the area.

The response action described in this ROD addresses contaminated groundwater associated with the Site, and provides the rationale for this preference. The selected remedy primarily addresses private potable wells impacted by groundwater contaminated with trichloroethene, a volatile organic compound. It represents the second of the three planned remedial phases, or operable units, for the Site.

The first operable unit (OU1) included the extraction and treatment of the Site's most highly contaminated groundwater, and reinjection of the treated groundwater to the aquifer. Long–term monitoring of natural attenuation will be used in the downgradient portions of the OU1 plume, to restore the contaminated groundwater to beneficial use and to meet the more stringent of the state and federal standards for drinking water. The third operable unit for the Site is within Washington Borough, and will address the contaminated source areas and soils located on, and in the vicinity of, the former American National Can facility.

The major components of the selected remedy for the second operable unit (OU2) that the Department concurs with include:

- Provision of potable water to impacted and threatened properties through the construction of a waterline and connections;
- Monitored natural attenuation for the remediation of the OU2 Study Area groundwater until cleanup goals are met;
- The establishment of a Classification Exception Area (CEA), which is an institutional control, to minimize the potential for exposure to contaminated groundwater until the aquifer meets the cleanup goals; and,
- The abandonment of private potable wells.

DEP appreciates the opportunity to participate in the decision making process to select an appropriate remedy and is looking forward to future cooperation with EPA in further remedial work at this site.

If you have any questions, please call me at 609-984-3074.

Sincerely,

Edward Putnam, Assistant Director
Publicly Funded Remediation Element
Site Remediation Program

C: Dave Sweeney, Assistant Commissioner, Site Remediation Program, DEP
Carole Petersen, Chief, New Jersey Remediation Branch, EPA Region II