RECORD OF DECISION

Lehigh Valley Railroad Derailment Superfund Site
LeRoy, Genesee County, New York

United States Environmental Protection Agency
Region 2
New York, New York
September 2023

692958

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Lehigh Valley Railroad Derailment Superfund Site
LeRoy, Genesee County, New York

Superfund Site Identification Number: NYD986950251
Operable Units: 01 (Amendment) and 02

STATEMENT OF BASIS AND PURPOSE

In 1997, New York State Department of Environmental Conservation (NYSDEC) issued a Record of Decision (ROD) for the Lehigh Valley Railroad Derailment (LVRR) Superfund Site (Site) located in the City of LeRoy, Genesee County, New York, denominated by EPA as Operable Unit (OU) 1, which addressed contamination in soil and bedrock and provided impacted properties a connection to the public waterline. In July of 1999, following the January 1999 final listing of the Site on the National Priorities List (NPL), the U.S. Environmental Protection Agency (EPA) concurred with the waterline component of the NYSDEC remedy, and, subsequently, in May 2002, concurred with the soil and bedrock components of the NYSDEC remedy. This decision document presents a comprehensive remedy for the Site through a remedy amendment for OU1 and the selection of a remedy for OU2 to address contamination in the groundwater, soil, bedrock, soil vapor and surface water.

The selected remedy was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §§ 9601-9675, and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300. This ROD explains the factual and legal basis for selecting a remedy to address the contamination at the Site. The attached index (see Appendix III) identifies the items that comprise the Administrative Record upon which the selected remedy is based.

The New York State Department of Environmental Conservation (NYSDEC) was consulted in accordance with CERCLA Section 121(f), 42 U.S.C. § 9621(f), and), in consultation with the NYS Department of Health (DOH), it partially concurs with the selected remedy (see Appendix IV).

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The Site cleanup is being addressed as two operable units. The response action described in this document amends the OU1 remedy selected by NYSDEC in 1997 and selects a remedy for OU2. The major components of the OU2 remedy by medium are:

1. **Groundwater** - For the approximately four-mile trichloroethylene (TCE) plume, implementation of a combination of monitoring and institutional controls (ICs) while invoking a technical impracticability (TI) waiver for chemical-specific groundwater standards in the TI Zone[1] because groundwater cannot be restored in a reasonable timeframe. Outside of the TI Zone, the groundwater standards will remain as the final cleanup goal. Long-term monitoring and groundwater use restrictions will be required.

2. **Bedrock Vadose Zone (BVZ)** - ICs and Groundwater Monitoring in the BVZ. The BVZ and the groundwater in the Spill Zone (the 10-acre area of the original TCE spill) are within the TI Zone.

3. **Soil in the Spill Zone** - Excavation/Disposal - Soil exceeding 6 NYCRR Part 375 TCE soil cleanup objectives for commercial use (200 milligrams per kilogram (mg/kg)) to a depth up to 10.5 feet below ground surface (bgs) will be excavated and properly disposed of off-Site. The area will be backfilled using clean, imported soil and/or stone underlain by a demarcation layer. Placement of topsoil and seed to provide for one foot of clean soil cover will extend to any areas of the Spill Zone where concentrations of TCE in surface soil exceeds 2 mg/kg, which is the New York State (NYS) value for the protection of ecological receptors.

4. **Surface Water** (Section of Mud Creek): In-situ treatment of contaminated surface water with streambed cover, ICs, and monitoring.

In addition, disturbed areas (including vegetated surfaces, roadways, sidewalks, curbs, etc.) will be restored to their original pre-construction condition and topographic contour following the completion of remedial construction.

5. **Common Elements Applicable to all Media:**

    a. ICs in the form of governmental controls (see Appendix C of the Feasibility (FS) Study Report); proprietary controls (*e.g.*, easements on Spill Zone parcels); and informational devices relating to groundwater, soil vapor, and the Spill Zone (*e.g.*, notices, publications) to limit exposure to contaminated soil, groundwater and soil vapor;

1 The TI Zone includes the portion of the groundwater in the Spill Zone and the plume downgradient to Spring Creek where the federal and state drinking water and groundwater standards cannot be achieved. (See Figure 4).

b. Monitoring, which includes sampling of groundwater, surface water, soil vapor and indoor air as follows:
    i. A long-term groundwater and surface water monitoring program will be implemented to track and to monitor changes in the groundwater contamination to ensure the RAOs are attained.
    ii. The groundwater data results will be used to evaluate any contaminant migration and changes in VOC contaminants over time.
    iii. Soil vapor and indoor air samples will be collected to ensure continued protection for impacted properties.
c. Maintenance of existing sub-slab depressurization systems (SSDSs) and installation of new systems, as needed, for impacted properties; and
d. Connection of new homes constructed over the groundwater plume to the current municipal water supply system or the provision of a point-of-entry treatment system if connection to the municipal system is not feasible.

With this comprehensive remedy for the Site, EPA is also amending the following components of the NYSDEC 1997 ROD (denominated by EPA as OU1):

1. Eliminating the bedrock vapor extraction source control measure;
2. Eliminating ex-situ soil vapor extraction, as it was implemented for two years;
3. Updating the surface water standard for TCE from the original cleanup goal of 11 micrograms per liter (µg/L) to the current NYSDEC standard of 40 µg/L;
4. Addressing soil contamination beneath Gulf Road by implementing ICs to restrict access and to require proper soil management if the roadbed is disturbed in the future; and
5. Updating the RAOs to recognize the waiver of certain Federal and state drinking water and groundwater standards at the Site because of the technical impracticability of achieving the standards throughout the TI Zone.

A Site Management Plan (SMP) will also be developed for long-term operation and maintenance (O&M) to provide for:

a) reviews of the effectiveness of the engineering and institutional controls;
b) proper management of the Site remedy post-construction;
c) long-term groundwater monitoring and health and safety requirements for managing contaminated media that remain in place under Gulf Road;
d) maintenance of existing vapor mitigation systems;
e) inspection of the plume area for new home construction and associated installation of new vapor mitigation systems; and
f) new connections of new homes constructed over the groundwater plume to the current municipal water supply system or the provision of a point-of-entry treatment system if connection to the municipal system is not feasible.

The environmental benefits of the selected remedy may be enhanced by consideration, during the design, of technologies and practices that are sustainable in accordance

with EPA Region 2's Clean and Green Energy Policy and NYSDEC's Green Remediation Policy.[2] This will include consideration of green remediation technologies and practices.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy meets the requirements for remedial actions set forth in CERCLA Section 121, 42 U.S.C. § 9621, because it: 1) is protective of human health and the environment; 2) meets a level or standard of control of the hazardous substances, pollutants, or contaminants that at least attain the legally applicable or relevant and appropriate requirements under federal and state laws; 3) is cost-effective; and 4) utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable.

Because the selected remedy will result in contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure, CERCLA requires that the Site remedy be reviewed at least once every five years. Also, provisions will be made for periodic reviews and certifications of the institutional and engineering controls. If justified by these reviews, additional remedial action may be implemented at the Site.

ROD DATA CERTIFICATION CHECKLIST

The ROD contains the remedy selection information noted below. More details may be found in the Administrative Record file for this remedy.

- Contaminants of concern and their respective concentrations (see Appendix II, Tables 1-1 to 1-6 and Tables 2-1 to 2-3);
- Baseline risk represented by the contaminants of concern (see ROD, pages 14 - 21 and Appendix II, Tables 3 - 8);
- Cleanup levels established for contaminants of concern and the basis for these levels (see ROD, page 25 and Appendix II, Table 9);
- Manner of addressing source materials constituting principal threats (see ROD, page 42);
- Current and reasonably anticipated future land use assumptions, plus current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD (see ROD, page 15);
- Potential land and groundwater use that will be available at the Site as a result of the selected remedy (see ROD, page 15);

2 See http://epa.gov/region2/superfund/green_remediation, https://semspub.epa.gov/work/HQ/100000160.pdf and also NYSDEC guidance at http://www.dec.ny.gov/docs/re-mediation_hudson_pdf/der31.pdf.

- Estimated capital, annual operation and maintenance, and present-worth costs; discount rate; and the number of years over which the remedy cost estimates are projected (see ROD, pages 27, 31 and 33 and Appendix II, Tables 11a -11e); and
- Key factors used in selecting the remedy (*i.e.*, how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (see ROD, pages 45 - 47).

AUTHORIZING SIGNATURE

Pat Evangelista

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September 28, 2023

Pat Evangelista, Director
Superfund and Emergency Management Division
EPA Region 2

Date

DECISION SUMMARY

Lehigh Valley Railroad Derailment Superfund Site
LeRoy, Genesee County, New York

United States Environmental Protection Agency
Region 2
New York, New York
September 2023

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SITE NAME, LOCATION, AND DESCRIPTION

The Lehigh Valley Railroad (LVRR) Derailment Superfund Site (Site) is located in Genesee, Monroe and Livingston Counties, New York. The Site is divided into two main areas, the Spill Zone and the Study Area. The Site is characterized by contaminated soil, bedrock and surface water in the Town of LeRoy, Genesee County, and by contaminated groundwater in Genesee, Monroe, and Livingston Counties.

The Spill Zone is approximately 10 acres in size and is defined as the physical location of the 1970 train derailment which resulted in contamination of overburden soils and bedrock with trichloroethene (TCE), in the vicinity of the former LVRR crossing at Gulf Road (**Figure 1**). The Spill Zone also includes a former railroad bed, a former quarry material staging area, and the foundation of a former hotel. Currently, the 10-acre Spill Zone is mostly undeveloped industrial, commercial, residential, and passive recreational land, largely covered with grass, brush, and wooded areas.

The Study Area is larger and is roughly bounded by the Oatka Creek Valley to the north, the Dolomite Quarry and Hanson Quarry to the west, Route 5 to the south, and Spring Creek Valley to the east (**Figure 2**). The Study Area includes a TCE-impacted groundwater plume emanating from the Spill Zone which extends eastward approximately four miles to Spring Creek. Mud Creek, an area of interest, is a frequently-dry stream bed which carries substantial water flow during flood events and is located approximately 600 feet (ft) to the east of the Site.

The Site cleanup is being addressed in two phases, or operable units (OUs). OU1 addresses the provision of an alternate water supply to area residences and businesses that were or have the potential to be impacted by the LVRR-contaminated groundwater plume, as well as contamination within the Spill Zone that is present in soil and extending into the bedrock. OU2 addresses the approximately four-mile contaminated groundwater plume, the contaminated groundwater discharging to surface water, as well as contaminated vapors that may migrate into residences as a result of soil vapor intrusion.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Site is the location of a former train derailment that occurred on December 6, 1970, at the Gulf Road railroad crossing in the Town of LeRoy. The train, operated by the potentially responsible party (PRP), the Lehigh Valley Railroad Company, derailed, and two tank cars containing TCE ruptured and spilled their contents (estimated at 30,000 gallons) onto the ground. As mentioned above, this area is referred to as the 10-acre Spill Zone. TCE is the primary contaminant of concern (COC) and is a chlorinated volatile organic compound (VOC), commonly used as a solvent. A third car containing a crystalline form of cyanide was also reported to have partially spilled. The cyanide was

recovered shortly after the derailment; however, the TCE infiltrated into the ground and was not recovered.

In early 1971, residents near the Site complained of TCE odors in homes and reported contamination of nearby drinking water wells. The PRP conducted limited cleanup activities at the spill location in response to the residents' concerns. Ditches were constructed in the Spill Zone and were flooded with water to flush the TCE out of the ground. Carbon filters were installed on several private wells to remove TCE from drinking water.

In 1990 and 1991, the New York State Department of Health (NYSDOH) sampled private water wells east of the Site and discovered TCE concentrations in more than 35 residential wells above the NYSDOH drinking water standard of 5 micrograms per liter (µg/L). Based on this information, EPA installed point-of-entry carbon treatment units (POETs) on all contaminated private wells. In November 1991, the Site was added to the NYS Registry of Inactive Hazardous Waste Disposal Sites.

In 1992, NYSDEC initiated a remedial investigation and feasibility study (RI/FS) under State law for the Site, completed an RI Report in 1996, and two FS Reports in early 1997. The NYSDEC RI found TCE concentrations in soil ranging from 46 to 840,000 micrograms per kilogram (µg/kg) and that a source of TCE-contamination remained in the unsaturated soil in the Spill Zone and bedrock in the Study Area, the nearby surface water, and the groundwater with a plume extending almost four miles east and southeast of the Spill Zone. TCE from the original spill is also referred to in this document as a dense non-aqueous phase liquid (NAPL) or DNAPL.

OU1 Remedy and Remedial Action

On March 28, 1997, NYSDEC issued a Record of Decision (ROD) for the Site. The ROD selected remedy included: 1) the installation of a waterline to provide potable water to approximately 70 affected residences and businesses near the Site; 2) the installation of an in-situ bedrock vapor extraction (BVE) system within a 10-acre DNAPL zone (Spill Zone); and 3) ex-situ soil vapor extraction (SVE) of approximately 10,000 cubic yards of TCE-contaminated soil. In August 1998, NYSDEC requested that EPA approve its ROD and assume responsibility for the source-control components of the remedy. At the same time, the State agreed to continue its work on the waterline component of the selected remedy. In July of 1999, following the January 1999 final listing of the Site on the National Priorities List (NPL), EPA concurred with the waterline component of the NYSDEC remedy.

In 1999, NYSDEC performed a BVE pilot study which indicated that, while there were uncertainties, ex-situ SVE and in-situ BVE could be effective in achieving the soil cleanup objectives in the NYS ROD. In May 2002, EPA concurred with the BVE and SVE components of the NYSDEC remedy.

During 2003, the waterline component of the selected remedy was successfully implemented. The POET systems that had been installed on the affected domestic wells were removed, and, subsequently, the properties were connected to the waterline. The waterline connections were completed in all four of the municipalities that were affected by the TCE plume (Town of Wheatland, Town of LeRoy, and the Town and Village of Caledonia). The waterline is currently providing potable water to approximately 70 affected residences and businesses in the area.

In September 2006, LVRR entered into a settlement agreement ("Settlement Agreement") with EPA by which LVRR conducted pre-remedial design investigations while undertaking the remedial design of the SVE system and the OU2 RI/FS. Additional evaluations of the feasibility of BVE were performed, as documented in reports from 2011 through 2014, a BVE Memorandum in 2018, and a focused BVE Report in 2019. Based upon review of the results of the pilot study and the subsequent evaluations, EPA concluded that given the nature of the vadose zone (bedrock) and the large fluctuations in groundwater levels found at the Site, as well as the size, migration, and location of the TCE-mass (diffused into the saturated and unsaturated bedrock), implementation of BVE would not remove enough mass to result in significant reduction of contamination in the bedrock or groundwater.

Pursuant to the Settlement Agreement LVRR also undertook vapor intrusion investigations in the Study Area. Starting in 2008, measures were initiated to protect property owners from exposure to vapors arising from contamination in groundwater volatilizing into soils and subsequently into residences, a process known as soil vapor intrusion (SVI). EPA required LVRR to install vapor mitigation systems at the affected properties. To date, more than 35 properties have been sampled to determine if contamination has migrated into indoor air. Sub-slab depressurization systems (SSDSs) were subsequently installed in 12 homes to mitigate potential exposures associated with SVI.

On March 21, 2014, EPA unilaterally issued Administrative Order for Remedial Action, Index Number CERCLA-02-2014-2010, (SVE Order) to LVRR for the remediation of soil using SVE. An in-situ SVE system was installed and became operational in July 2015. The SVE system operated continuously in the Spill Zone for two years. Despite removing over 284 pounds of volatile organic compounds (VOCs), the post-SVE data indicated that cleanup goals had not been achieved. As a result, EPA determined that continued SVE cleanup would not attain cleanup levels or accomplish RAOs and, in July 2017, the SVE system was shut down. The residual concentrations above cleanup goals were likely associated with rock fines present in the overburden materials that are highly diffused into the rock matrix.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI and FS reports and a Proposed Plan[1] were released to the public for comment on August 18, 2023. These documents were also made available to the public at information repositories maintained at the Caledonia Public Library located at 3108 Main Street, Caledonia, New York, the Woodward Memorial Library located at Wolcott Street, LeRoy, New York, and the EPA Region 2 Office in New York City. The documents were also made available online at EPA's website: https://www.epa.gov/superfund/lehigh-valley-rr. Notices of availability for the above-referenced documents were published in the Batavia Daily News, on EPA's website and were distributed to various news outlets and local contacts. The public comment period ran from August 18, 2023, to September 18, 2023. On August 29, 2023, EPA conducted a public meeting at the Caledonia Mumford High School located at 99 North Street, Caledonia, New York, to inform local officials and interested citizens about the Superfund process, to explain the Proposed Plan for the Site, including the preferred remedy and to respond to questions and comments from the approximately 14 attendees. Responses to the questions and comments received at the public meeting and in writing during the public comment period are included in the attached Responsiveness Summary (see Appendix V).

SCOPE AND ROLE OF RESPONSE ACTION

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP), at 40 CFR Section 300.5, defines an operable unit as a discrete action that comprises an incremental step toward comprehensively addressing site problems. A discrete portion of a remedial response 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.

EPA has designated two OUs for the Site. OU1 addresses the provision of an alternate water supply to area residences and businesses that have been or have the potential to be impacted by the LVRR contaminated groundwater plume, as well as contamination within the Spill Zone, that is present in soil and extends into the bedrock.

The waterline component of the OU1 remedy was successfully implemented in 2003. However, the components of the remedy addressing contaminated soil and bedrock were not fully implemented.

OU2 addresses the approximately four-mile contaminated groundwater plume, contaminated groundwater discharging to surface water, as well as contaminated vapors that may migrate into residences as a result of soil vapor intrusion. The OU2 RI Report was completed in 2014 and the OU2 FS was completed in 2023.

[1] A Proposed Plan describes the remedial alternatives considered for a site and identifies the preferred remedy with the rationale for that preference.

The subject of this ROD includes an amendment to the OU1 remedy and addresses the Site contamination in OU2. The remedies selected in this ROD are considered the final comprehensive remedy for the Site.

SUMMARY OF SITE CHARACTERISTICS

The discussion below summarizes a few essential features of the highly complex geologic and hydrologic setting at the Site. A better understanding of the Site conditions can be found in the RI and FS Reports. In addition to sampling groundwater for hazardous substances, a series of studies were conducted to better understand how fractures in the bedrock aquifer are connected, with the goal of understanding how the groundwater moves. The RI also included rock coring and other sampling techniques to analyze the extent to which contaminants had been diffused into the rock itself, a phenomenon called matrix diffusion that is associated with certain rock formations. The environmental media investigated during the RI included soil, bedrock, surface water, sediment, groundwater, and soil vapor. Samples were primarily collected to delineate the extent of media contaminated by TCE. The results of the RI are summarized below.

The primary contaminants of concern at the Site are TCE and its breakdown daughter products: cis-1,2 dichloroethene, trans-1,2 dichloroethene, 1,1 dichloroethene and vinyl chloride.

Site Geology and Hydrogeology

A comprehensive summary of the regional geology of western New York and geology of the Site, including the Study Area and Spill Zone, can be found in the NYSDEC RI/FS. A summary of the geologic conditions of the Site, based on the NYSDEC RI/FS, observations and research by LVRR's contractor, Unicorn Management Consultants (UMC) follows.

The area geology is well documented in the NYSDEC 1996 RI report and the LVRR 2014 RI report as consisting generally of a carbonate series of bedrock ranging from Silurian to Devonian in age. Bedrock units in descending order and from youngest to oldest include the Onondaga Formation, the Bois Blanc Formation, the Akron Formation, the Bertie Formation, and the Camillus Formation. Each generally consists of limestone/dolomite sequences with varying amounts of sandstone, shale and chert. The Camillus Formation, underlain by the Syracuse Formation, a dolomite/anhydrate sequence, is considered the base of the Study Area as it produces non-potable water.

The Site is located in the Allegheny Plateau Physiographic Province in western New York. The northeastern portion of the Study Area slopes downward toward the northeast and Mud Creek. East of the Spill Zone, the topography slopes generally downward toward Spring Creek along an undulating surface. North of Gulf Road/Flint Hill Road, the topography slopes downward to the north toward Oatka Creek. The

southeastern portion of the Spill Zone slopes downward to the east and southeast to Mud Creek. The western section of the Spill Zone is generally higher in elevation and contains piles of quarried rock debris, remnant of historical quarrying activities in the area.

The major surface drainage feature at the Site includes Oatka Creek, which generally defines the northern boundary of the Site. Mud Creek, a seasonal tributary of Oatka Creek, flows from south to north through the western portion of the Site and hydraulically downgradient of the Spill Zone. Other seasonal surface water features are generally defined by the west-to-east-oriented NYS Route 5. South-to-north flowing Spring Creek (a tributary of Oatka Creek) generally defines the eastern-most distal end of the TCE plume with monitoring wells beyond that defining the eastern-most portion of the Site.

The geology of the Site area generally consists of unconsolidated overburden material, underlain by glacial till (matrix of fine to coarse grained gravel and sand and clayey silt) and glacial fluvial deposits underlain by sedimentary bedrock dipping gently to the south. In the eastern portion of the Site, overburden materials are underlain by weathered limestone bedrock. However, along Spring Creek, bedrock was encountered at depths considerably deeper than in borings advanced west of Spring Creek. Over most of the Study Area, the Onondaga Formation is the upper most rock unit, dipping gently to the south. However, in the northern and eastern portions of the Study Area, some formations are exposed north and east of an erosional line resulting in an erosional surface sloping north and east into the Oatka Creek and Spring Creek drainages. Owing to the predominantly carbonate/dolomite nature of the bedrock, the Study Area is characterized by karstic features including sinkholes, swallets, and sinking streams, as well as numerous springs/seeps along Oatka Creek, Mud Creek, and Spring Creek. The karstic nature of the Study Area bedrock has a dramatic effect on the overall hydrogeology of the area and TCE-impacted groundwater transport mechanisms, including documented groundwater elevation fluctuations of up to 50 ft or more over short time periods.

NATURE AND EXTENT OF CONTAMINATION

Soil

As discussed above, the 1970 train derailment resulted in approximately 30,000 gallons of TCE and one ton of cyanide crystals being released into the Spill Zone. Immediate cleanup of the spill included the removal of cyanide crystals and the spreading of neutralizers to counteract the effects of any remaining cyanide that could not be removed. TCE released by two ruptured tank cars could not be recovered at the time of the derailment and ultimately migrated into the ground and groundwater.

Soil sampling activities were conducted by LVRR in the Spill Zone from 2010 through 2017. The sampling included the collection of approximately 250 soil samples from a

total of 174 test borings advanced to bedrock observed at depths between approximately one and 10.5 feet below ground surface (bgs) and arranged in a grid-like pattern in the Spill Zone both north and south of Gulf Road. Analysis of 28 of the samples detected TCE at concentrations ranging between 7.6 and 400 milligrams per kilogram (mg/kg), exceeding the RAO for TCE in soil of 7 mg/kg established in the 1997 ROD. The results of these efforts were summarized in a report prepared by UMC titled “Soil Data Summary Report, Pre-RD” submitted to EPA in December 2010.

In March 2014, EPA issued the SVE Order for remedial action that required LVRR to perform the SVE component of the OU1 remedy for the Site. In April 2015, in-situ SVE construction and operations on the north and south sides of Gulf Road commenced. The full-scale systems were placed into operation in July 2015.

In September 2016, following approximately 14 months of operation, preliminary post-SVE sampling efforts identified concentrations remaining in the overburden above concentration-based performance objectives presented in the OU1 ROD. On July 21, 2017, the SVE system was shut down after having removed over 284 pounds of VOCs, including TCE, over its 2-year operation. The post-SVE data indicate that cleanup goals have not been achieved (See **Figure 5**). Residual concentrations are likely associated with contaminant mass diffused into rock fragments present in the overburden materials. Continued cleanup using in-situ SVE would not attain cleanup levels or accomplish RAOs. For contaminants of concern and their respective concentrations remaining in the Spill Zone soil, see Appendix II, **Tables 1-1 to 1-6**, Summary of LVRR Soil Sample Analytical Results.

Bedrock

Activities related to the 2010 LVRR RI included: bedrock coring and rock core analysis to assess the bedrock matrix for TCE impacts; inspection of boreholes for the presence of nonaqueous phase liquid (NAPL); geophysical testing and FLUTe (Flexible Liner Underground Technologies) profiling to assess bedrock structure and aquifer hydraulic characteristics; packer testing and the collection of groundwater samples to assess aquifer hydraulic characteristics and groundwater quality at discrete intervals; and bedrock vapor sampling to assess bedrock vadose zone TCE vapor concentrations. In total, 44 bedrock test borings were conducted as part of the 2010 RI. Twelve of the 44 borings were completed as FLUTe-style monitoring wells.

The bedrock coring data showed that:

- There is a substantial amount of contamination that had previously been NAPL that has diffused into the rock matrix over time above the observed static water level at boring location LVRR-36. There does not appear to be any NAPL below this level.
- There is a substantial amount of TCE mass in the rock matrix (approximately 9.7 grams in a square meter of rock) below the observed static water level at boring location LVRR-36.

- There is a substantial amount of TCE mass in the rock matrix (approximately three grams in a square meter of rock) above the observed static water level at boring location LVRR-35.
- While the Nedrow and Clarence members of the Onondaga Formation contain significant TCE mass at boring locations LVRR-36 and LVRR-35, very little mass is evident in those units at location LVRR-33.
- Significant TCE mass extends into the top of the Camillus Formation at boring location LVRR-35 at an elevation of approximately 655 feet above mean sea level, corresponding to a depth of approximately 93 feet bgs.
- Most of the TCE mass at boring location LVRR-33 occurs below the static water level in the Bertie Formation and in the top of the Camillus Formation.
- At LVRR-35 the water in the fractures is essentially in equilibrium with the matrix pore water.
- At boring location LVRR-33, TCE concentrations in groundwater samples collected during packer testing are generally between one and three orders of magnitude lower than the estimated rock matrix pore water concentrations indicating that TCE is diffusing out of the rock matrix and into the fractures in this part of the plume.

Based on these findings, the conceptual site model was developed as follows:

The initial spill resulted in TCE as DNAPL moving downward through the thin soils, into the bedrock matrix, and eventually encountering groundwater within the Spill Zone. As the TCE was transported downward and predominantly eastward from the ground surface, the TCE DNAPL moved from areas of high concentration to low concentration diffusing into the soil, bedrock in the unsaturated (vadose) zone and dissolved into groundwater in the saturated zone at the Spill Zone. Large fluctuations in the groundwater table have acted as a mechanism to spread TCE from the vadose zone to the saturated zone in the Spill Zone. Diffusion of TCE mass from the rock matrix into the groundwater occurs within the Spill Zone as lower concentration TCE-impacted groundwater levels rise and encounter higher concentrations in the rock matrix. Diffusion of TCE mass from the rock matrix into groundwater occurs through a process referred to as back diffusion. As the groundwater elevation level recedes it has a higher TCE concentration which is transported downgradient where a portion of the TCE mass in groundwater diffuses into bedrock. This diffusive cycle of TCE mass moving from the bedrock to groundwater and groundwater to bedrock is continuous throughout the TCE plume.

Groundwater

LVRR conducted RI activities from 2008 through 2015 and the findings of the investigations indicated that TCE and/or TCE degradation products were detected in 40 of 53 samples collected in the groundwater plume. The highest concentrations of TCE were found in the shallow wells near the Spill Zone. Concentrations of TCE and the presence of TCE degradation products generally decrease with depth and lateral

distance from the Spill Zone. [See Appendix II, **Tables 2-1 to 2-3**, Summary of LVRR Groundwater Sample Analytical Results.]

A comparison of recent LVRR investigations (2008-2018) with the initial NYSDEC remedial investigations (1996) shows that the TCE plume has not changed significantly in terms of aerial extent since at least 1996 and has achieved a steady state plume configuration condition.

TCE concentrations in Spill Zone wells generally decrease in successively lower stratigraphic units, but overall concentrations exceed the drinking water standard of 5 µg/L for TCE. Groundwater samples collected from monitoring wells located in the Spill Zone (DC-01, DC-02, DC-05, DC-15, DC-16, LVRR-35 and LVRR-36) detected TCE at levels ranging from 450 to 4,400 µg/L, exceeding the drinking water standard of 5 µg/L. (See **Figure 3**).

The TCE concentrations in wells located immediately downgradient of the Spill Zone (DC-03, DC-06, DC-17, LVRR-20, LVRR-34, and LVRR-37) detected TCE at levels ranging from 40 to 760 µg/L. However, TCE levels generally decrease in successively lower stratigraphic units, eventually reaching levels that do not exceed the drinking water standard of 5 µg/L in the lower-most karstic portion of the Camillus Formation or, in the case of DC-17B (TCE was non-detect), the Syracuse Formation. (See **Figure 3**).

Groundwater samples collected from downgradient monitoring wells located by Spring Street (DC-13, DC-14, GCM, LVRR-22, and LVRR-23) detected TCE at levels ranging from non-detect or ND to 11 µg/L, slightly exceeding the drinking water standard of 5 µg/L. (See **Figure 3**).

Groundwater samples collected from downgradient monitoring wells located east of Spring Creek (LVRR-38, LVRR-39, LVRR-40, LVRR-41, and LVRR-42) detected TCE at an estimated concentration of 0.27 µg/l. Analysis of the remaining groundwater samples collected from wells east of Spring Creek did not detect TCE in concentrations, exceeding laboratory reporting limits. (See **Figure 3**).

Based on historical groundwater quality data, the eastwardly flowing Study Area TCE-impacted groundwater (in the upper Camillus and shallower formations) is largely controlled by the Spring Creek fault zone and discharges to the associated surface water features which, in turn, drain northward to Oatka Creek. However, groundwater in lower Camillus and deeper formations is intercepted by the fault zone, and TCE impacts are mitigated by the diluting effect of allogenic water entering the Study Area from the south and along the fault zone itself. This is evidenced by the non-detect concentrations of TCE in monitoring well clusters LVRR-38 through LVRR-42, as well as residential wells located east of the Spring Creek fault zone.

Based on the findings of the RI Report and other investigations, the overall horizontal extent of TCE-impacted groundwater within the Study Area has been delineated. Some minor areas of uncertainty exist in the vicinity of LVRR-37 at a depth interval between

approximately 50 feet and 75 feet bgs, corresponding to the Bertie and upper-most portion of the Camillus Formation. The TCE-impact groundwater plume likely extends further to the north in this area. The overall vertical extent of TCE-impacted groundwater has also been delineated with some minor areas of uncertainty near Spill Zone well clusters DC-01 and LVRR-35, advanced to total depths of 160 feet and 180 feet bgs, respectively, and the vicinity of Spring Street well clusters DC-13, and LVRR-14, advanced to total depths of approximately 60 feet bgs, corresponding generally to the Camillus/upper Syracuse Formations. Future monitoring will help refine the understanding of the nature and extent of contamination in these areas. (**Figure 3**).

Based on TCE concentration trend and distribution observations, with the exception of the areas noted above, the horizontal and vertical extent of the TCE-impacted groundwater plume is defined within the limits of the Study Area. Further, the magnitude of the TCE impacts and the overall plume geometry appear to have reached a state of dynamic equilibrium, with overall lower TCE concentrations but similar overall plume shape and orientation in the most recent sampling events as compared to earlier events. Further, in conjunction with these observations and considering analysis of groundwater elevation and geophysical data, as well as stream sediment and surface water analytical results, Spring Creek and the apparent fault zone oriented along its course act as a discharge zone for TCE-impacted groundwater preventing plume advancement further to the east.

Potential for Groundwater Restoration

A report, entitled, Assessment of Groundwater Restoration Potential and Technical Impracticability (AGTI) Report, dated May 25, 2019, was prepared to assess whether it is technically practicable, from an engineering perspective, to restore groundwater at the Site within a reasonable timeframe. Within the AGTI Report, factors such as the volume and duration of the release of Site-related constituents were considered in evaluating the potential for groundwater restoration at the Site. The chemical properties of these constituents and the volume and depth of contaminated media were also considered. In addition, Site-specific hydrogeologic characteristics were assessed as they relate to groundwater restoration potential. These factors are summarized below.

Site-Specific Factors Regarding Technical Impracticability

The initial spill resulted in TCE as a DNAPL moving downward through the thin soils into the bedrock matrix, and, eventually, encountering groundwater within the Spill Zone. As the TCE was transported downward from the ground surface, the TCE DNAPL moved from areas of high concentration to low concentration diffusing into the soil, bedrock in the unsaturated (vadose) zone and dissolved into groundwater in the saturated zone at the Spill Zone.

Currently, the majority of the TCE mass is located in the rock matrix, in micro-fractures and in pore spaces above the saturated zone dissolved into pore space groundwater, sorbed onto the bedrock, or as vapors. The diffusion of TCE into and out of the rock

matrix occurs dynamically within the entire plume (present day and historic) both in the saturated and vadose zones during times of high water. This process has been documented from the Spill Zone approximately two miles eastward to Limerock Road. As such, the rock matrix provides a continuous source of TCE impacts to groundwater via back diffusion. This occurs when groundwater in the fractures has TCE concentrations that are lower than those in the adjacent bedrock matrix. This is the cause of long-term plume persistence despite the depletion of DNAPL within the Spill Zone. While diffusion processes have been beneficial in causing strong attenuation of the TCE plume and in reducing mass discharge to surface water, it also presents an impediment to plume cleanup in a reasonable timeframe.

Significant volumes of allogenic water from runoff during storm events, ranging from 3 million gallons per month (Mg/mo) to 406 Mg/mo, mix with the groundwater system in the Study Area. The plume receives the least amount of allogenic recharge in October, coinciding with the highest reported TCE groundwater concentrations. Water level changes of 50 feet or more occur rapidly, in a matter of hours or days. The water level responses within each formation are similar with very little or no lag time, indicating that the geologic formations act as a single aquifer which is hydraulically interconnected through a complex fracture network.

In addition to reliable field data and observations, a Discrete Fracture Network (DFN) model was created, using FRACTRAN (a numerical model for simulation of groundwater flow through fractured porous media such as bedrock) informed by Site field measurements and laboratory data, to understand how the various processes controlling plume behavior interact to result in the observed (and interpolated) plume configuration and behavior over various time and distance scales. Mathematical models are necessary to make informed predictions regarding future plume behavior since no future field data are currently available for the Site. The DFN model has some limitations. The DFN FRACTRAN model does not exactly recreate the fracture network in 3-D space but simulates the fracture network in fracture density and fracture width and, therefore, is not 100 percent accurate. However, this modelling approach is the most robust simulation available for groundwater flow through fractures and diffusion from fracture water to rock matrix, where the majority of contaminant mass is stored, and back diffused to fracture water.

The modeling indicates that even complete removal of TCE mass from the Spill Zone or from other areas of the overall plume footprint will not restore groundwater to its most beneficial use or eliminate risk to human health or the environment within any reasonable timeframe. At the LVRR Site, restoration to MCLs would be expected to take centuries, even with the removal of all TCE from the Spill Zone. However, TCE concentrations within the plume and downgradient discharges to surface water will continue to decline due to natural processes.

Technology Limitations and Site-location Factors

Because the VOC-contamination is now largely contained within the rock matrix, to be successful, a remedial technology needs to be capable of treating contamination in both the rock matrix and the bedrock fractures. Furthermore, an effective technology must remain within the rock matrix over a period of time long enough to promote treatment. A review of currently available remedial technologies identifies no viable technologies capable of effectively treating the fractured bedrock in a full-scale implementation. Reviewed technologies included widely used methods (*e.g.*, groundwater extraction and ex-situ treatment, in-situ bioremediation or in-situ chemical treatment), and innovative technologies (*e.g.*, aquifer heating)**.**

Stability of Groundwater Conditions

The TCE dissolved-phase plume is contained horizontally by natural and anthropogenic processes. Natural controls on the plume include the Spring Creek fault to the east, the northeast-trending regional groundwater flow to the west, an influx of surface water from outside the footprint of the plume through karstic features to the south, including sinkholes and solution-enlarged fractures (which result in dilution and dispersion), and by upward vertical hydraulic gradients to the north and south.

While the extent of the plume boundary is near steady state, the presence of TCE within the bedrock continues to be a long-term source of contamination. The diffusion of TCE into and out of the rock matrix occurs dynamically within the entire plume (present day and historic) both in the saturated and vadose zones during times of high water. As such, the rock matrix provides a continuous source of TCE impacts to groundwater via back diffusion. In addition, the influx of billions of gallons of fresh water annually to the plume has hindered, but not stopped, the process of natural attenuation and helps to maintain the state of dynamic equilibrium.

Surface Water

Mud Creek, a seasonal tributary of Oatka Creek, flows from south to north through the western portion of the Site and hydraulically downgradient of the Spill Zone. Site remedial investigations identified a large sinkhole located near the Spill Zone through which Mud Creek flows and loses much of its water to the bedrock. Downgradient of the sinkhole, TCE was detected in surface water samples collected at the Mud Creek area, including the waterfall at 320 µg/L and downstream of the waterfall at 440 µg/L and 380 µg/L (See **Figure 6**). These TCE concentrations exceed the NYSDEC Class C surface water quality standard of 40 µg/L indicating that TCE-impacted groundwater originating from the Spill Zone discharges via springs to this portion of Mud Creek.

Private Well Investigations

From 2008 to 2009, 23 private wells near the Site that were no longer used for drinking water were included in the monitoring network and sampled for VOCs and cyanide.

The wells were chosen based on four criteria, including spatial distribution of the wells with respect to the groundwater plume, contaminant concentrations, groundwater flow direction, and presence of pumping wells. The results indicated that TCE and/or TCE degradation products were detected in the following private wells:

- Detectable concentrations of TCE were reported in the samples collected from L-14 (70 µg/L) and L-33B (22 µg/L). L-14 is a well located near the racetrack on Flint Hill Road used to wet the dirt track; the water is not used for drinking. L-33B is located on Spring Street and is used for irrigation. Both properties are connected to the public water supply.
- An estimated concentration of vinyl chloride (0.44 µg/L) was present in the sample collected from M-20. M-20 is located on the museum property east of the main parking lots. Water from this well is not used for drinking purposes.

An alternate water source was implemented for the purpose of providing a long-term solution that addressed public health concerns with respect to the consumption of potable water. Any existing production well is not used as potable water for drinking purposes. The construction of a municipal water line was designed by Stearns & Wheler, LLC in 1998 under a contract with the NYSDEC. Construction of the water line ran from December 2001 through July 2003, and included 15 miles of 8-inch & 12-inch diameter water mains, with a total of 70 individual service connections. Once it was put into service, the waterline provided affected users with a clean source of potable water. The waterline connections were completed in all four of the municipalities that were affected by the TCE plume (Town of Wheatland, Town of LeRoy, and the Town and Village of Caledonia). Details of the installation are provided in the “Final Remediation Report, Water Distribution System, Lehigh Valley Railroad Derailment Site” prepared by Stearns and Wheler, LLC in August 2003 (NYSDEC, 2003). Additionally, decommissioning of all impacted private/domestic water supply wells that were located within the extent of the TCE groundwater plume was conducted with the exception of the following:

1. L-14: This well is used for non-potable utility purposes only (dust control of a racing track), and the property owner does not wish to abandon the well. Additionally, there are signs posted on the property indicating that the water from the domestic well is for non-potable use only; and

2. L-33B: This well is used during the summer for garden irrigation only, and the property owner does not wish to abandon the well. The property owner permitted LVRR to post a “non-potable” sign next to the well. On May 20, 2020, UMC on behalf of LVRR posted the agreed upon sign next to the domestic well.

Vapor Intrusion

Starting in 2008, measures were initiated to protect property owners from exposure to vapors from contamination in groundwater volatilizing into soils and subsequently into

residences, a process known as soil vapor intrusion. To date, more than 35 properties have been sampled to determine if contamination has migrated into indoor air. As a result of the sampling, sub-slab depressurization systems (SSDSs) were installed in 12 homes to mitigate potential exposures associated with soil vapor intrusion (SVI) plus one location installed a SSDS system for radon that also acts to mitigate SVI. The mitigation systems are monitored and continue to be effective in controlling indoor TCE vapors.

CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

Land Use

The 10-acre Spill Zone is mostly undeveloped industrial, commercial, residential, and passive recreational land, largely covered with grass, brush, and wooded areas. The current land use over the 4.1-mile plume, designated as the Study Area, is mixed use, including residential, recreational, agricultural, and commercial/industrial.

Groundwater Use

Because the area is served by municipal water [and there are various governmental controls in place in the affected municipalities], it is unlikely that the groundwater underlying the Site will be used for potable purposes in the foreseeable future. Regional groundwater is, however, designated as a drinking water source by NYSDEC.

SUMMARY OF SITE RISKS

As part of the RI/FS for the Site, a baseline risk assessment (BRA) and a supplemental risk evaluation for soil were conducted to estimate the current and future effects of contaminants on human health and the environment. A BRA 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, surface water and groundwater uses. It provides the basis for taking an action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. The BRA included a human health risk assessment (HHRA, 2016) and a screening-level ecological risk assessment (SLERA, 2013). In 2021, EPA conducted a soil risk evaluation that supplemented the baseline risk assessment for the Site. This section of the ROD summarizes the results of the 2016 HHRA and 2021 supplemental soil risk evaluations.

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 contaminant 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 $1 \times 10^{-6} – 1 \times 10^{-4}$ or a Hazard Index greater than 1; contaminants at these concentrations are considered contaminants 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 contaminants of potential concern (COPCs) in each medium were identified based on such factors as toxicity, frequency of detection, fate and transport of the contaminants in the environment, concentration, mobility, persistence and bioaccumulation. The HHRA began with selecting COPCs in various media at the site (i.e., groundwater, surface water and sediment) that could potentially cause adverse effects in exposed populations. COPCs were selected by comparing the maximum detected concentrations of each chemical identified with state and federal risk-based screening values. The COPC screening was conducted separately for each medium of interest and exposure area in the HHRA. A comprehensive list of all COPCs can be found in the HHRA in the administrative record. Only site-related risk driving COCs, or those chemicals exceeding EPA's threshold criteria, are included in **Table 3**.

The 2021 supplemental soil risk evaluation conducted by EPA evaluated potential human health risk from exposure to residual TCE source in the Spill Zone soils post-treatment with the SVE system. Unlike in the HHRA, the 2021 supplemental risk evaluation only quantified risk from exposure to TCE in the Spill Zone soil.

Exposure Assessment

Consistent with Superfund policy and guidance, the HHRA 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 in the HHRA.

The current land use at the Site, including the approximate 10-acre Spill Zone and the resultant 4.1-mile groundwater plume, designated as the Study Area, is mixed use, including residential, recreational, agricultural, and commercial/industrial. Future land use is expected to remain the same. The identification and selection of potential receptor populations in the HHRA was based on both current and potential future land uses of the Site. Media of concern evaluated in the 2016 HHRA included groundwater, as well as surface water and sediments in nearby Mud Creek, Oatka Creek and Spring Creek. As such, the following receptor populations and pathways were quantitatively evaluated in the 2016 HHRA:

- Future Resident (Adult/Child)- Ingestion of groundwater as drinking water, dermal contact with groundwater while bathing or showering, and inhalation of VOCs released during bathing or showering.
- Future Commercial/Industrial Worker- Ingestion of groundwater as drinking water and dermal contact while hand washing.
- Current/Future Construction/Utility Worker- Incidental ingestion of and dermal contact with shallow groundwater in a trench, and inhalation of vapor phase chemicals released from groundwater to a confined space (trench).
- Current/Future Recreational User (Adult/Adolescent/Child)- incidental ingestion of and dermal contact with surface water and sediment while wading or swimming in Mud, Oatka, and Spring Creek.

In 2021, to supplement the HHRA, EPA conducted an additional risk evaluation for residual TCE source in the Spill Zone soils post-treatment with a SVE system. Residual TCE contamination in the Spill Zone is present on land zoned industrial, therefore, the following receptor populations and pathways were evaluated:

- Current/Future Commercial Worker- incidental ingestion and inhalation of soil particulates released from Spill Area soils; and
- Current/Future Construction Workers- incidental ingestion and inhalation of soil particulates released from Spill Area soils.

A summary of the exposure pathways included in the 2016 HHRA and the 2021 Supplemental Risk Evaluation for soil can be found in **Table 4**.

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 each medium can be found in **Table 3**, while a comprehensive list of the exposure point concentrations for all COPCs can be found in the 2016 HHRA for the site.

Toxicity Assessment

In this step, the types of adverse health effects associated with contaminant exposures and the relationship between magnitude of exposure and severity of adverse health effects were determined. Potential health effects are contaminant-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 contaminants are capable of causing both cancer and noncancer health effects.

Under current EPA guidelines, the likelihood of carcinogenic risks and noncancer hazards due to exposure to site contaminants are considered separately. Consistent with current EPA policy, it was assumed that the toxic effects of the site-related contaminants 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 Values Database (PPRTV), or another source that is identified as an appropriate reference for toxicity values consistent with EPA guidance (https://www.epa.gov/sites/default/files/2015-11/documents/tier3-toxicityvalue-whitepaper.pdf). This information is presented in **Table 5** (noncancer toxicity data summary) and **Table 6** (cancer toxicity data summary). Additional toxicity information for all COPCs is presented in the 2016 HHRA.

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 contaminants identified in environmental media (*e.g.*, the amount of a contaminants 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 contaminant (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). The key concept for a noncancer HI is that a "threshold level" (measured as an HI of less than or equal to 1) exists at which noncancer health effects are not expected to occur.

As previously stated, the HI is calculated by summing the HQs for all contaminants for likely exposure scenarios for a specific population. An HI greater than 1 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 contaminants for a specific population exceeds 1, separate HI values are then calculated for those contaminants which are known to act on the same target organ. These discrete HI values are then compared to the acceptable limit of 1 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 contaminants for each exposure pathway is contained in **Table 7**.

As shown in **Table 7**, the HI for noncancer health effects exceeded EPA's threshold of 1 for adult resident (HI of 7,000), child resident (HI of 12,000), commercial/industrial worker (HI of 43), construction/utility worker (HI of 94), adult recreator (HI of 6.6), adolescent recreator (HI of 9.1) and child recreator (HI of 18). For the residential receptors, the hazard was predominantly driven by inhalation exposures to TCE that could occur during showering or bathing activities. The recreator hazards were driven by exposure to TCE in surface water from the Mud Creek exposure unit (SW-EU1). For the construction/utility worker, the HI of 94 was driven by exposure to TCE in Spill Zone soil and groundwater. Similarly, exposure to TCE in groundwater and Spill Zone soil by the commercial/industrial workers resulted in hazard estimates that exceeded unity (HI=43).

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 under the conditions described in the Exposure Assessment, 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 x 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 Exposure Assessment. Again, as stated in the National Contingency Plan, the acceptable risk range for site-related exposure is 10^{-6} to 10^{-4}.

As summarized in **Table 8**, the total estimated cancer risks for future residents and commercial/industrial workers exceeded EPA's target risk range of 10^{-6} to 10^{-4}. The estimated cancer risk for the child/adult resident of 3.7×10^{-2} was mainly driven by exposure to TCE in groundwater. Similarly, the estimated cancer risks for the commercial/industrial worker of 2.3×10^{-4} was also mainly driven by exposure to TCE in groundwater.

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 contaminants 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 contaminants of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the contaminants 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 contaminants. 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.

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 human health risk assessment report.

Screening Level Ecological Risk Assessment (SLERA)

The SLERA was prepared to determine whether potential adverse ecological effects are occurring or may occur based on concentrations of contaminants of potential ecological concern (COPECs) in sediment and surface water at the Site. Ecological exposure was first evaluated by quantifying potential risk based on the most conservative exposure scenarios. The results indicated that maximum concentrations of some constituents in surface water and sediment exceeded conservative screening criteria. However, the potential for impacts to populations from exposure to those constituents is low when evaluated using refined benchmarks that use more realistic exposure conditions to specific receptors. The findings of the exposure evaluation and risk characterization support the following conclusions for the exposure area:

1) Cyanide was detected at a low concentration in surface water at one location in Mud Creek. This however does not pose unacceptable risks for fish communities because the pathway for exposure is incomplete as Mud Creek upstream of Gorge Pond runs dry portions of the year and, therefore, is unable to support fish communities.
2) Acetone was also found in in sediment at the Site but is not a Site-related constituent as it was not associated with the spill from the train derailment. The acetone is unlikely to adsorb to sediment and was found in similar concentrations within and outside the historical plume. The lack of sediment quality criteria and ecotoxicity data suggest that this analyte is unlikely to adversely impact macroinvertebrates. Therefore, the presence of this constituent in sediment samples is not considered Site-related and does not pose a significant risk to benthic invertebrate populations.

A Supplemental Ecological Risk Evaluation was performed to estimate the potential for adverse effects to ecological receptors exposed to contaminated soils at the Site (USEPA, 2021b). Analytical data used in the Supplemental Risk Evaluation included TCE concentrations measured in post-SVE soil boring samples collected in August 2017 from 0.5 to 2.5 ft bgs. The risk was evaluated for surface soils because exposure pathways to terrestrial ecological receptors are only complete in surface soil. Exposure point concentrations (EPC) calculated by EPA were compared to the 2 mg/kg soil cleanup objective (SCO) for protection of ecological receptors established by the NYSDEC. The NYSDEC value assumes that the soil-to-earthworm-to-small mammal exposure pathway is the most sensitive wildlife ingestion pathway. Based on this comparison, EPA calculated a hazard quotient (HQ) for the Spill Zone of 230 based on an EPC of 460.2 mg/kg. Under current conditions, placement of a stone cover as part of the SVE system prevents the establishment of habitat to support a forage base (*e.g.*, earthworms, vegetation, etc.) for ecological receptors and minimizes incidental soil ingestion. However, if the existing cover is removed, there is a potential for future habitat to be present for ecological receptors.

Summary of Human Health Risks

In summary, the result of the 2016 HHRA and the 2021 supplemental soil evaluation indicated that residual TCE in Spill Zone soils, groundwater and surface water of Mud Creek were associated with cancer and/or noncancer risk estimates that exceeded EPA's threshold criteria. Further, as discussed in the 2016 HHRA, the presence of TCE in groundwater was also found at levels that could be of concern for the vapor intrusion pathway.

Basis for Action

Based upon the RI and the quantitative human-health risk assessment and ecological evaluation, 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 hazardous substances at and from the Site.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives 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 (TBC) guidance, and site-specific risk-based levels.

The RAOs identified in the 1997 NYSDEC ROD were as follows:

- Provide for attainment of Standards, Criteria and Guidance (SCGs) for groundwater quality and surface water quality at the limits of the area of concern, to the extent practicable.

- Prevent, to the extent possible, migration of contaminants in groundwater and reduce the impacts of contaminated groundwater to the environment.
- Reduce, control, or eliminate, to the extent practicable, the soil and bedrock contamination present at the derailment Site.
- Eliminate the potential for human and wildlife exposure to soil containing Site-related contaminants.
- Contain, treat and/or dispose of contaminated soil in a manner consistent with applicable state and federal regulations and guidance.

EPA is amending and supplementing these RAOs with the RAOs detailed below which are organized by media. In developing RAOs for groundwater, EPA expects to return usable groundwater to its beneficial uses (in this case, use as drinking water) wherever practicable, within a timeframe that is reasonable given the characteristics of the site. All groundwater in New York State is classified as "GA," which means it is suitable as a source of drinking water. Therefore, applicable or relevant and appropriate requirements for groundwater include the NYS Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations (6 NYCRR Part 703) and the Safe Drinking Water Act maximum contaminant levels (MCLs). EPA also acknowledges, however, that groundwater restoration is not always achievable due to limitations in remedial technologies and other site-specific factors. These factors may include technology limitations, contaminant phase, contaminant depth, complexity of geological setting, and hydraulic regime.

As discussed above, after evaluating the nature and extent of groundwater contamination and the available remedial alternatives for groundwater, EPA has concluded that the available technologies cannot achieve restoration of the contaminated groundwater to drinking water standards. EPA is invoking a waiver of ARARs due to technical impracticability (TI) for groundwater at the Site. The PRP documented its evaluation of the potential for groundwater restoration in the 2019 AGTI report and identified a zone where ARARs are expected to be exceeded for the foreseeable future. EPA acknowledged that this evaluation satisfied the requirements for a TI waiver.

This TI decision applies only to the chemical-specific groundwater standards being waived in the area where ARARs or other cleanup standards cannot be reached (hereinafter, the TI Zone). For the Site, the TI Zone includes the portion of the groundwater in the Spill Zone and the plume downgradient to Spring Creek. The horizontal and vertical extent of the TI Zone is illustrated on **Figure 4**, which shows the TI Zone (items 1 and 2 below) and an area around the TI Zone as follows:

> **1. Red (Zone 1)**: depicts an area encompassing the approximately 3.1 million square foot Spill Zone and extending vertically to the upper Camillus Formation (a depth corresponding to approximately 120 ft bgs), resulting in a volume of approximately 213 million cubic feet where groundwater TCE concentrations generally exceed 1,000 µg/L; and

2. Yellow (Zone 2): depicts an area encompassing approximately 102 million square feet outside of the Spill Zone area extending vertically to the base of the Camillus Formation (ranging from approximately 120 ft bgs in the western extent of the Study Area to outcrops occasionally near Spring Creek, and Oatka Creek), resulting in a volume of approximately 7,821 million cubic feet where groundwater TCE concentrations generally range from 5 µg/L to 1,000 µg/L. The TI boundary at the distal end of the TCE plume was established to include the entire Spring Creek Fault Zone that extends just east of Spring Creek.

3. Gray (Monitoring Zone): depicts an area outside of the TI Zone that encompasses an approximately 39 million square foot area extending vertically to the base of the Camillus Formation (ranging from approximately 120 ft bgs in the western extent of the Study Area to outcrops occasionally near Spring Creek, and Oatka Creek) resulting in a volume of approximately 2,990 million cubic feet where TCE concentrations in groundwater generally range from non-detect to 5 µg/L. Outside of the TI Zone (in the gray area), the preliminary remediation goals (discussed below) will be used to verify compliance with the TI waiver.

When restoration of groundwater to beneficial uses is not practicable, EPA selects an alternative remedial strategy that is technically practicable, protective of human health and the environment, and satisfies statutory and regulatory requirements of CERCLA. Consistent with the NCP, alternative remedial strategies for TI sites typically address three site concerns: 1) exposure control; 2) source control; and 3) aqueous plume migration. The RAOs outlined below for groundwater, soil vapor, bedrock, surface water and soil address these concerns.

Groundwater Remedial Action Objectives:

- Prevent current and future human exposure (via ingestion, inhalation and dermal contact) to Site-related contaminants in groundwater that exceed federal or state maximum contaminant levels (MCLs).

- Prevent further migration of Site-related contaminants in groundwater at levels exceeding MCLs beyond the delineated areal extent of the groundwater contamination or TI Zone.

- Prevent the migration of Site-related contaminants in groundwater to surface water that would result in exceeding applicable surface water quality standards.

Soil Vapor Intrusion (SVI) Remedial Action Objective:

- Mitigate potential current and future unacceptable risks from subsurface SVI into indoor air.

Bedrock Remedial Action Objectives:

- Mitigate, to the extent practicable, the Bedrock Vadose Zone (BVZ) as an ongoing source of groundwater contamination;
- Accelerate long-term improvement to the groundwater in a reasonable time frame; and,
- Support further risk reduction for the Site as a whole.

Soil in Spill Zone Remedial Action Objective:

- Prevent human exposure to contaminated Spill Zone soil (*i.e.*, contaminated overburden fill material/debris/soil) via incidental ingestion and inhalation above levels that pose an unacceptable risk for commercial use.

Surface Water Remedial Action Objective:

- Prevent unacceptable risk to human receptors from incidental ingestion and dermal contact exposure to contaminated surface and seep water in the Mud Creek area by reducing contaminant levels to the more stringent federal or state standards.

Remediation Goals

Remediation goals (RGs) are media- and contaminant-specific numerical or qualitative federal and state standards that can be compared directly to RAOs and will be used for developing use restrictions and other actions to prevent exposure and for assessing the extent of the aqueous plume. To evaluate remedial alternatives and support the RAOs, preliminary remediation goals (PRGs) for the Site were developed for soil, groundwater and surface water. PRGs are related to RAOs and are based on state and federal standards and are used for developing the final cleanup levels, or RGs, in the ROD, use restrictions and other actions to prevent exposure. RGs will not be used for achieving restoration of groundwater within the TI Zone to the numerical goals but will be used for assessing the extent of the aqueous plume.

As there are no chemical-specific ARARs for SVI, RGs were not specifically developed for vapor intrusion. However, applicable TBC criteria include EPA Vapor Intrusion Screening Levels (VISLs) and NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York. The most current EPA VISLs and NYSDOH criteria will be used in the evaluation of the SVI pathway at the Site.

The 1997 NYSDEC OU1 ROD established the groundwater and surface water RGs as follows:

- Groundwater: 5 µg/L TCE
- Surface water: 11 µg/L TCE
- Surface soil: 7 mg/kg TCE; 3 mg/kg 1,2-dichloroethene

With this decision, EPA is replacing the RGs with the following (also **Table 9** in Appendix II):

Remediation Goals (RGs)

ENVIRONMENTAL MEDIA	CONTAMINANT OF CONCERN	RG	UNITS
Groundwater[1]	Trichloroethene (TCE)	5	µg/L
	cis-1,2-dichloroethene	5	µg/L
	trans-1,2-dichloroethene	5	µg/L
	1,1- dichloroethene	5	µg/L
	Vinyl Chloride	2	µg/L
Surface Water[2]	Trichloroethene (TCE)	40	µg/L
Soil[3]	Trichloroethene (TCE)	200	mg/kg

Footnotes:
[1] Lower of the NYSDEC Class GA Groundwater Quality Standards and NY state and federal Maximum Contaminant Levels were selected as RGs. These RGs are the ARARs being waived in the TI Zone.
[2] NYSDEC - Part 703: Surface Water Quality Standards for Class C waters (based on designation of Mud Creek).
[3] 6 NYCRR Part 375, Table 375-6.8(b) Commercial use Soil Cleanup Objective. The protection of groundwater SCO was evaluated as part of the Feasibility Study but was not applied because groundwater restoration is not practicable.

As reflected in the RG table above, the primary groundwater COCs include TCE and its breakdown daughter products: cis- and trans- 1,2 dichloroethene, 1,1,- dichloroethene and vinyl chloride.

The OU2 RI and AGTI Report conclude that a substantial quantity of TCE from the original spill has diffused into the rock matrix. As such, remediation of the bedrock matrix would be difficult as a result of the bedrock geology, as well as the size, migration, and location of the TCE mass. Currently, there are no published ARARs, TBCs, or other guidance specific to the BVZ. Therefore, RGs have not been identified for the BVZ. The AGTI Report concludes that the restoration of groundwater within the Study Area to its most beneficial use is not technically practical within a reasonable timeframe. Therefore, BVZ RAOs are based on source reduction and exposure control.

SUMMARY OF REMEDIAL ALTERNATIVES

Section 121(b)(1) of CERCLA, 42 U.S.C. § 9621(b)(1), mandates that remedial actions must be protective of human health and the environment, cost-effective, comply with ARARs, and utilize permanent solutions, alternative treatment technologies, and resource recovery alternatives to the maximum extent practicable. Section 121(b)(1) of CERCLA also establishes a preference for remedial actions that employ, as a principal element, treatment to reduce, permanently and significantly, the volume, toxicity, or

mobility of the hazardous substances, pollutants, and contaminants at a site. Section 121(d) of CERCLA, 42 U.S.C. § 9621(d), further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants that, at least, attains ARARs under federal and state laws, unless a waiver can be justified pursuant to Section 121(d)(4) of CERCLA, 42 U.S.C. § 9621(d)(4).

The alternatives for addressing contamination at the Site are organized by media and summarized below. Detailed descriptions of the remedial alternatives for addressing the contamination found at the Site are provided in the 2023 FS Report. The construction time for each alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, negotiate the remedy performance with the PRP or procure contracts for design and construction.

Common Elements of the Alternatives

The alternatives described below, with the exception of the 'No Action' alternative, include common elements which are implementable and do not change significantly in scope from one alternative to another as follows:

a. Institutional Controls in the form of governmental controls (see Appendix C of the 2023 FS Report); proprietary controls (*e.g.*, easements on Spill Zone parcels); and informational devices relating to groundwater, soil vapor, and the Spill Zone (*e.g.*, notices, publications) to limit exposure to contaminated soil, groundwater and soil vapor;
b. Monitoring, which includes sampling, of groundwater, surface water, soil vapor and indoor air as follows:
    - A long-term groundwater and surface water monitoring program will be implemented to track and to monitor changes in the groundwater contamination to ensure the RAOs are attained.
    - The groundwater data results would be used to evaluate any contaminant migration and changes in VOC contaminants over time.
    - Soil vapor and indoor air would be collected to ensure continued protection for impacted properties.
c. Maintenance of existing sub-slab depressurization systems (SSDSs) and installation of new systems, as needed, for impacted properties; and
d. Connection of new homes constructed over the groundwater plume to the current municipal water supply system or the provision of a point-of-entry treatment system if connection to the municipal system is not feasible.

The costs for the common elements discussed above that apply to groundwater and soil vapor are outlined below. For the common elements that apply to the other media, those costs are presented in the media-specific alternatives below.

Cost Summary for Groundwater and Soil Vapor Common Elements

Media	Description	Capital Costs	Present Worth O&M Costs(1)	Institutional Controls Cost	Total Costs
Groundwater	Monitoring & ICs	$0	$2,253,200	$524,000	$2,778,000
Soil Vapor	Monitoring & Maintenance	$0	$659,700	$0	$660,000

(1) Present Worth costs for Groundwater and Soil Vapor Media Operation & Maintenance were estimated for a 30-year O&M period

Bedrock Vadose Zone (BVZ) Remedial Alternatives

BVZ Alternative 1: No Action

The Superfund regulations require that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative does not include any remedial measures that address the contamination at the Site.

Capital Cost:	$0
Annual O&M Cost:	$0
Present-Worth Cost:	$0

BVZ Alternative 2: Monitoring and ICs

No active remedial actions would be implemented in the BVZ under Alternative 2. An operations and maintenance (O&M) plan would be prepared to protect workers from TCE exposure by outlining methods and procedures for any on-Site work activities. Additionally, ICs (consisting of deed notices and informational devices) and monitoring (groundwater sampling) would be established to prevent the potential use and exposure of impacted materials, as well as to monitor the groundwater quality through sampling over time.

Capital Cost:	$0
Annual O&M Cost:	$0
Common Elements Cost:	$137,250
Present-Worth Cost:	$137,250
Construction Time:	Not Applicable

BVZ Alternative 3a (original OU1 bedrock remedy): BVE in a 10-acre portion of the BVZ, Monitoring and ICs:

Under this alternative, which was also part of the selected remedy in the OU1 ROD, a BVE system would be installed within the Spill Zone to address the TCE mass that remains within the unsaturated BVZ in the 10-acre area. This would consist of a network of vapor extraction wells, vacuum extraction pumps, and a treatment system to mitigate the extracted vapors. The extent of the proposed area is based on bedrock TCE vapor with the outer most limits containing concentrations of approximately 10,000 µg/m3. TCE within the seasonally saturated BVZ would not be addressed by this alternative as it would not be effective.

Capital Cost:	$8.36 million
Annual O&M Cost:	$1.00 million
Common Elements Cost:	$0.14 million
Present-Worth Cost:	$9.50 million
Construction Time:	8 months

BVZ Alternative 3b: BVE in a 2-acre portion of the BVZ, Monitoring and ICs

Under this alternative, a BVE system would be installed within the Spill Zone to address the TCE mass that remains within the unsaturated BVZ in a two-acre area. This consists of a network of vapor extraction wells, vacuum extraction pumps, and a treatment system to mitigate the extracted vapors. The extent of the proposed area is based on bedrock TCE vapor data with the outermost limits containing concentrations of approximately 1,000,000 µg/m3. TCE within the seasonally saturated BVZ would not be addressed by this alternative as it would not be effective.

Capital Cost:	$2.73 million
Annual O&M Cost:	$0.85 million
Common Elements Cost:	$0.14 million
Present-Worth Cost:	$3.72 million
Construction Time:	4 months

Surface Water (SW) Remedial Alternatives

SW Alternative 1: No Action

The Superfund regulations require that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. The no-action remedial alternative does not include any remedial measures that address the contamination at the Site.

Capital Cost:	$0
Annual O&M Cost:	$0
Present-Worth Cost:	$0

SW Alternative 2: ICs and Monitoring

No active surface water remedial action would be implemented as part of this alternative. Improvements in surface water quality would be through natural degradation of TCE by dispersion, dilution, volatilization, biodegradation, and abiotic processes. Monitoring would determine if the surface water quality improved over time.

Capital Cost:	$1.76 million
Annual O&M Cost:	$0
Common Elements Cost:	$0.08 million
Present-Worth Cost:	$1.84 million
Construction Time:	Not Applicable

SW Alternative 3: Hydraulic Containment of Contaminated Groundwater with ICs and Monitoring

This alternative would involve the installation and operation of several groundwater extraction wells (and associated treatment and discharge of extracted groundwater) to prevent contaminated groundwater discharges to surface water and active seeps and flows within the Mud Creek area. A Preliminary Design Investigation (PDI) would be undertaken and include collection of seasonal data in the Mud Creek area for flow conditions, groundwater elevations, surface water quality, and identification of fractured rock or karst subsurface flow pathways. Wells and piezometers would be installed, and pump tests would be completed to refine data on groundwater level fluctuations and flow directions, seep flow rates, changes in COC concentrations, and hydraulic conductivity. Monitoring would determine if the surface water quality improves over time.

Capital Cost:	$5.43 million
Annual O&M Cost:	$5.09 million
Common Elements Cost:	$0.08 million
Present-Worth Cost:	$10.6 million
Construction Time:	1 year

SW Alternative 4: Streambed Cover with ICs and Monitoring

This alternative consists of covering the active Mud Creek stream segments and seeps that are impacted by TCE with stones sourced from nearby quarries. The stones would be placed such that the stream would be well below the top of the streambed cover, thereby preventing direct human contact with TCE-impacted media. A PDI would be conducted in order to properly assess the long-term effectiveness of the proposed streambed cover, and to ensure its proper design and placement. Monitoring would determine if the surface water quality improves over time.

Capital Cost:	$2.07 million
Annual O&M Cost:	$0.53 million
Common Elements Cost:	$0.08 million
Present-Worth Cost:	$2.69 million
Construction Time:	3 months

SW Alternative 5: In-situ Treatment of Contaminated Surface Water, Streambed Cover with ICs, and Monitoring

This alternative includes the streambed cover from Alternative 4 and adds the installation of one or more permeable treatment barriers (PTBs) to create treatment zones as an engineered in-situ treatment process. The PTBs would also prevent any potential human contact with TCE-impacted surface water. Once a PDI has been completed for the Mud Creek area, the design, the number of treatment zones, their specific location, configuration, and the process or media to be used within the treatment zones will be determined. The PDI would collect seasonal data for flow conditions, groundwater elevations, surface water quality samples, and identification of fractured rock or karst subsurface flow pathways. Additional geochemical sampling and pilot scale installation of one or more of the PTBs in potential treatment zones would be conducted to determine performance and maintenance requirements of the PTBs. Monitoring would determine if the surface water quality improves over time.

Capital Cost:	$4.12 million
Annual O&M Cost:	$3.10 million
Common Elements Cost:	$0.08 million
Present-Worth Cost:	$7.31 million
Construction Time:	3 months

Soil Remedial Alternatives

Soil Alternative 1: No Action

The NCP requires that a “No Action” alternative be developed and considered as a baseline for comparing other remedial alternatives. Under this alternative, no additional action would be implemented beyond what was accomplished under the OU1 ROD.

Capital Cost:	$0
Annual O&M Cost:	$0
Present-Worth Cost:	$0

Soil Alternative 2: Solidification/Stabilization (S/S) or Cover System using Commercial Land-Use Based PRG

Under this alternative, the Spill Zone overburden soils would be remediated using ex situ solidification/ stabilization. Overburden materials exceeding the commercial land-use PRG of 200 mg/kg for TCE in soil to depths ranging up to 10.5 ft bgs would be excavated, mixed with Portland cement (or other material) to immobilize the contamination, and returned to the excavation area underlain by a demarcation layer. Post-excavation samples would be completed to ensure all impacted overburden soil exceeding the commercial land use PRG of 200 mg/kg for TCE has been removed. In addition, placement of topsoil and seed to provide for one foot of clean soil cover will extend to any areas of the Spill Zone where surface soil exceeds 2 mg/kg, which is the NYS value for the protection of ecological receptors. Community air monitoring and dust control measures would be performed during construction activities to ensure that VOCs are not volatilizing into the air.

On-Site ex-situ treatment of TCE-impacted overburden in a temporary treatment unit and placing the solidified material in the excavation area would need to comply with Resource Conservation and Recovery Act (RCRA) corrective action management unit (CAMU) performance standards including requirements for a liner, leachate collection system, cap, and groundwater monitoring.

Capital Cost:	$1.37 million
Annual O&M Cost:	$0.71 million
Common Elements Cost:	$0.12 million
Present-Worth Cost:	$2.20 million
Construction Time:	20 months

Soil Alternative 3: Excavation/Disposal using Commercial Land-Use Based PRG

Under this alternative, the Spill Zone overburden material exceeding the commercial land use PRG for TCE of 200 mg/kg would be excavated to depths of up to 10.5 ft bgs. An estimated total of 1,150 cubic yards (yd^3) (1,840 tons) of overburden would be removed and disposed off-Site at an approved disposal facility. Post-excavation samples would be completed to ensure all impacted overburden material exceeding the PRG of 200 mg/kg for TCE has been removed. The area would then be backfilled using clean, imported soil and/or stone underlain by a demarcation layer. In addition, placement of topsoil and seed to provide for one foot of clean soil cover would extend to areas of the Spill Zone where surface soil exceeds the 2 mg/kg value for the protection of ecological receptors. Community air monitoring and dust control measures would be performed during construction activities to verify volatilization of VOCs into the air is not occurring.

Capital Cost:	$3.02 million
Annual O&M Cost:	$0.06 million
Common Elements Cost:	$0.12 million
Present-Worth Cost:	$3.20 million
Construction Time:	6 months

Soil Alternative 4: Low-Temperature Thermal Desorption (LTTD) using Commercial Land-Use Based PRG

Under this alternative, the Spill Zone overburden material exceeding the commercial land use PRG of 200 mg/kg would be remediated ex-situ using LTTD to depths of up to 10.5 ft bgs. An estimated total of 1,150 yd^3 (1,840 tons) of overburden would be removed, treated via LTTD. Post-excavation samples would be completed to ensure all impacted overburden material exceeding the PRG of 200 mg/kg for TCE has been removed. The area would then be backfilled using clean, imported soil and/or stone underlain by a demarcation layer. In addition, placement of topsoil and seed to provide for one foot of clean soil cover would extend to areas of the Spill Zone where surface

soil exceeds 2 mg/kg value for the protection of ecological receptors. Community air monitoring and dust control measures will be performed during construction activities to verify volatilization of VOCs into the air is not occurring.

On-Site treatment of TCE-impacted overburden by ex-situ in a temporary treatment unit and placing the treated material in the excavation area would need to comply with the RCRA CAMU performance standards. If LTTD treatment achieves 90% reduction of TCE or reaches 10 times the universal treatment standard (60 mg/kg), the CAMU would not have to comply with the requirements for a liner, leachate collection system, cap, and groundwater monitoring.

Capital Cost:	$1.82 million
Annual O&M Cost:	$0.06 million
Common Elements Cost:	$0.12 million
Present-Worth Cost:	$2.00 million
Construction Time:	16 months

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy for a site, EPA considers the factors set forth in Section 121 of CERCLA, 42 U.S.C. § 9621, and conducts a detailed analysis of the viable remedial alternatives in accordance with the NCP, 40 C.F.R Section 300.430(e)(9), the EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies*, OSWER Directive 9355.3-01, and the EPA's *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, OSWER 9200.1-23.P. The detailed analysis consists of an assessment of the individual alternatives set forth in the FS against each of the nine evaluation criteria set forth at Section 300.430(e)(9)(iii) of the NCP and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

The evaluation criteria are described below.

Threshold Criteria – The two threshold criteria described below must be met in order for the alternatives to be eligible for selection in accordance with the NCP.

- *Overall protection of human health and the environment* addresses whether a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

- *Compliance with ARARs* addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and requirements or provide grounds for invoking a waiver.

Primary Balancing Criteria – The following five criteria are utilized to compare and evaluate the elements of one alternative to another that meet the threshold criteria:

- *Long-term effectiveness and permanence* refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.
- *Reduction of toxicity, mobility, or volume through treatment* is the anticipated performance of the treatment technologies, with respect to these parameters, that a remedy may employ.
- *Short-term effectiveness* addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.
- *Implementability* is the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.
- *Cost* includes estimated capital and O&M costs, and net present-worth costs.

Modifying Criteria – The modifying two modifying criteria are used as the final evaluation of remedial alternatives, generally after EPA has received public comment on the RI/FS and Proposed Plan:

- *State acceptance* indicates if, based on its review of the RI and FS reports and the Proposed Plan, the State concurs with the selected remedy at the present time.
- *Community acceptance* refers to the public's general response to the alternatives described in the FS report and Proposed Plan.

The following is a comparative analysis of these alternatives based upon the evaluation criteria noted above.

Bedrock Alternatives

Overall Protection of Human Health and the Environment

BVZ Alternative 1 (No Action) would not meet the RAOs and would not be protective of human health and the environment because no action would be taken. BVZ Alternatives 2, 3a and 3b would address risk mitigation through the ICs. Although the active remedial BVZ alternatives (3a and 3b) would provide for a marginal reduction in TCE mass within the BVZ, the beneficial impact with respect to protection of human health would be negligible given that the majority of the TCE mass would be retained within the bedrock matrix micro pore spaces. None of the alternatives presented would substantially improve groundwater quality as a result of the matrix diffusion

mechanisms that occur between the bedrock matrix porewater and the groundwater media, which would be expected to continue for a significant period of time into the future.

Compliance with Applicable or Relevant and Appropriate Requirements
There are no current federal and/or state ARARs that are applicable for the bedrock source material. None of the bedrock alternatives presented would be sufficient to meet the groundwater ARAR of 5 µg/L across the entirety of the TCE-impacted groundwater plume or to reduce risk, in general, with regards to exposure to TCE-impacted groundwater media.

Long-Term Effectiveness and Permanence
BVZ Alternative 1 would not have any long-term effectiveness and permanence because no action would be taken. BVZ Alternative 2, which involves the implementation of comment elements and ICs, would provide for a permanent and effective means of mitigating potential exposure to TCE-impacted bedrock media and to Site groundwater that is impacted by the TCE present within the bedrock media. BVZ Alternatives 3a and 3b would not be expected to provide any benefit with respect to: i) reducing TCE mass to any practical extent within the BVZ; and ii) reducing TCE concentrations (and associated exposure risk) within the TCE-impacted groundwater media, based on an analysis of the Site data collected through various investigations and modeling efforts.

Reduction of Toxicity, Mobility, or Volume Through Treatment
BVZ Alternative 1 would not address the contamination through treatment, so there would be no reduction in toxicity, mobility, or volume of the contaminants, and the alternative does not include long-term monitoring of groundwater conditions. As a result of the limitations and uncertainties associated with the matrix diffusion processes within bedrock media, the unpredictable nature associated with the application of BVE in a fractured bedrock media and any implementation of active remediation through BVE (BVZ Alternatives 3a and 3b), would be expected to recover a very small fraction of the TCE mass that lies within the BVZ. Consequently, only a marginal reduction of toxicity, mobility and volume would be expected within the bedrock media when compared to the BVZ Alternatives 1 and 2.

Short-Term Effectiveness
BVZ Alternative 1 would not have short-term adverse impacts, because no action would be implemented. The activities associated with the BVE system installation phase for BVZ Alternatives 3a and 3b would present a moderate to high degree of risk to on-Site workers, and little to no risk to the community. The elevated risk associated with the installation of the BVE system could be mitigated through the appropriate training of on-Site personnel, and implementation of rigorous safety protocols. Once a BVE system is operational, routine sampling and O&M activities would present a moderate degree of risk to on-Site workers, and little to no risk to the community. In contrast, implementation of either BVZ Alternatives 1 or 2 would not present any increased risk to on-Site workers or the public, in general.

Implementability
BVZ Alternative 1 would be the easiest alternative to implement, as there are no activities to undertake. The implementability of BVZ remedial alternatives 3a and 3b would be challenging since a large number of extraction wells would be required, there are uncertainties with regards to their placement, and there are system operational challenges associated with: i) a highly variable water table; and ii) matrix diffusion processes within the bedrock media (both of which would limit that amount of TCE mass that could be recovered by the BVE process). Additionally, the application of BVE would not address the TCE-impacted bedrock that is present below the water table, thus further impacting its implementability and effectiveness. In contrast, there are no technical or administrative implementability issues associated with the BVZ Alternatives 1 and 2.

Cost
The estimated capital, O&M, and present-worth cost are discussed in detail in EPA's *Final Feasibility Study Report*. For estimating costs and for planning purposes, a 3-year time frame was used for O&M under Alternatives 3a and 3b. The cost estimates are based on the best available information.

Cost Summary for Bedrock Media Remedial Alternatives

Alternative	Capital Cost	Present Worth Costs	Institutional Control Costs	Total Costs
#1 – No Action	$0	$0	$0	$0
#2 – Institutional Controls	$0	$0	$137,250	$137,250
#3a – BVE (10-Acre Area)	$8,356,700	$1,007,616	$137,250	$9,502,000
#3b – BVE (2-Acre Area)	$2,729,950	$850,176	$137,250	$3,718,000

Surface Water Alternatives

Overall Protection of Human Health and the Environment
SW Alternative 1 (No Action) would not meet the RAOs and would not be protective of human health and the environment because no activities would be taken. SW Alternative 2: ICs and Monitoring and SW Alternative 4: Streambed Cover with ICs and Monitoring would not be protective remedial approaches since they would not reliably prevent unacceptable exposure in Mud Creek surface water and would not address contaminant migration from the Spill Zone to Mud Creek. The Hydraulic Containment (SW Alternative 3) and In-situ Treatment with Streambed Cover (SW Alternative 5) alternatives would provide protection by eliminating unacceptable exposure through both the containment of the TCE-impacted surface water and treatment process. A PDI would need to be conducted in order to obtain specific data, such as seasonal surface water flows, TCE concentrations, and pilot scale data to assist in the implementation of

key design elements for SW Alternatives 2, 3, 4, and 5.

Compliance with Applicable or Relevant and Appropriate Requirements
The No Action alternative would not comply with NYS standards for surface water TCE concentration within a "Class C" stream (*i.e.*, 40 µg/L). SW Alternative 2 (PDI and Common Elements) and SW Alternative 4 (Streambed Cover with ICs) would not comply with ARARs and would not provide for a reduction in TCE concentrations that would meet the RG. Implementation of Hydraulic Containment (SW Alternative 3) and In-Situ Treatment with Streambed Cover (SW Alternative 5) would achieve the RG for TCE.

Long-Term Effectiveness and Permanence
The long-term effectiveness under the No Action and the ICs and Monitoring alternatives (SW Alternatives 1 and 2) would not be achieved, as these two alternatives do not provide for a method to address surface water TCE concentrations that exceed the RG. Assuming favorable results are obtained from the PDI, SW Alternatives 3, 4, and 5 could all provide for an effective long-term solution with regards to surface water TCE-impacts in the Mud Creek area. In addition to favorable results from the PDI, the implementation of routine O&M procedures would be another key component with regards to the long-term effectiveness of SW Alternatives 3, 4, and 5.

Reduction of Toxicity, Mobility, or Volume Through Treatment
SW Alternative 1 (No Action) would not address the contamination through treatment so there would be no reduction in toxicity, mobility, or volume of the contaminants. Additionally, the No Action alternative does not include long-term monitoring of the ongoing groundwater conditions. The No Action and the Common Elements alternatives (SW Alternatives 1 and 2) do not provide for any reduction of toxicity, mobility or volume of TCE impacts. Since SW Alternatives 3 and 5 provide for a method of containment for contaminated groundwater discharging to surface water, the two alternatives would then provide for a reduction in the toxicity, mobility and volume of TCE with regards to the surface water pathway. Since SW Alternative 4 presents only a physical barrier, this alternative does not provide a reduction of toxicity, mobility or volume. SW Alternatives 3 and 5 also provides for an additional mechanism that may result in the reduction of toxicity, mobility and volume of TCE in surface water through a treatment process.

Short-Term Effectiveness
SW Alternative 1 (No Action) would not have short-term adverse impacts because no action would be implemented. The system installation activities associated with SW Alternatives 3, 4 and 5 would present a moderate to high degree of risk to on-Site workers, and little to no risk to the community. A significant component of this risk is the result of construction activities that would need to be conducted in largely wooded and uneven terrain. The elevated risk associated with the installation of these remedial systems could be mitigated through the appropriate training of on-Site personnel, use of proper construction equipment, and implementation of safety protocols. Routine sampling and O&M activities associated with the proposed remedial systems would

present a moderate degree of risk to on-Site workers and little to no risk to the community. In contrast, implementation of either the No Action or the Common Elements alternatives would not present any increased risk to on-Site workers or the public in general.

Implementability

Alternative 1 would be the easiest alternative to implement, as there are no activities to undertake. No technical implementability issues are associated the No Action and Common Elements alternatives. SW Alternatives 3, 4 and 5 would all require a PDI to be conducted initially in order to determine the design parameters associated with their implementation. Depending on the results of the PDI, each of these three alternatives would require a significant amount of construction activities to be conducted within a heavily wooded area, as well as the Mud Creek streambed itself. Access roads would need to be constructed for construction equipment and on-Site workers to access the various locations where system infrastructure needs to be installed. SW Alternatives 3 and 5 would require an installation phase that may take half-a-year or more to complete. Additionally, SW Alternative 3 would require a significant footprint to house all the necessary equipment necessary for its implementation. SW Alternatives 3 and 5 would require extensive routine O&M activities associated with their long-term operation. This could include servicing of pumps, motors and treatment equipment, replacement of treatment media, and/or waste disposal. In contrast, the long-term O&M activities associated with SW Alternative 4 would be simple and straightforward, and significantly easier to manage over the long-term.

Cost

The estimated capital, O&M, and present-worth cost are discussed in detail in the *Final Feasibility Study Report*. For estimating costs and for planning purposes, a 30-year time frame was used for O&M under Alternatives 3 through 5. The costs estimates are based on the best available information.

Cost Summary for Surface Water Media Remedial Alternatives

Alternative	Capital Cost	Present Worth Costs	Institutional Control Costs	Total Costs
#1 – No Action	$0	$0	$0	$0
#2 – Institutional Controls	$1,757,300	$0	$81,750	$1,840,000
#3 – Hydraulic Containment	$5,427,950	$5,087,690	$81,750	$10,598,000
#4 – Streambed Cover	$2,073,200	$533,587	$81,750	$2,689,000
#5 – In-Situ Treatment with Streambed Cover	$4,121,550	$3,102,250	$81,750	$7,306,000

Soil Alternatives

Overall Protection of Human Health and the Environment
Soil Alternative 1 (No Action) would not meet the RAOs and would not be protective of human health and the environment because no action would be taken. Except for the No Action Alternative, all alternatives are protective of human health and the environment. Soil Alternatives 3 and 4 reduce TCE concentrations on-Site through physical removal. Although Soil Alternative 2 does not reduce TCE concentrations, solidification would mitigate wind/surface water erosion and incidental ingestion/inhalation and placement within a lined/capped CAMU would make these alternatives equally as protective.

Compliance with Applicable or Relevant and Appropriate Requirements
EPA has identified NYSDEC's soil cleanup objectives (SCOs) (6 NYCRR § 375-6.5) as an ARAR, a "to-be considered," or other guidance to address contaminated soil at the Site. Refer to soil PRG in the table above. The No Action Alternative does not achieve the soil PRGs. Since all alternatives involve removal of soil and any treatment options would be expected to meet the soil PRGs for the soil placed back on the ground, post-excavation soil samples would verify attainment of the PRGs. Imported soil for backfill under Soil Alternative 3 would be tested to verify conformance with the allowable constituent levels for imported fill soil. Since Soil Alternative 2 (solidification) would not achieve any reduction in soil TCE concentrations, the CAMU would need to comply with the requirements for a liner, leachate collection, cap, and groundwater monitoring.

Long-Term Effectiveness and Permanence
The No Action Alternative provides no long-term effectiveness toward achieving the RAOs. All alternatives prevent direct contact with residual impacts. Soil Alternative 3 provides the greatest long-term effectiveness and permanence since the TCE-impacted soil media is removed from the Site. If proven effective through pilot testing, Soil Alternative 4 (LTTD) will permanently reduce TCE concentrations on-Site.

Reduction of Toxicity, Mobility, or Volume Through Treatment
Soil Alternative 1, (No Action), would not address the contamination through treatment, so there would be no reduction in toxicity, mobility, or volume of the contaminants, and the alternative does not include long-term monitoring of groundwater conditions. Soil Alternative 2 (solidification) would reduce the mobility but not the toxicity or volume of TCE impacted soil media. Soil Alternative 3 (off-Site disposal) would reduce the toxicity, mobility, and volume on-Site; however, the off-Site reduction in toxicity and/or volume depends on the form of treatment/disposal at the Treatment, Storage and Disposal Facility (TSDF). Soil Alternative 4 (LTTD) would reduce the volume of TCE in the soil media but the overall reduction in volume and toxicity depends on the form of emissions control employed.

Short-Term Effectiveness
Soil Alternative 1 would not have short-term adverse impacts because no action would be implemented. All other soil alternatives would result in noise, dust, and vapor

impacts; however, these are considered minimal and controllable through proper construction techniques. Evaluation of additional emissions controls for crushing that might be required under Soil Alternative 2 (solidification) would be considered during pilot-testing. Except for Soil Alternative 2, the work would be sequenced to minimize the time the excavation will remain open and safety measures would be in place. Construction of a CAMU for Soil Alternative 2 would require an open excavation for a significant period to install the liner and leachate collection system. Soil Alternative 4 would require significant fuel for the LTTD reactor and, since natural gas is not available near the Site, propane or heating oil tanks would need to be kept on-Site resulting in short-term risk to both human health and the environment.

Implementability

Alternative 1 would be the easiest alternative to implement, as there are no activities to undertake. Soil Alternative 2 (solidification) would have significant technical and administrative implementability issues surrounding construction of a CAMU in the Spill Zone. Since ex-situ solidification and stabilization of the soil media does not result in a TCE concentration reduction, the CAMU would have to comply with the requirements for a liner, leachate collection system, cap, and groundwater monitoring. Administrative issues include require agency approval of the CAMU design. The impacted soil media would need to be excavated and stockpiled or placed in roll off containers pending CAMU construction. The impacted material would need to be covered to prevent erosion. Design and construction of a CAMU would extend the time for these remedial alternatives by approximately 12 months. Other implementability issues include determining the type and amount of binding agent that will effectively solidify the impacted soil media and securing the appropriate equipment. The footprint of the CAMU would need to be larger than the excavation area to manage the grade change due to volume increases through the addition of the solidification agent.
Soil Alternative 3 (off-Site disposal) would require traffic coordination for off-Site transport to the TSDF, securing a disposal contract with out-of-State TSDF, and locating a borrow source for backfill material. Soil Alternative 4 requires a pilot test to verify effectiveness, securing specialized equipment for LTTD, and emissions control. Soil Alternative 4 is estimated to take up to 18 months to implement. For all active soil alternatives, community air monitoring and dust control measures would be performed during construction activities to verify volatilization of VOCs into the air is not occurring.

Cost

The estimated capital, O&M, and present-worth cost are discussed in detail in the *Final Feasibility Study Report*. For estimating costs and for planning purposes, a 30-year time frame was used for O&M under Alternatives 2 through 4. The costs estimates are based on the best available information.

Cost Summary for Soil Media Remedial Alternatives

Alternative	Capital Cost	Present Worth Costs	Institutional Control Costs	Total Costs
#1 – No Action	$0	$0	$0	$0
#2 – Solidification/ Stabilization	$1,368,900	$706,000	$121,750	$2,198,000
#3 – Excavation and Proper Disposal	$3,017,897	$62,000	$121,750	$3,202,000
#3 – Low Temperature Thermal Desorption	$1,813,090	$62,000	$121,750	$1,997,000

State/Support Agency Acceptance

NYSDEC, in consultation with NYS Department of Health (NYSDOH), concurs with EPA's selected remedies for the groundwater, bedrock vapor, soil vapor, soil, surface water and the common elements applicable to the various media, however, NYSDEC does not concur with EPA's remediation goal for soil. A letter of concurrence is attached in Appendix IV.

Community Acceptance

Relatively few comments were received during the public comment period. Other than correspondence from LVRR, which expressed concerns about the preferred surface water alternative and the overall cost of the remedy, and a resident's comment on costs of the remedy, the comments and questions received in writing and during the public meeting tended to focus more on Site history, the costs of the prior response actions, and other issues (*e.g.*, connection to the waterline, soil disturbance in/around the Spill Zone, etc.) that were not directly related to the proposed remedy. Given the comments received, EPA believes that the public generally supports the selected remedy. Significant comments are summarized and addressed in the Responsiveness Summary, which is attached as Appendix V to this document.

PRINCIPAL THREAT WASTE

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 the migration of contamination to groundwater, surface water, or air, or act as a source for direct exposure. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained or will 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 alternatives, using the remedy-selection criteria that are described above. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

TCE released from the train derailment has diffused into the bedrock matrix and continues to be an ongoing source of groundwater contamination. Contaminated groundwater is generally not considered to be source material. As discussed in detail in this ROD, the bedrock acts as a continual, slow source to groundwater at the Site, and therefore does not meet the definition of principal threat waste. Additionally, soil is not considered principal threat waste because it does not act as a significant source of contamination to groundwater.

SELECTED REMEDY

Summary of the Rationale for the Selected Remedy

The selected remedy is intended to be a comprehensive one which addresses all contaminated media: groundwater, soil, bedrock, surface water and vapor intrusion.

The selected remedy for the groundwater involves a TI waiver of chemical-specific ARARs based on the following factors: (1) the limited options available to successfully treat contamination in fractured bedrock with extensive evidence of matrix diffusion into the rock over a wide area; (2) the expected limited ability of the groundwater contamination to expand beyond its current extent; and, (3) the limited potential for treatment or containment of contamination remaining in the Spill Zone to result in a measurable improvement in groundwater quality anywhere in the aquifer within a reasonable time period. It also includes monitoring and institutional controls (see common elements).

The selected remedy for the Bedrock Vadose Zone – BVZ Alternative 2: ICs and Groundwater Monitoring was selected over BVZ Alternatives 3a and 3b. As demonstrated in the FS, the source reduction RAOs cannot be met because of matrix diffusion, complexity of the fracture network, and the groundwater elevation fluctuations in the BVZ. The active remedial BVZ alternatives (3a and 3b) would not achieve any appreciable reduction of TCE mass in the long term as a result of the matrix diffusion mechanisms that occur between the bedrock matrix porewater and the groundwater media, which would be expected to continue for a significant period of time into the future. This is also a basis for EPA’s TI waiver as to restoration of groundwater. The implementation of long-term groundwater monitoring and ICs will provide for an effective means of mitigating potential exposure to TCE-impacted bedrock media, and to Site groundwater that is impacted by the TCE present within the bedrock media.

The selected remedy for soil - excavation and off-Site disposal - was selected over other alternatives because it is expected to achieve the greatest degree of long-term effectiveness and permanence by removing impacted soils. Excavation is technically

feasible, is a proven technology, and more reliable than the soil treatment presented in Soil Alternatives 4 and 5. It is expected that the soil remedy will be substantially implemented within five to six months at a cost comparable to the other alternatives and provide for long-term reliability of the remedy.

The selected remedy for surface water - in-situ treatment of contaminated surface water with streambed cover, ICs and monitoring - was selected over the other Alternatives because it is expected to achieve substantial and long-term risk reduction through treatment of contaminants, prevention of contaminant migration, and the use of engineering and institutional controls. The surface water component of the remedy reduces the risk within a reasonable time frame, at a cost comparable to other alternatives, and provides for long-term reliability of the remedy. A PDI would be undertaken and include collection of seasonal data in the Mud Creek area to refine flow conditions, groundwater elevations, surface water quality, and fractured rock or karst subsurface flow pathways.

Based upon the information currently available, EPA believes that the selected remedy meets the threshold criteria and provides the best balance of trade-offs among the other alternatives with respect to the balancing criteria. As discussed above, EPA is invoking an ARAR waiver for specific federal and state drinking water and groundwater standards at the Site because of the technical impracticability of achieving ARARs in the TI Zone.

Description of the Selected Remedy

The response action described in this document amends the OU1 remedy selected by NYSDEC in 1997 and selects a remedy for OU2. The major components of the OU2 remedy by medium are:

1. **Groundwater** - For the approximately four-mile TCE plume, implementation of a combination of monitoring and ICs while invoking a TI waiver for chemical-specific groundwater standards in the TI Zone (see **Figure 4**) because groundwater cannot be restored in a reasonable timeframe. Outside of the TI Zone, the groundwater standards will remain as the final cleanup goal. Long-term monitoring and groundwater use restrictions will be required.

2. **Bedrock Vadose Zone (BVZ)** - ICs and Groundwater Monitoring in the BVZ. The BVZ and the groundwater in the Spill Zone (the 10-acre area of the original TCE spill) are within the TI Zone (see **Figure 4**).

3. **Soil in the Spill Zone** - Excavation/Disposal - Soil exceeding 6 NYCRR Part 375 TCE soil cleanup objectives for commercial use (200 milligrams per kilogram (mg/kg)) to a depth up to 10.5 feet below ground surface (bgs) will be excavated and properly disposed of off-Site. The area will be backfilled using clean, imported soil and/or stone underlain by a demarcation layer. Placement of topsoil and seed to provide for one foot of clean soil cover will extend to any

areas of the Spill Zone where concentrations of TCE in surface soil exceeds 2 mg/kg, which is the NYS value for the protection of ecological receptors.

4. **Surface Water** (Section of Mud Creek): In-situ treatment of contaminated surface water with streambed cover, ICs, and monitoring.

In addition, disturbed areas (including vegetated surfaces, roadways, sidewalks, curbs, etc.) will be restored to their original pre-construction condition and topographic contour following the completion of remedial construction.

5. **Common Elements Applicable to all Media:**

    a. ICs in the form of governmental controls (see Appendix C of the Feasibility (FS) Study Report); proprietary controls (*e.g.*, easements on Spill Zone parcels); and informational devices relating to groundwater, soil vapor, and the Spill Zone (*e.g.*, notices, publications) to limit exposure to contaminated soil, groundwater and soil vapor;
    b. Monitoring, which includes sampling of groundwater, surface water, soil vapor, and indoor air as follows:
        i. A long-term groundwater and surface water monitoring program will be implemented to track and to monitor changes in the groundwater contamination to ensure the RAOs are attained;
        ii. The groundwater data results will be used to evaluate any contaminant migration and changes in VOC contaminants over time;
        iii. Soil vapor and indoor air will be collected to ensure continued protection for impacted properties;
    c. Maintenance of existing sub-slab depressurization systems (SSDSs) and installation of new systems, as needed, for impacted properties; and
    d. Connection of new homes constructed over the groundwater plume to the current municipal water supply system or the provision of a point-of-entry treatment system if connection to the municipal system is not feasible.

With this comprehensive remedy for the Site, EPA is also amending the following components of the NYSDEC 1997 ROD (denominated by EPA as OU1):

1. Eliminating the bedrock vapor extraction source control measure;
2. Eliminating ex-situ soil vapor extraction, as it was implemented for two years;
3. Updating the surface water standard for TCE from the original cleanup goal of 11 micrograms per liter (µg/L) to the current NYSDEC standard of 40 µg/L;
4. Addressing soil contamination beneath Gulf Road by implementing ICs to restrict access and to require proper soil management if the roadbed is disturbed in the future; and
5. Updating the RAOs to recognize the waiver of certain Federal and state drinking water and groundwater standards at the Site because of the technical Impracticability of achieving the standards throughout the TI Zone.

A Site Management Plan (SMP) will also be developed for long-term operation and maintenance (O&M) to provide for:

a) reviews of the effectiveness of the engineering and institutional controls;
b) proper management of the Site remedy post-construction;
c) long-term groundwater monitoring and health and safety requirements for managing contaminated media that remain in place under Gulf Road;
d) maintenance of existing vapor mitigation systems;
e) inspection of the plume area for new home construction and associated installation of new vapor mitigation systems; and
f) new connections of new homes constructed over the groundwater plume to the current municipal water supply system or the provision of a point-of-entry treatment system if connection to the municipal system is not feasible.

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

Expected Outcomes of the Selected Remedy

Implementation of the ROD remedy for groundwater, soil, bedrock, soil vapor, and surface water will eliminate current and potential future exposure to contaminants in these media and ensure that contaminated groundwater does not migrate beyond the boundaries of the TI Zone.

Summary of the Estimated Remedy Costs

The estimated capital and total present-worth cost of the comprehensive selected remedy is $14,082,504. It should be noted that these cost estimates are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent of the actual project cost. These cost estimates are based on the best available information regarding the anticipated scope of the selected remedy. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedy.

[2] See http://epa.gov/region2/superfund/green_remediation, https://semspub.epa.gov/work/HQ/100000160.pdf, and also NYSDEC guidance at http://www.dec.ny.gov/docs/re-mediation_hudson_pdf/der31.pdf.

STATUTORY DETERMINATIONS

Section 121(b)(1) of CERCLA mandates that a remedial action must be protective of human health and the environment, be cost-effective and utilize permanent solutions and alternative treatment 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 the Site. Section 121(d) of CERCLA 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 section 121(d)(4) of CERCLA.

EPA has determined that the selected remedy complies with the CERCLA and NCP provisions for remedy selection, meets the threshold criteria, and provides the best balance of tradeoffs among the alternatives with respect to the balancing and modifying criteria. The following sections discuss how the selected remedy meets those statutory requirements.

Protection of Human Health and the Environment

The selected remedy will adequately protect human health and the environment by eliminating, reducing, or controlling exposures to human and environmental receptors through excavation, treatment, engineering controls, long-term monitoring, and ICs. The selected soil remedy will remove and dispose of contaminated materials offsite, thereby eliminating risk of exposure and migration of impacted soils. The selected surface water remedy will provide long-term risk reduction and protection through both the treatment of contaminants and a containment mechanism to prevent accidental exposure. The selected soil gas remedy will limit exposure risks using ICs and monitoring through maintenance of existing SSDSs and installation of new systems, as needed, for impacted properties. The implementation of long-term groundwater monitoring and ICs would provide for an effective means of mitigating potential exposure to TCE-impacted bedrock media, and to Site groundwater that is impacted by the TCE that is present within the bedrock media.

Compliance with ARARs

The selected remedy will comply with chemical- location- and action-specific ARARs for all media except where ARARs are waived. A full list of the ARARs, TBCs and other guidelines related to implementation of the selected remedy is presented at Tables 10a – 10c**.** A discussion of the more significant ARAR issues is included below.

EPA is invoking a TI waiver for chemical-specific groundwater ARARs in the TI Zone because groundwater cannot be restored in a reasonable timeframe. After evaluating the nature and extent of groundwater contamination and the available remedial alternatives for groundwater, EPA has concluded that the available technologies

cannot achieve restoration of the contaminated groundwater to drinking water standards. Outside of the TI Zone, the ARARs will remain as the final cleanup goal.

The most stringent of the National Primary Drinking Water Standards MCLs, NYS Groundwater Quality Standards and NYSDOH Drinking Water Quality Standards were selected as the remediation goal for the COCs. Consistent with the RAOs and the groundwater TI waiver, these numerical goals will be used for assessing the extent of the aqueous plume and ensuring the necessary use restrictions are enforced, but not for achieving restoration of groundwater to the numerical goals/criteria.

Cost-Effectiveness

A cost-effective remedy is one whose costs are proportional to its overall effectiveness (NCP 300.430(f)(1)(ii)(D)). Overall effectiveness is based on the evaluations of long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Each of the alternatives underwent a detailed cost analysis. In that analysis, capital and annual O&M costs were estimated and used to develop present-worth costs. In the present-worth cost analysis, annual O&M costs were calculated for the estimated life of those alternatives with O&M. The total estimated present worth cost for implementing the selected remedy is approximately $14 million. See Appendix II, **Tables 11a -11e** for detailed cost estimates.

Based on the comparison of overall effectiveness to cost, the selected remedy meets the statutory requirement that Superfund remedies be cost effective (NCP Section 300.430(f)(1)(ii)(D)) in that it represents reasonable value for the money to be spent. Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The overall effectiveness of the selected remedy has been determined to be proportional to the costs, and the selected remedy, therefore, represents reasonable value for the money to be spent.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

The selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner for the Site. EPA has determined that the selected remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element, the bias against off-Site disposal without treatment, and state/support agency and community acceptance. The selected remedy satisfies the criteria for long-term effectiveness and permanence by permanently reducing and/or removing the mass of contaminants in Site soils, surface water, and soil gas, thereby reducing the toxicity, mobility and volume of contamination.

Preference for Treatment as a Principal Element

By using an in-situ treatment as part of the surface water alternative, the selected remedy satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Five-Year Review Requirements

Because this preferred alternative would result in contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure, CERCLA requires that the Site remedy be reviewed at least once every five years. Provisions would also be made for periodic reviews and certifications of the institutional and engineering controls. If justified by these reviews, additional remedial action may be implemented at the LVRR Site.

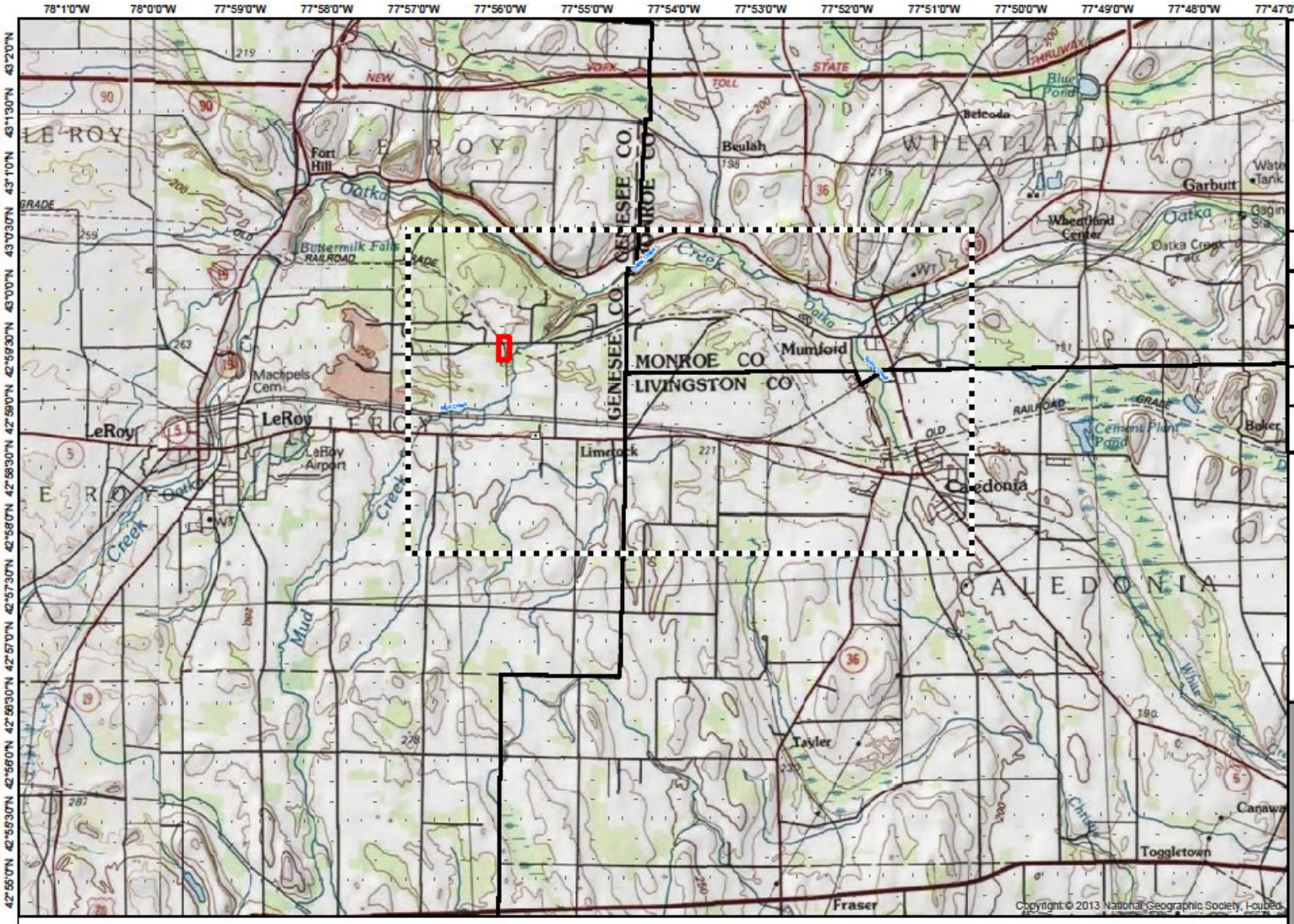
DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan, released for public comment on August 18, 2023, identified the following preferred alternatives for the contaminated media at the Site: 1) Groundwater: Utilization of a TI waiver (includes monitoring and ICs); 2) Bedrock Vadose Zone Alternative BVZ - 2: ICs and Groundwater Monitoring; 3) Soil Alternative 3: Excavation and off-Site Disposal at a licensed disposal facility; and 4) Surface Water Alternative SW-5: In-situ treatment of contaminated surface water with streambed cover, ICs and monitoring as the preferred remedy.

EPA considered all comments during the public comment period to determine if any significant changes to the remedy, as originally identified in the Proposed Plan, were necessary. EPA has determined that no significant changes to the remedy, as originally identified in the Proposed Plan, are necessary or appropriate.

APPENDIX I

FIGURES



1 0.5 0 1 2 3 Miles

Regional Map

FIGURE 1

M/N

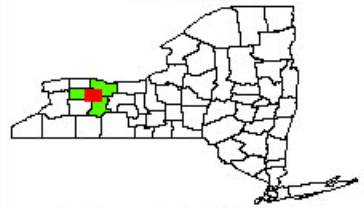
Unicorn Management Consultants, LLC

52 Federal Road
Suite 2C
Danbury, CT
06810

(203) 205-9000

Project Name:	Lehigh Valley Railroad Derailment Superfund Site
Author: RTM	**Checked By:** NRH/ZDD
Project #: 2032	**Created:** 10/27/09
	Revised: 8/11/20
Scale: 1 In:5,000 ft	**File:** Fig1-2_Regional

New York State



●= Approximate Study Area

Legend

- Approximate Spill Zone
- Approximately Study Area
- County Boundary

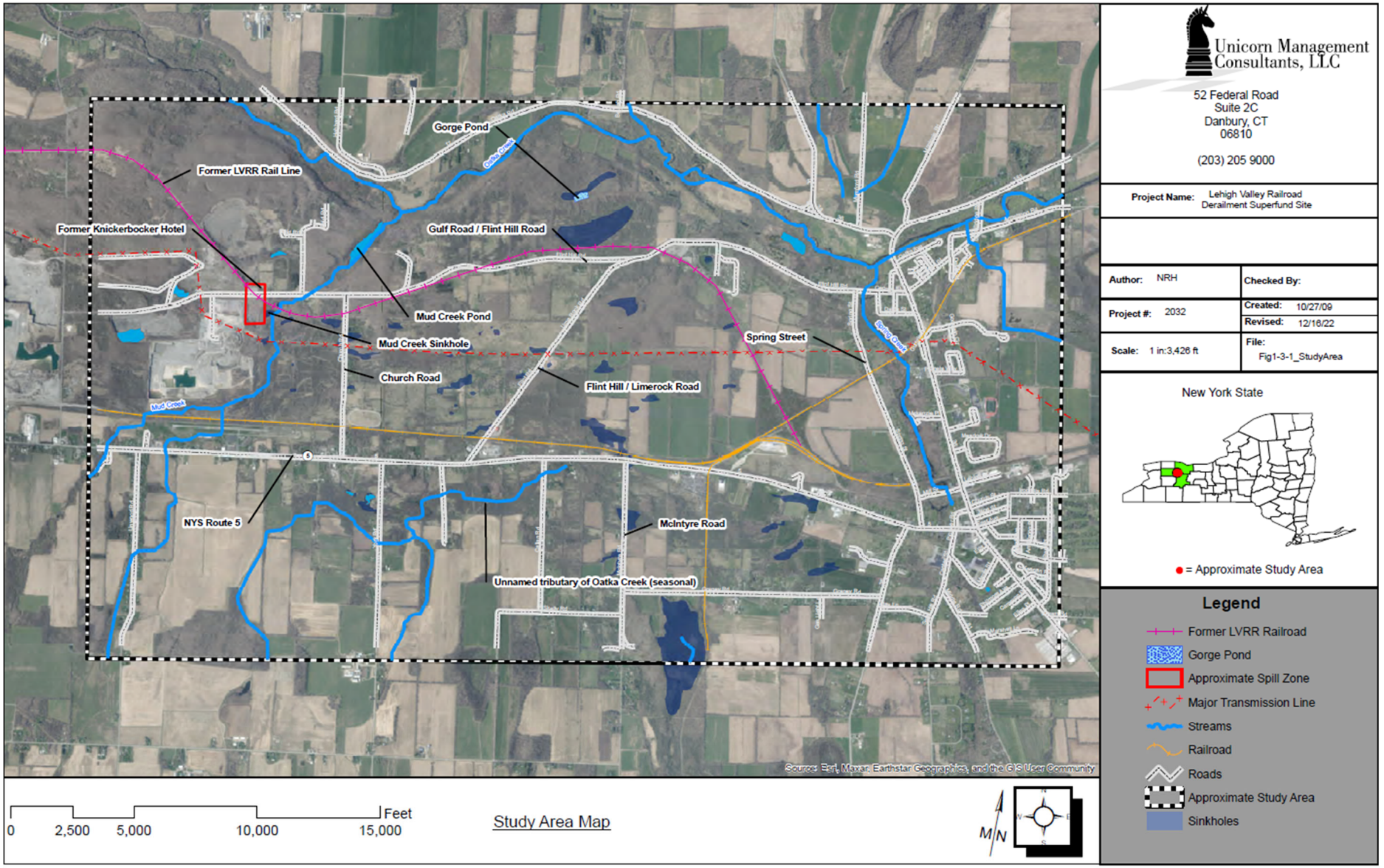

Gorge Pond
Former LVRR Rail Line
Former Knickerbocker Hotel
Gulf Road / Flint Hill Road
Mud Creek Pond
Mud Creek Sinkhole
Church Road
Spring Street
Flint Hill / Limerock Road
NYS Route 5
McIntyre Road
Unnamed tributary of Oatka Creek (seasonal)
Mud Creek
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
0 2,500 5,000 10,000 15,000 Feet
Study Area Map
M/N
Unicorn Management Consultants, LLC
52 Federal Road
Suite 2C
Danbury, CT
06810
(203) 205 9000
Project Name: Lehigh Valley Railroad Derailment Superfund Site
Author: NRH
Checked By:
Project #: 2032
Created: 10/27/09
Revised: 12/16/22
Scale: 1 in:3,426 ft
File: Fig1-3-1_StudyArea
New York State
● = Approximate Study Area
Legend
Former LVRR Railroad
Gorge Pond
Approximate Spill Zone
Major Transmission Line
Streams
Railroad
Roads
Approximate Study Area
Sinkholes

FIGURE 2

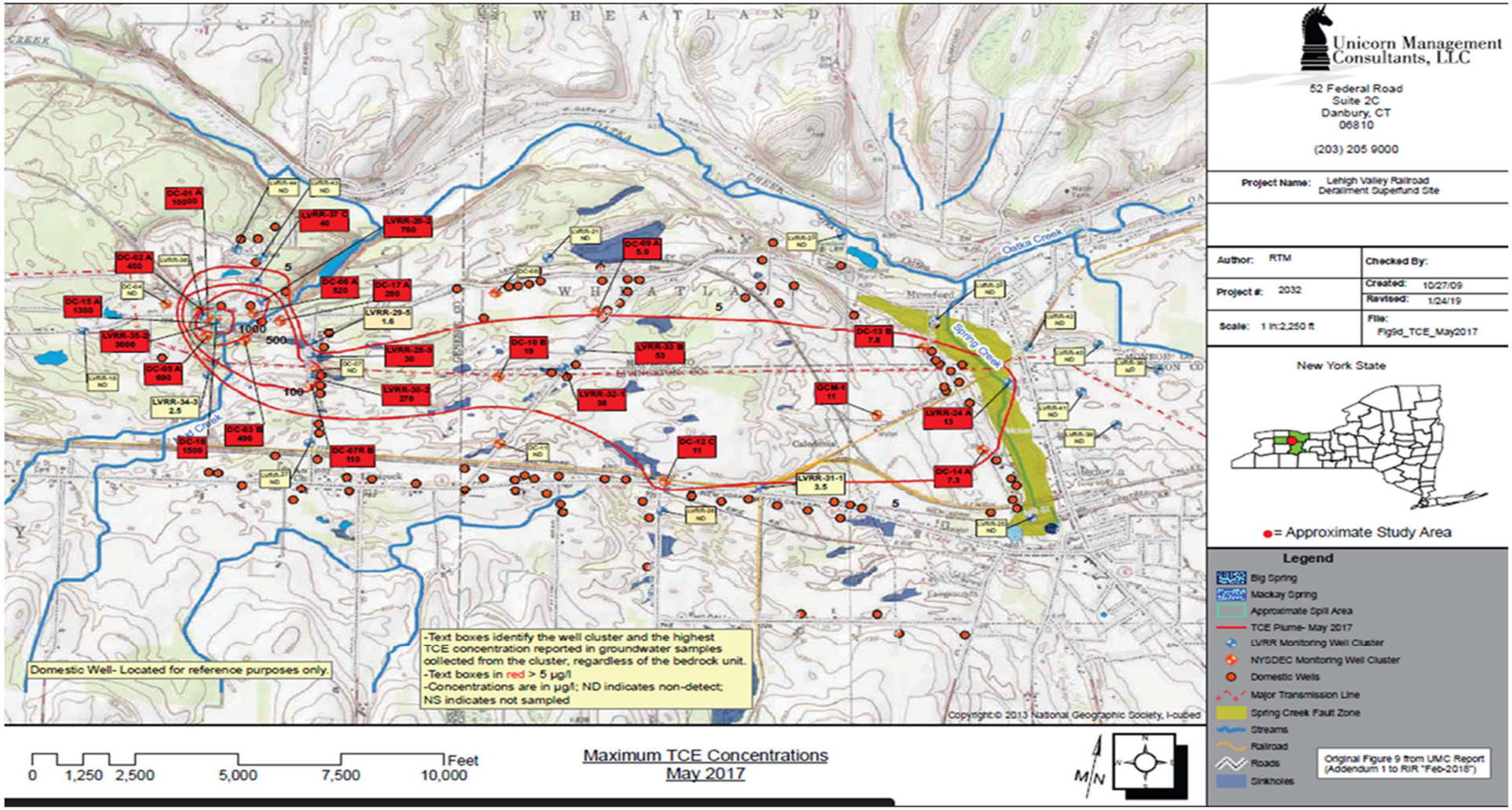

Unicorn Management Consultants, LLC
52 Federal Road
Suite 2C
Danbury, CT
06810
(203) 205 9000
Project Name: Lehigh Valley Railroad Derailment Superfund Site
Author: RTM
Checked By:
Project #: 2032
Created: 10/27/09
Revised: 1/24/19
Scale: 1 in:2,250 ft
File: Fig9d_TCE_May2017
New York State
= Approximate Study Area
Legend
Big Spring
Mackay Spring
Approximate Spill Area
TCE Plume- May 2017
LVRR Monitoring Well Cluster
NYSDEC Monitoring Well Cluster
Domestic Wells
Major Transmission Line
Spring Creek Fault Zone
Streams
Railroad
Roads
Sinkholes
Original Figure 9 from UMC Report (Addendum 1 to RIR "Feb-2018")
Domestic Well- Located for reference purposes only.
-Text boxes identify the well cluster and the highest TCE concentration reported in groundwater samples collected from the cluster, regardless of the bedrock unit.
-Text boxes in red > 5 µg/l
-Concentrations are in µg/l; ND indicates non-detect; NS indicates not sampled
Copyright © 2013 National Geographic Society, i-cubed
0 1,250 2,500 5,000 7,500 10,000 Feet
Maximum TCE Concentrations
May 2017
M/N

FIGURE 3

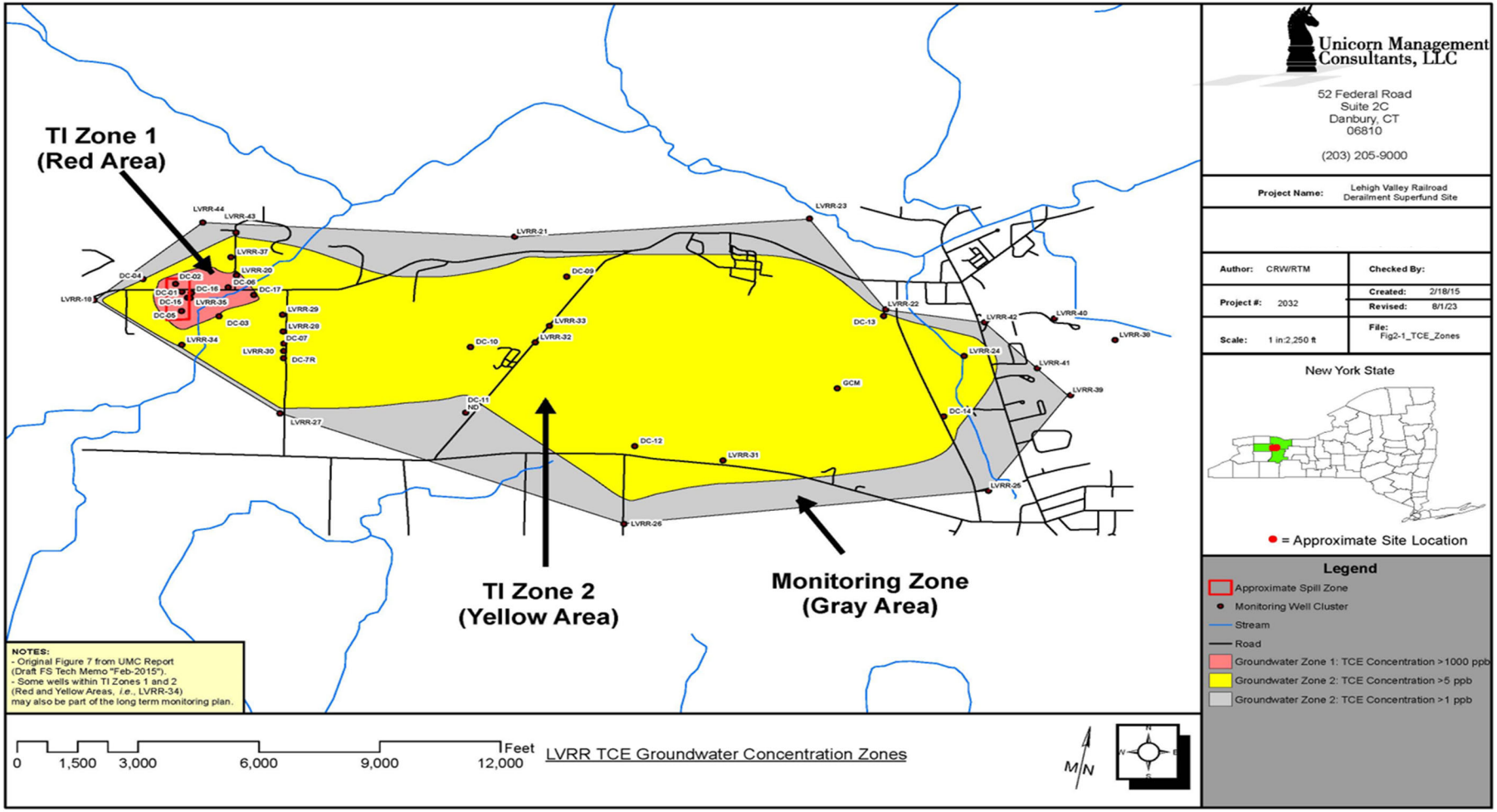

TI Zone 1
(Red Area)
TI Zone 2
(Yellow Area)
Monitoring Zone
(Gray Area)
NOTES:
- Original Figure 7 from UMC Report
(Draft FS Tech Memo "Feb-2015").
- Some wells within TI Zones 1 and 2
(Red and Yellow Areas, i.e., LVRR-34)
may also be part of the long term monitoring plan.
0 1,500 3,000 6,000 9,000 12,000 Feet
LVRR TCE Groundwater Concentration Zones
Unicorn Management Consultants, LLC
52 Federal Road
Suite 2C
Danbury, CT
06810
(203) 205-9000
Project Name: Lehigh Valley Railroad Derailment Superfund Site
Author: CRW/RTM
Checked By:
Project #: 2032
Created: 2/18/15
Revised: 8/1/23
Scale: 1 in:2,250 ft
File: Fig2-1_TCE_Zones
New York State
= Approximate Site Location
Legend
Approximate Spill Zone
Monitoring Well Cluster
Stream
Road
Groundwater Zone 1: TCE Concentration >1000 ppb
Groundwater Zone 2: TCE Concentration >5 ppb
Groundwater Zone 2: TCE Concentration >1 ppb

FIGURE 4

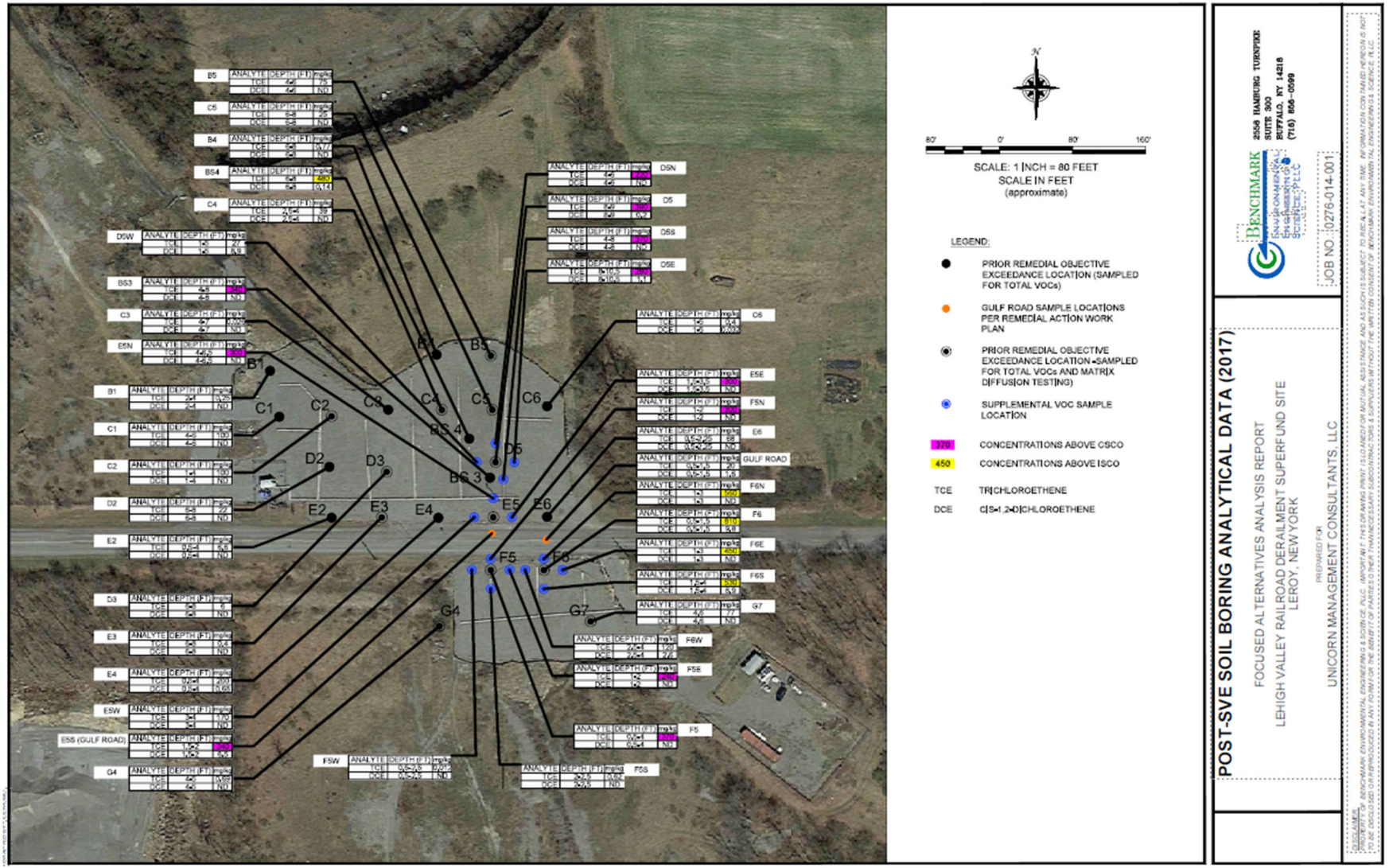

N
80' 0' 80' 160'
SCALE: 1 INCH = 80 FEET
SCALE IN FEET
(approximate)
LEGEND:
PRIOR REMEDIAL OBJECTIVE EXCEEDANCE LOCATION (SAMPLED FOR TOTAL VOCs)
GULF ROAD SAMPLE LOCATIONS PER REMEDIAL ACTION WORK PLAN
PRIOR REMEDIAL OBJECTIVE EXCEEDANCE LOCATION -SAMPLED FOR TOTAL VOCs AND MATRIX DIFFUSION TESTING)
SUPPLEMENTAL VOC SAMPLE LOCATION
370 CONCENTRATIONS ABOVE CSCO
450 CONCENTRATIONS ABOVE ISCO
TCE TRICHLOROETHENE
DCE CIS-1,2-DICHLOROETHENE
POST-SVE SOIL BORING ANALYTICAL DATA (2017)
FOCUSED ALTERNATIVES ANALYSIS REPORT
LEHIGH VALLEY RAILROAD DERAILMENT SUPERFUND SITE
LEROY, NEW YORK
PREPARED FOR
UNICORN MANAGEMENT CONSULTANTS, LLC
BENCHMARK
2558 HAMBURG TURNPIKE
SUITE 300
BUFFALO, NY 14218
(716) 856-0599
JOB NO.: 0276-014-001

Figure 5

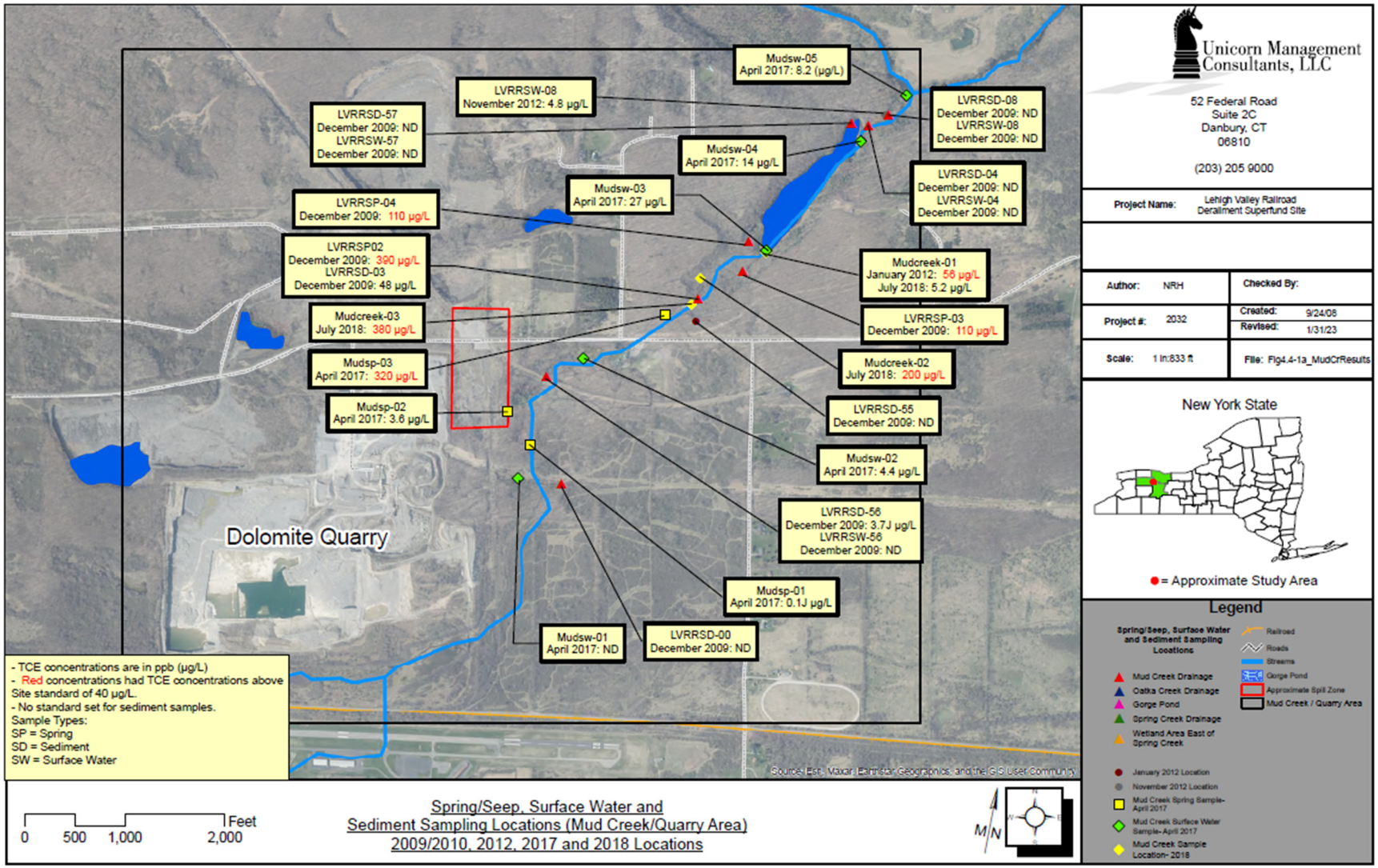

Mudsw-05
April 2017: 8.2 (µg/L)
LVRRSW-08
November 2012: 4.8 µg/L
LVRRSD-57
December 2009: ND
LVRRSW-57
December 2009: ND
LVRRSD-08
December 2009: ND
LVRRSW-08
December 2009: ND
Mudsw-04
April 2017: 14 µg/L
LVRRSD-04
December 2009: ND
LVRRSW-04
December 2009: ND
Mudsw-03
April 2017: 27 µg/L
LVRRSP-04
December 2009: 110 µg/L
LVRRSP02
December 2009: 390 µg/L
LVRRSD-03
December 2009: 48 µg/L
Mudcreek-01
January 2012: 56 µg/L
July 2018: 5.2 µg/L
Mudcreek-03
July 2018: 380 µg/L
LVRRSP-03
December 2009: 110 µg/L
Mudsp-03
April 2017: 320 µg/L
Mudcreek-02
July 2018: 200 µg/L
Mudsp-02
April 2017: 3.6 µg/L
LVRRSD-55
December 2009: ND
Mudsw-02
April 2017: 4.4 µg/L
Dolomite Quarry
LVRRSD-56
December 2009: 3.7J µg/L
LVRRSW-56
December 2009: ND
Mudsp-01
April 2017: 0.1J µg/L
Mudsw-01
April 2017: ND
LVRRSD-00
December 2009: ND
- TCE concentrations are in ppb (µg/L)
- Red concentrations had TCE concentrations above Site standard of 40 µg/L.
- No standard set for sediment samples.
Sample Types:
SP = Spring
SD = Sediment
SW = Surface Water
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
0 500 1,000 2,000 Feet
Spring/Seep, Surface Water and Sediment Sampling Locations (Mud Creek/Quarry Area) 2009/2010, 2012, 2017 and 2018 Locations
M/N
Unicorn Management Consultants, LLC
52 Federal Road
Suite 2C
Danbury, CT
06810
(203) 205 9000
Project Name: Lehigh Valley Railroad Derailment Superfund Site
Author: NRH
Checked By:
Project #: 2032
Created: 9/24/08
Revised: 1/31/23
Scale: 1 In:833 ft
File: Fig4.4-1a_MudCrResults
New York State
= Approximate Study Area
Legend
Spring/Seep, Surface Water and Sediment Sampling Locations
Mud Creek Drainage
Oatka Creek Drainage
Gorge Pond
Spring Creek Drainage
Wetland Area East of Spring Creek
January 2012 Location
November 2012 Location
Mud Creek Spring Sample- April 2017
Mud Creek Surface Water Sample- April 2017
Mud Creek Sample Location- 2018
Railroad
Roads
Streams
Gorge Pond
Approximate Spill Zone
Mud Creek / Quarry Area

Figure 6

APPENDIX II

TABLES

TABLE 1-1

Summary of LVRR Soil Sample Analytical Results

Focused Alternatives Analysis Report Spill Zone Soils (Operable Unit OU 1)

Lehigh Valley Railroad Derailment Superfund Site, LeRoy, NY

Parameter [1]	ROD [2]	NYSDEC Part 375 Soil Cleanup Objectives [3]				B-1	B-4			BS-3	BS-4	B-5	B-5	
		Unrestricted	Protection of Public Health		Protection of Groundwater	Total VOCs	Total VOCs	Total VOCs	Matrix Diffusion	Total VOCs	Total VOCs	Total VOCs	Total VOCs	Matrix Diffusion
			Commercial	Industrial		8/23/2017	9/14/2016	8/22/2017	9/5/2017	8/24/2017	8/22/2017	8/22/2017	8/22/2017	9/6/2017
Chloromethane	–	NA	NA	NA	NA	6.2U	14U	590U	68.8	5100U	690U	5.9U	2800U	73.3U
Vinyl Chloride	–	20	13000	27000	20	6.2U	14U	590U	57.4U	5100U	690U	5.9U	2800U	73.3U
1,1-Dichloroethene	–	330	500000	1000000	330	6.2U	14U	590U	28.7U	5100U	690U	5.9U	2800U	36.6U
Carbon Disulfide	–	NA	NA	NA	NA	6.2U	14U	590UJ	28.7U	5100U	690UJ	5.9U	2800U	36.6U
Methylene Chloride	–	50	500000	1000000	50	6.2U	14U	590U	28.7U	5100U	690U	5.9U	2800U	36.6U
trans-1,2-DCE	–	250	500000	1000000	250	6.2U	14U	590U	28.7U	5100U	690U	5.9U	2800U	36.6U
1,1-Dichloroethane	–	270	240000	480000	270	6.2U	14U	590U	28.7U	5100U	690U	5.9U	2800U	36.6U
cis-1,2-DCE	3000	250	500000	1000000	250	6.2U	3.6J	590U	28.7U	**5100U**	140J	5.9U	2800U	36.6U
Chloroform	–	370	350000	700000	370	6.2U	14U	590U	28.7U	5100U	690U	5.9U	2800U	36.6U
1,1,1-Trichloroethane	–	680	500000	1000000	680	6.2U	14U	590U	28.7U	5100U	690U	5.9U	2800U	36.6U
Benzene	–	60	44000	89000	60	0.39J	14U	590U	28.7U	5100U	690U	5.9U	2800U	36.6U
1,2-Dichloroethane	–	20	30000	60000	20	6.2U	14U	590U	28.7U	5100U	690U	5.9U	2800U	36.6U
Trichloroethene	7000	470	200000	400000	470	250J	**70000**	770	1360	**340000J**	**480000J**	170J	**75000D**	**14000**
Toluene	–	700	500000	1000000	700	6.2U	14U	590U	28.7U	5100U	690U	5.9U	2800U	36.6U
Tetrachloroethene	–	1300	150000	300000	1300	6.2U	14U	590U	28.7U	5100U	690U	5.9U	2800U	36.6U
Ethylbenzene	–	1000	390000	780000	1000	6.2U	14U	590U	28.7U	5100U	690U	5.9U	2800U	36.6U
m,p-Xylene	–	260	500000	1000000	1600	6.2U	28U	590U	28.7U	5100U	690U	5.9U	2800U	36.6U
o-Xylene	–	260	500000	1000000	1600	6.2U	14U	590U	28.7U	5100U	690U	5.9U	2800U	36.6U
Isopropylbenzene	–	NA	NA	NA	NA	6.2U	14U	590U	57.4U	5100U	690U	5.9U	2800U	73.3U
Styrene	–	NA	NA	NA	NA	6.2U	14U	590U	28.7U	5100U	690U	5.9U	2800U	36.6U
1,3,5-Trimethylbenzene	–	8400	190000	380000	8400	6.2U	14U	590U	57.4U	5100U	690U	5.9U	2800U	73.3U
1,2,4-Trimethylbenzene	–	3600	190000	380000	3600	6.2U	14U	590U	28.7U	5100U	690U	5.9U	2800U	36.6U
Naphthalene	–	NA	NA	NA	NA	6.2U	14U	590U	8.61J	5100U	690U	5.9U	2800U	36.6U
1,4-Dioxane	–	100	130000	250000	100	6.2U	280U	590U	NA	5100U	690U	5.9U	2800UJ	NA
Methycyclohexane	–	NA	NA	NA	NA	6.2U	14U	590U	NA	5100U	690U	5.9U	2800U	NA
Cyclohexane	–	NA	NA	NA	NA	2.4J	14U	590U	NA	5100U	690U	5.9U	2800U	NA
2-Butanone (MEK)	–	120	500000	1000000	120	20	14U	590U	NA	5100U	690U	18	2800U	NA
Acetone	–	50	500000	1000000	50	690J	14U	590U	NA	5100U	690U	440J	2800U	NA
MTBE	–	930	500000	1000000	930	6.2	14U	590U	NA	5100U	690U	5.9U	2800U	NA
n-Proplybenzene	–	3900	500000	1000000	3900	6.2U	14U	590U	NA	5100U	690U	5.9U	2800U	NA

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table. All soil results are in ug/kg (ppb).
2. March 1997 Record of Decision (ROD) Concentrations-Based Objectives in ug/kg (ppb).
3. Values per 6NYCRR Part 375 Soil Cleanup Objectives (SCOs) in ug/kg (ppb).
4. Sample not logged in by ALS; once discovered, sample was outside holding time.

Acronyms:

J = Estimated Concentration

J = Estimated Concentration

(J-) = The result is an estimated quantity, but the result may be biased low. NA = Not Analyzed or SCO not available

U = Below Laboratory Reporting Limit

UJ = Below Laboratory Reporting Limit, quantitation limit is approximate

B = Detected in blank sample

R = Rejected by data validator

Color Code:

BOLD	Detection Exceeds Regulatory Level for Toxicity Characteristic
BOLD	Detection Exceeds Part 375 Industrial SCO
BOLD	Detection Exceeds Part 375 Commercial SCO
BOLD	Detection Limit Exceeds Record of Decision Objective

TABLE 1-2

Summary of LVRR Soil Sample Analytical Results

Focused Alternatives Analysis Report Spill Zone Soils (Operable Unit OU 1)

Lehigh Valley Railroad Derailment Superfund Site, LeRoy, NY

Parameter [1]	ROD [2]	NYSDEC Part 375 Soil Cleanup Objectives [3]				C-1	C-2			C-3	C-4		C-5		C-6
		Unrestricted	Protection of Public Health		Protection of Groundwater	Total VOCs	Total VOCs	Total VOCs	Matrix Diffusion	Total VOCs	Total VOCs	Matrix Diffusion	Total VOCs	Matrix Diffusion	Total VOCs
			Commercial	Industrial		8/23/2017	9/14/2016	8/23/2017	9/5/2017	8/23/2017	8/23/2017	9/5/2017	8/22/2017	9/5/2017	8/24/2017
Chloromethane	--	NA	NA	NA	NA	1100U	2700U	1200U	32.3J	6.9U	720U	76.9	540U	74.6	62DJ
Vinyl Chloride	--	20	13000	27000	20	1100U	2700U	1200U	57.7U	6.9U	720U	62.8U	540U	69.1U	4.7U
1,1-Dichloroethene	--	330	500000	1000000	330	1100U	2700U	1200U	28.9U	6.9U	720U	31.4U	540U	34.6U	4.7U
Carbon Disulfide	--	NA	NA	NA	NA	1100U	2700U	1200U	28.9U	6.9U	720U	31.4U	540UJ	34.6U	4.7U
Methylene Chloride	--	50	500000	1000000	50	1100U	2700U	1200U	28.9U	6.9U	720U	31.4U	540U	34.6U	4.7U
trans-1,2-DCE	--	250	500000	1000000	250	1100U	2700U	1200U	28.9U	6.9U	720U	31.4U	540U	34.6U	4.7U
1,1-Dichloroethane	--	270	240000	480000	270	1100U	2700U	1200U	28.9U	6.9U	720U	31.4U	540U	34.6U	4.7U
cis-1,2-DCE	3000	250	500000	1000000	250	1100U	2700U	1200U	28.9U	6.9U	720U	31.4U	540U	34.6U	32J
Chloroform	--	370	350000	700000	370	1100U	2700U	1200U	28.9U	6.9U	720U	31.4U	540U	34.6U	4.7U
1,1,1-Trichloroethane	--	680	500000	1000000	680	1100U	2700U	1200U	28.9U	6.9U	720U	31.4U	540U	34.6U	4.7U
Benzene	--	60	44000	89000	60	1100U	5400	140J	12.1J	6.9U	720U	6.59J	540U	10.7J	4.7U
1,2-Dichloroethane	--	20	30000	60000	20	1100U	2700U	1200U	28.9U	6.9U	720U	31.4U	540U	34.6U	4.7U
Trichloroethene	7000	470	200000	400000	470	100000J	80000	100000J	1150	26	39000J	677	25000J	1950	400J
Toluene	--	700	500000	1000000	700	1100U	18000	860J	55.4	6.9U	720U	25.4J	540U	41.5	4.7U
Tetrachloroethene	--	1300	150000	300000	1300	1100U	2700U	1200U	28.9U	6.9U	720U	31.4U	540U	34.6U	4.7U
Ethylbenzene	--	1000	390000	780000	1000	1100U	5200	240J	28.9U	6.9U	720U	31.4U	540U	34.6U	4.7U
m,p-Xylene	--	260	500000	1000000	1600	1100U	11000	910J	72.4	6.9U	720U	37.7	540U	54.9	4.7U
o-Xylene	--	260	500000	1000000	1600	1100U	11000	870J	43.9	6.9U	81J	21.4J	540U	34.6U	4.7U
Isopropylbenzene	--	NA	NA	NA	NA	1100U	4000	230J	57.7U	6.9U	720U	62.8U	540U	69.1U	4.7U
Styrene	--	NA	NA	NA	NA	1100U	2700U	1200U	28.9U	6.9U	720U	31.4U	540U	34.6U	4.7U
1,3,5-Trimethylbenzene	--	8400	190000	380000	8400	1100U	2700U	1200U	57.7U	6.9U	720U	62.8U	540U	69.1U	4.7U
1,2,4-Trimethylbenzene	--	3600	190000	380000	3600	1100U	2700U	550J	42.7	6.9U	720U	31.4U	540U	34.6U	4.7U
Naphthalene	--	NA	NA	NA	NA	1100U	2700U	1200U	49.6	6.9U	720U	29.2J	540U	34.6U	4.7U
1,4-Dioxane	--	100	130000	250000	100	1100U	2700U	1200U	NA	6.9U	720U	NA	540U	NA	4.7U
Methycyclohexane	--	NA	NA	NA	NA	1100U	12000	2500J	NA	6.9U	560J	NA	540U	NA	4.7U
Cyclohexane	--	NA	NA	NA	NA	1100U	4200	780J	NA	6.9U	720U	NA	540U	NA	4.7U
2-Butanone (MEK)	--	120	500000	1000000	120	1100U	2700U	1200U	NA	6.6J	720U	NA	540U	NA	29
Acetone	--	50	500000	1000000	50	1100U	2700U	1200U	NA	150	720U	NA	540U	NA	R
MTBE	--	930	500000	1000000	930	1100U	2700U	1200U	NA	1.4J	720U	NA	540U	NA	4.4J
n-Proplybenzene	--	3900	500000	1000000	3900	1100U	2700U	260J	NA	6.9U	720U	NA	540U	NA	4.7U

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table. All soil results are in ug/kg (ppb).
2. March 1997 Record of Decision (ROD) Concentrations-Based Objectives in ug/kg (ppb).
3. Values per 6NYCRR Part 375 Soil Cleanup Objectives (SCOs) in ug/kg (ppb).
4. Sample not logged in by ALS; once discovered, sample was outside holding time.

Acronyms:

J = Estimated Concentration
(J-) = The result is an estimated quantity, but the result may be biased low. NA = Not Analyzed or SCO not available
U = Below Laboratory Reporting Limit
UJ = Below Laboratory Reporting Limit, quantitation limit is approximate
B = Detected in blank sample
R = Rejected by data validator

Color Code:

BOLD	Detection Exceeds Regulatory Level for Toxicity Characteristic
BOLD	Detection Exceeds Part 375 Industrial SCO
BOLD	Detection Exceeds Part 375 Commercial SCO
BOLD	Detection Limit Exceeds Record of Decision Objective

TABLE 1-3

Summary of LVRR Soil Sample Analytical Results

Focused Alternatives Analysis Report Spill Zone Soils (Operable Unit OU 1)

Lehigh Valley Railroad Derailment Superfund Site, LeRoy, NY

Parameter [1]	ROD [2]	NYSDEC Part 375 Soil Cleanup Objectives [3]				D-2			D-3	D-5			D-5N	D-5E			D-5S	D-5W
		Unrestricted	Protection of Public Health		Protection of Groundwater	Total VOCs	Total VOCs	Matrix Diffusion	Total VOCs	Total VOCs	Total VOCs	Matrix Diffusion	Total VOCs	Total VOCs	TCLP (ug/L)	SPLP (ug/L)	Total VOCs	Total VOCs
			Commercial	Industrial		9/14/2016	8/22/2017	9/5/2017	8/22/2017	9/14/2016	8/22/2017	9/5/2017	8/24/2017	8/24/2017	8/24/2017	8/24/2017	8/24/2017	8/24/2017
Chloromethane	–	NA	NA	NA	NA	960U	640U	44.7J	620U	6.4U	540U	55.5J	3100U	1600U	NA	NA	4000U	1100U
Vinyl Chloride	–	20	13000	27000	20	960U	640U	91.3U	620U	6.4U	540U	69.8U	3100U	1600U	100U	5U	4000U	1100U
1,1-Dichloroethene	–	330	500000	1000000	330	960U	640U	45.6U	620U	6.4U	540U	34.9U	3100U	1600U	100U	5U	4000U	1100U
Carbon Disulfide	–	NA	NA	NA	NA	960U	640UJ	45.6U	620UJ	6.4U	540UJ	34.9U	3100U	1600U	NA	NA	4000U	1100U
Methylene Chloride	–	50	500000	1000000	50	960U	640U	45.6U	620U	6.4U	540U	34.9U	3100U	1600U	NA	NA	4000U	1100U
trans-1,2-DCE	–	250	500000	1000000	250	960U	640U	45.6U	620U	6.4U	540U	34.9U	3100U	1600U	NA	NA	4000U	1100J
1,1-Dichloroethane	–	270	240000	480000	270	960U	640U	45.6U	620U	6.4U	540U	34.9U	3100U	1600U	NA	NA	4000U	1100U
cis-1,2-DCE	3000	250	500000	1000000	250	960U	640U	45.6U	620U	29	200J	34.9U	3100U	1100J	NA	NA	4000U	8900
Chloroform	–	370	350000	700000	370	960U	640U	45.6U	620U	1.9J	540U	34.9U	3100U	1600U	100U	5U	4000U	1100U
1,1,1-Trichloroethane	–	680	500000	1000000	680	960U	640U	45.6U	620U	6.4U	540U	34.9U	3100U	1600U	NA	NA	4000U	1100U
Benzene	–	60	44000	89000	60	960U	640U	9.33J	620U	0.41J	540U	34.9U	3100U	170J	100U	5U	4000U	1100U
1,2-Dichloroethane	–	20	30000	60000	20	960U	640U	45.6U	620U	6.4U	540U	34.9U	3100U	1600U	100U	5U	4000U	1100U
Trichloroethene	7000	470	200000	400000	470	13000	22000	1750	6000	670000	390000J	3530	220000J	280000J	232	221	370000J	27000
Toluene	–	700	500000	1000000	700	960U	640U	28.3J	620U	6.4U	540U	34.9U	3100U	770J	NA	NA	4000U	1100U
Tetrachloroethene	–	1300	150000	300000	1300	960U	640U	45.6U	620U	6.4U	540U	34.9U	3100U	1600U	100U	5U	4000U	1100U
Ethylbenzene	–	1000	390000	780000	1000	960U	42J	45.6U	620U	6.4U	540U	34.9U	3100U	140J	NA	NA	4000U	1100U
m,p-Xylene	–	260	500000	1000000	1600	1900U	160J	48.8	620U	13U	540U	20.9J	3100U	730J	NA	NA	4000U	1100U
o-Xylene	–	260	500000	1000000	1600	960U	120J	31J	620U	6.4U	540U	34.9U	3100U	380J	NA	NA	4000U	1100U
Isopropylbenzene	–	NA	NA	NA	NA	960U	640U	91.3U	620U	6.4U	540U	69.8U	3100U	1600U	NA	NA	4000U	1100U
Styrene	–	NA	NA	NA	NA	960U	640U	45.6U	620U	6.4U	540U	34.9U	3100U	1600U	NA	NA	4000U	1100U
1,3,5-Trimethylbenzene	–	8400	190000	380000	8400	960U	640U	91.3U	620U	6.4U	540U	34.9U	3100U	1600U	NA	NA	4000U	1100U
1,2,4-Trimethylbenzene	–	3600	190000	380000	3600	960U	120J	45.6U	620U	6.4U	540U	34.9U	3100U	310J	NA	NA	4000U	1100U
Naphthalene	–	NA	NA	NA	NA	960U	640U	49.3	620U	6.4U	540U	34.9U	3100U	1600U	NA	NA	4000U	1100U
1,4-Dioxane	–	100	130000	250000	100	960U	640U	NA	620U	130U	540U	NA	3100U	1600U	NA	NA	4000U	1100U
Methycyclohexane	–	NA	NA	NA	NA	960U	670	NA	210J	6.4U	540U	NA	3100U	980J	NA	NA	4000U	1100U
Cyclohexane	–	NA	NA	NA	NA	960U	210J	NA	620U	6.4U	540U	NA	3100U	1600U	NA	NA	4000U	1100U
2-Butanone (MEK)	–	120	500000	1000000	120	960U	640U	NA	620U	6.4U	540U	NA	3100U	1600U	1000U	50U	4000U	1100U
Acetone	–	50	500000	1000000	50	960U	640U	NA	620U	6.4U	540U	NA	3100U	1600U	NA	NA	4000U	1100U
MTBE	–	930	500000	1000000	930	960U	640U	NA	620U	6.4U	540U	NA	3100U	1600U	NA	NA	4000U	1100U
n-Proplybenzene	–	3900	500000	1000000	3900	960U	640U	NA	620U	6.4U	540U	NA	3100U	1600U	NA	NA	4000U	1100U

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table. All soil results are in ug/kg (ppb).
2. March 1997 Record of Decision (ROD) Concentrations-Based Objectives in ug/kg (ppb).
3. Values per 6NYCRR Part 375 Soil Cleanup Objectives (SCOs) in ug/kg (ppb).
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Acronyms:

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UJ = Below Laboratory Reporting Limit, quantitation limit is approximate
B = Detected in blank sample
R = Rejected by data validator

Color Code:

BOLD	Detection Exceeds Regulatory Level for Toxicity Characteristic
BOLD	Detection Exceeds Part 375 Industrial SCO
BOLD	Detection Exceeds Part 375 Commercial SCO
BOLD	Detection Limit Exceeds Record of Decision Objective

TABLE 1-4
Summary of LVRR Soil Sample Analytical Results
Focused Alternatives Analysis Report Spill Zone Soils (Operable Unit OU 1)
Lehigh Valley Railroad Derailment Superfund Site, LeRoy, NY

Parameter [1]	ROD [2]	NYSDEC Part 375 Soil Cleanup Objectives [3]				E-2	E-3		E-4			E-5								E-5N	E-5E
		Unrestricted	Protection of Public Health		Protection of Groundwater	Total VOCs	Total VOCs	Matrix Diffusion	Total VOCs	Total VOCs	Matrix Diffusion	Total VOCs	Total VOCs	Total VOCs [4]	TCLP (ug/L)	TCLP (ug/L)	SPLP (ug/L)	SPLP (ug/L)	Matrix Diffusion	Total VOCs	Total VOCs
			Commercial	Industrial		8/24/2017	8/22/2017	9/5/2017	9/14/2016	8/22/2017	9/5/2017	9/14/2016	11/11/2016	8/22/2017	11/11/2016	8/22/2017	11/11/2016	8/22/2017	9/5/2017	8/24/2017	8/24/2017
Chloromethane	--	NA	NA	NA	NA	390U	5.3U	65.8J-	520U	600U	80.6	900U	4.5U	NA	NA	NA	NA	NA	90.6	3900U	16000U
Vinyl Chloride	--	20	13000	27000	20	390U	5.3U	54.9UJ	520U	600U	63.7U	900U	4.5U	NA	20U	20U	5U	5U	58.1U	3900U	16000U
1,1-Dichloroethene	--	330	500000	1000000	330	390U	5.3U	27.4UJ	520U	600U	31.9U	900U	4.5U	NA	20U	20U	5U	5U	29U	3900U	16000U
Carbon Disulfide	--	NA	NA	NA	NA	390U	5.3U	27.4UJ	520U	600UJ	31.9U	900U	4.5U	NA	NA	NA	NA	NA	29U	3900U	16000U
Methylene Chloride	--	50	500000	1000000	50	390U	5.3U	27.4UJ	520U	600U	31.9U	900U	4.5U	NA	NA	NA	NA	NA	29U	3900U	16000U
trans-1,2-DCE	--	250	500000	1000000	250	390U	5.3U	27.4UJ	520U	600U	31.9U	900U	4.5U	NA	NA	NA	NA	NA	29U	3900U	16000U
1,1-Dichloroethane	--	270	240000	480000	270	390U	5.3U	27.4UJ	520U	600U	31.9U	900U	4.5U	NA	NA	NA	NA	NA	29U	3900U	16000U
cis-1,2-DCE	3000	250	500000	1000000	250	390U	5.3U	27.4UJ	520U	680	21.0J	490J	632J	NA	NA	NA	NA	NA	11.3J	**3900U**	**16000U**
Chloroform	--	370	350000	700000	370	390U	5.3U	27.4UJ	520U	600U	31.9U	900U	4.5U	NA	20U	20U	5U	5U	29U	3900U	16000U
1,1,1-Trichloroethane	--	680	500000	1000000	680	390U	5.3U	27.4UJ	520U	600U	31.9U	900U	4.5U	NA	NA	NA	NA	NA	29U	3900U	16000U
Benzene	--	60	44000	89000	60	26J	0.43J	9.33J-	520U	600U	6.05J	900U	4.5U	NA	20U	20U	5U	5U	10.5J	3900U	16000U
1,2-Dichloroethane	--	20	30000	60000	20	390U	5.3U	27.4UJ	520U	600U	31.9U	900U	4.5U	NA	20U	20U	5U	5U	29U	3900U	16000U
Trichloroethene	7000	470	200000	400000	470	6600	400J	81.8J-	29000	200000J	7220	520000	190000	NA	520	255	424	795	10900	300000J	300000
Toluene	--	700	500000	1000000	700	84J	1.2J	47.2J-	520U	R	17.2J	900U	4.5U	NA	NA	NA	NA	NA	26.4J	3900U	16000U
Tetrachloroethene	--	1300	150000	300000	1300	390U	5.3U	27.4UJ	520U	600U	31.9U	900U	4.5U	NA	20U	20U	5U	5U	29U	3900U	16000U
Ethylbenzene	--	1000	390000	780000	1000	390U	0.29J	27.4UJ	520U	600U	31.9U	900U	4.5U	NA	NA	NA	NA	NA	29U	3900U	16000U
m,p-Xylene	--	260	500000	1000000	1600	390U	5.3U	74.3J-	1000U	600U	24.5J	1800U	8.9U	NA	NA	NA	NA	NA	27.9J	3900U	16000U
o-Xylene	--	260	500000	1000000	1600	47J	5.3U	22.8J-	520U	67J	31.9U	100J	4.5U	NA	NA	NA	NA	NA	29U	3900U	16000U
Isopropylbenzene	--	NA	NA	NA	NA	390U	5.3U	54.9UJ	520U	600U	63.7U	900U	4.5U	NA	NA	NA	NA	NA	58.1U	3900U	16000U
Styrene	--	NA	NA	NA	NA	390U	5.3U	27.4UJ	520U	600U	31.9U	900U	4.5U	NA	NA	NA	NA	NA	29U	3900U	16000U
1,3,5-Trimethylbenzene	--	8400	190000	380000	8400	390U	5.3U	54.9UJ	520U	600U	63.7U	900U	NA	NA	NA	NA	NA	NA	58.1U	3900U	16000U
1,2,4-Trimethylbenzene	--	3600	190000	380000	3600	390U	5.3U	43.6J-	520U	600U	31.9U	900U	NA	NA	NA	NA	NA	NA	29U	3900U	16000U
Naphthalene	--	NA	NA	NA	NA	390U	5.3U	27.4UJ	520U	600U	12.4J	900U	NA	NA	NA	NA	NA	NA	13.1J	3900U	16000U
1,4-Dioxane	--	100	130000	250000	100	390U	5.3UJ	NA	520U	600U	NA	900U	167U	NA	NA	NA	NA	NA	NA	3900U	16000U
Methycyclohexane	--	NA	NA	NA	NA	170J	2.3J	NA	150J	280J	NA	390J	4.5U	NA	NA	NA	NA	NA	NA	3900U	16000U
Cyclohexane	--	NA	NA	NA	NA	390U	3.4J	NA	520U	600U	NA	900U	4.5U	NA	NA	NA	NA	NA	NA	3900U	16000U
2-Butanone (MEK)	--	120	500000	1000000	120	390U	25	NA	520U	600U	NA	900U	4.5U	NA	NA	200U	NA	50U	NA	3900U	16000U
Acetone	--	50	500000	1000000	50	230J	R	NA	520U	600U	NA	900U	4.5U	NA	NA	NA	NA	NA	NA	3900U	16000U
MTBE	--	930	500000	1000000	930	390U	5.3U	NA	520U	600U	NA	900U	4.5U	NA	NA	NA	NA	NA	NA	3900U	16000U
n-Proplybenzene	--	3900	500000	1000000	3900	390U	5.3U	NA	520U	600U	NA	900U	4.5U	NA	NA	NA	NA	NA	NA	3900U	16000U

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table. All soil results are in ug/kg (ppb).
2. March 1997 Record of Decision (ROD) Concentrations-Based Objectives in ug/kg (ppb).
3. Values per 6NYCRR Part 375 Soil Cleanup Objectives (SCOs) in ug/kg (ppb).
4. Sample not logged in by ALS; once discovered, sample was outside holding time.

Acronyms:

J = Estimated Concentration
(J-) = The result is an estimated quantity, but the result may be biased low. NA = Not Analyzed or SCO not available
U = Below Laboratory Reporting Limit
UJ = Below Laboratory Reporting Limit, quantitation limit is approximate
B = Detected in blank sample
R = Rejected by data validator

Color Code:

BOLD	Detection Exceeds Regulatory Level for Toxicity Characteristic
BOLD	Detection Exceeds Part 375 Industrial SCO
BOLD	Detection Exceeds Part 375 Commercial SCO
BOLD	Detection Limit Exceeds Record of Decision Objective

TABLE 1-5
Summary of LVRR Soil Sample Analytical Results
Focused Alternatives Analysis Report Spill Zone Soils (Operable Unit OU 1)
Lehigh Valley Railroad Derailment Superfund Site, LeRoy, NY

Parameter [1]	ROD [2]	NYSDEC Part 375 Soil Cleanup Objectives [3]				E-5-5(S)	E-5W	E-6	F5						F-5N	F-5E	F-5S	F-5W
		Unrestricted	Protection of Public Health		Protection of Groundwater	Total VOCs	Total VOCs	Total VOCs	Total VOCs	Total VOCs	TCLP	SPLP	Total VOCs	Matrix Diffusion	Total VOCs	Total VOCs	Total VOCs	Total VOCs
			Commercial	Industrial		8/24/2017	8/24/2017	8/24/2017	9/14/2016	11/11/2016	11/11/2016	11/11/2016	8/23/2017	9/6/2017	8/23/2017	8/23/2017	8/23/2017	8/23/2017
Chloromethane	--	NA	NA	NA	NA	11000U	7200U	3000U	730U	4.1U	NA	NA	7600U	48.7J	11000U	4800U	9.3U	4.7U
Vinyl Chloride	--	20	13000	27000	20	11000U	7200U	3000U	730U	4.1U	20U	5U	7600U	72.1U	11000U	4800U	9.3U	4.7U
1,1-Dichloroethene	--	330	500000	1000000	330	11000U	7200U	3000U	730U	4.1U	20U	5U	7600U	36.1U	11000U	4800U	9.3U	4.7U
Carbon Disulfide	--	NA	NA	NA	NA	11000U	7200U	3000U	730U	4.1U	NA	NA	7600U	36.1U	11000U	4800U	9.3U	4.7U
Methylene Chloride	--	50	500000	1000000	50	11000U	7200U	3000U	730U	4.1U	NA	NA	7600U	36.1U	11000U	4800U	9.3U	4.7U
trans-1,2-DCE	--	250	500000	1000000	250	11000U	7200U	3000U	730U	4.1U	NA	NA	7600U	36.1U	11000U	4800U	9.3U	4.7U
1,1-Dichloroethane	--	270	240000	480000	270	11000U	7200U	3000U	730U	4.1U	NA	NA	7600U	36.1U	11000U	4800U	9.3U	4.7U
cis-1,2-DCE	3000	250	500000	1000000	250	**6500J**	**7200U**	**3000U**	360J	5.9	NA	NA	**7600U**	36.1U	**11000U**	**4800U**	9.3U	4.7U
Chloroform	--	370	350000	700000	370	11000U	7200U	3000U	730U	4.1U	20U	5U	7600U	36.1U	11000U	4800U	9.3U	4.7U
1,1,1-Trichloroethane	--	680	500000	1000000	680	11000U	7200U	3000U	730U	4.1U	NA	NA	7600U	36.1U	11000U	4800U	9.3U	4.7U
Benzene	--	60	44000	89000	60	11000U	7200U	3000U	730U	4.1U	20U	5U	7600U	36.1U	11000U	4800U	0.71J	4.7U
1,2-Dichloroethane	--	20	30000	60000	20	11000U	7200U	3000U	730U	4.1U	20U	5U	7600U	36.1U	11000U	4800U	9.3U	4.7U
Trichloroethene	7000	470	200000	400000	470	**340000**	**170000**	**68000**	**3100000**	**64500**	174	134	**370000J**	4300	**300000**	**240000J**	620J	12
Toluene	--	700	500000	1000000	700	11000U	7200U	3000U	730U	4.1U	NA	NA	7600U	24.9J	11000U	4800U	2.9J	4.7U
Tetrachloroethene	--	1300	150000	300000	1300	11000U	7200U	3000U	730U	4.1U	20U	5U	7600U	36.1U	11000U	4800U	9.3U	4.7U
Ethylbenzene	--	1000	390000	780000	1000	11000U	7200U	3000U	730U	4.1U	NA	NA	7600U	36.1U	11000U	4800U	9.3U	4.7U
m,p-Xylene	--	260	500000	1000000	1600	11000U	7200U	3000U	1500U	8.3U	NA	NA	7600U	53.7	11000U	4800U	3.1J	4.7U
o-Xylene	--	260	500000	1000000	1600	11000U	7200U	3000U	730U	4.1U	NA	NA	7600U	27.1J	11000U	4800U	1.2J	4.7U
Isopropylbenzene	--	NA	NA	NA	NA	11000U	7200U	3000U	730U	4.1U	NA	NA	7600U	72.1U	11000U	4800U	0.54J	4.7U
Styrene	--	NA	NA	NA	NA	11000U	7200U	3000U	730U	4.1U	NA	NA	7600U	36.1U	11000U	4800U	9.3U	4.7U
1,3,5-Trimethylbenzene	--	8400	190000	380000	8400	11000U	7200U	3000U	730U	NA	NA	NA	7600U	72.1U	11000U	4800U	9.3U	4.7U
1,2,4-Trimethylbenzene	--	3600	190000	380000	3600	11000U	7200U	3000U	730U	NA	NA	NA	7600U	36.1	11000U	4800U	1.9J	4.7U
Naphthalene	--	NA	NA	NA	NA	11000U	7200U	3000U	730U	NA	NA	NA	7600U	37.2	11000U	4800U	9.3U	4.7U
1,4-Dioxane	--	100	130000	250000	100	11000U	7200U	3000U	150000	155U	NA	NA	7600U	NA	11000U	4800U	9.3U	4.7U
Methycyclohexane	--	NA	NA	NA	NA	11000U	7200U	3000U	320J	4.1U	NA	NA	7600U	NA	11000U	4800U	5.9J	4.7U
Cyclohexane	--	NA	NA	NA	NA	11000U	7200U	3000U	730U	4.1U	NA	NA	7600U	NA	11000U	4800U	4.9J	4.7U
2-Butanone (MEK)	--	120	500000	1000000	120	11000U	7200U	3000U	730U	4.1U	NA	NA	7600U	NA	11000U	4800U	19	15
Acetone	--	50	500000	1000000	50	11000U	7200U	3000U	730U	4.1U	NA	NA	7600U	NA	11000U	4800U	550J	740U
MTBE	--	930	500000	1000000	930	11000U	7200U	3000U	730U	4.1U	NA	NA	7600U	NA	11000U	4800U	9.3U	2.1J
n-Proplybenzene	--	3900	500000	1000000	3900	11000U	7200U	3000U	730U	4.1U	NA	NA	7600U	NA	11000U	4800U	9.3U	4.7U

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table. All soil results are in ug/kg (ppb).
2. March 1997 Record of Decision (ROD) Concentrations-Based Objectives in ug/kg (ppb).
3. Values per 6NYCRR Part 375 Soil Cleanup Objectives (SCOs) in ug/kg (ppb).
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Color Code:

BOLD	Detection Exceeds Regulatory Level for Toxicity Characteristic
BOLD	Detection Exceeds Part 375 Industrial SCO
BOLD	Detection Exceeds Part 375 Commercial SCO
BOLD	Detection Limit Exceeds Record of Decision Objective

TABLE 1-6
Summary of LVRR Soil Sample Analytical Results
Focused Alternatives Analysis Report Spill Zone Soils (Operable Unit OU 1)
Lehigh Valley Railroad Derailment Superfund Site, LeRoy, NY

Parameter [1]	ROD [2]	NYSDEC Part 375 Soil Cleanup Objectives [3]				F-6			F-6N	F-6E	F-6S	F-6W	G-4			G-7			Gulf Road
		Unrestricted	Protection of Public Health		Protection of Groundwater	Total VOCs	Total VOCs	Matrix Diffusion	Total VOCs	Total VOCs	Total VOCs	Total VOCs	Total VOCs	Total VOCs	Matrix Diffusion	Total VOCs	Total VOCs	Matrix Diffusion	Total VOCs
			Commercial	Industrial		9/14/2016	8/23/2017	9/6/2017	8/23/2017	8/23/2017	8/23/2017	8/23/2017	9/14/2016	8/23/2017	9/5/2017	9/14/2016	8/23/2017	9/5/2017	8/24/2017
Chloromethane	--	NA	NA	NA	NA	11000U	33000U	47.8J	14000U	10000U	30000U	3500U	6.4U	4.8U	76.7U	650U	3600U	85.5U	580U
Vinyl Chloride	--	20	13000	27000	20	11000U	33000U	78.9U	14000U	10000U	30000U	3500U	6.4U	4.8U	76.7U	650U	3600U	85.5U	580U
1,1-Dichloroethene	--	330	500000	1000000	330	11000U	33000U	39.5U	14000U	10000U	30000U	3500U	6.4U	4.8U	38.4U	650U	3600U	42.7U	580U
Carbon Disulfide	--	NA	NA	NA	NA	11000U	33000U	39.5U	14000U	10000U	30000U	3500U	6.4U	4.8U	38.4U	650U	3600U	42.7U	580U
Methylene Chloride	--	50	500000	1000000	50	11000U	33000U	39.5U	14000U	10000U	30000U	3500U	6.4U	4.8U	38.4U	650U	3600U	42.7U	580U
trans-1,2-DCE	--	250	500000	1000000	250	11000U	33000U	39.5U	14000U	10000U	30000U	3500U	6.4U	4.8U	38.4U	650U	3600U	42.7U	580U
1,1-Dichloroethane	--	270	240000	480000	270	11000U	33000U	39.5U	14000U	10000U	30000U	3500U	6.4U	4.8U	38.4U	650U	3600U	42.7U	580U
cis-1,2-DCE	3000	250	500000	1000000	250	**22000**	**9800J**	1140	**14000U**	**10000U**	**6900J**	2600J	1.5J	4.8U	38.4U	650U	3600U	42.7U	1600
Chloroform	--	370	350000	700000	370	11000U	33000U	39.5U	14000U	10000U	30000U	3500U	6.4U	4.8U	38.4U	650U	3600U	42.7U	580U
1,1,1-Trichloroethane	--	680	500000	1000000	680	11000U	33000U	39.5U	14000U	10000U	30000U	3500U	6.4U	4.8U	38.4U	650U	3600U	42.7U	580U
Benzene	--	60	44000	89000	60	11000U	33000U	39.5U	14000U	10000U	30000U	3500U	6.4U	4.8U	9.59J	90J	3600U	42.7U	580U
1,2-Dichloroethane	--	20	30000	60000	20	11000U	33000U	39.5U	14000U	10000U	30000U	3500U	6.4U	4.8U	38.4U	650U	3600U	7.69J	580U
Trichloroethene	7000	470	200000	400000	470	**2600000**	**810000**	**16100**	**560000**	**450000J**	**530000**	**120000**	69	690J	239J	**48000**	**77000**	1550	**20000**
Toluene	--	700	500000	1000000	700	11000U	33000U	39.5U	14000U	10000U	30000U	3500U	6.4U	4.8U	36J	1200	3600U	26.1J	580U
Tetrachloroethene	--	1300	150000	300000	1300	11000U	33000U	65.9	14000U	10000U	30000U	3500U	6.4U	4.8U	38.4U	650U	3600U	42.7U	580U
Ethylbenzene	--	1000	390000	780000	1000	11000U	33000U	39.5U	14000U	10000U	30000U	3500U	6.4U	4.8U	38.4U	200J	3600U	42.7U	28J
m,p-Xylene	--	260	500000	1000000	1600	22000U	33000U	34.3J	14000U	10000U	30000U	3500U	13U	4.8U	44	1300U	3600U	44	580U
o-Xylene	--	260	500000	1000000	1600	11000U	33000U	39.5J	14000U	10000U	30000U	3500U	6.4U	4.8U	29.9J	760	370J	29.9J	580U
Isopropylbenzene	--	NA	NA	NA	NA	11000U	33000U	78.9U	14000U	10000U	30000U	3500U	6.4U	4.8U	76.7U	140J	3600U	85.5U	580U
Styrene	--	NA	NA	NA	NA	11000U	33000U	39.5U	14000U	10000U	30000U	3500U	6.4U	4.8U	38.4U	650U	3600U	42.7U	580U
1,3,5-Trimethylbenzene	--	8400	190000	380000	8400	11000U	33000U	78.9U	14000U	10000U	30000U	3500U	6.4U	4.8U	52.9J	650U	3600U	85.5U	580U
1,2,4-Trimethylbenzene	--	3600	190000	380000	3600	11000U	33000U	39.5U	14000U	10000U	30000U	3500U	6.4U	4.8U	94.7	650U	560J	42.7U	150J
Naphthalene	--	NA	NA	NA	NA	11000U	33000U	145	14000U	10000U	30000U	3500U	6.4U	4.8U	23.4J	650U	3600U	67.1	580U
1,4-Dioxane	--	100	130000	250000	100	11000U	33000U	NA	14000U	10000U	30000U	3500U	6.4U	4.8U	NA	650U	3600U	NA	580U
Methycyclohexane	--	NA	NA	NA	NA	11000U	33000U	NA	14000U	10000U	30000U	3500U	2.1J	1.3J	NA	2500	3200J	NA	330J
Cyclohexane	--	NA	NA	NA	NA	11000U	33000U	NA	14000U	10000U	30000U	3500U	6.4U	4.8U	NA	870	1100J	NA	580U
2-Butanone (MEK)	--	120	500000	1000000	120	11000U	33000U	NA	14000U	10000U	30000U	3500U	6.4U	7.8	NA	650U	3600U	NA	580U
Acetone	--	50	500000	1000000	50	11000U	33000U	NA	14000U	10000U	30000U	3500U	6.4U	460J	NA	650U	3600U	NA	580U
MTBE	--	930	500000	1000000	930	11000U	33000U	NA	14000U	10000U	30000U	3500U	6.4U	1.6J	NA	650U	3600U	NA	580U
n-Proplybenzene	--	3900	500000	1000000	3900	11000U	33000U	NA	14000U	10000U	30000U	3500U	6.4U	4.8U	NA	650U	3600U	NA	580U

Notes:

1. Only those parameters detected at a minimum of one sample location are presented in this table. All soil results are in ug/kg (ppb).
2. March 1997 Record of Decision (ROD) Concentrations-Based Objectives in ug/kg (ppb).
3. Values per 6NYCRR Part 375 Soil Cleanup Objectives (SCOs) in ug/kg (ppb).
4. Sample not logged in by ALS; once discovered, sample was outside holding time.

Acronyms:

J = Estimated Concentration
(J-) = The result is an estimated quantity, but the result may be biased low. NA = Not Analyzed or SCO not available
U = Below Laboratory Reporting Limit
UJ = Below Laboratory Reporting Limit, quantitation limit is approximate
B = Detected in blank sample
R = Rejected by data validator

Color Code:

BOLD	Detection Exceeds Regulatory Level for Toxicity Characteristic
BOLD	Detection Exceeds Part 375 Industrial SCO
BOLD	Detection Exceeds Part 375 Commercial SCO
BOLD	Detection Limit Exceeds Record of Decision Objective

Table 2-1 Trichloroethylene (TCE) Concentrations in Groundwater

Lehigh Valley Railroad Derailment Superfund Site, Le Roy, NY

			NYSDEC TCE Sampling Results (ppb)							Unicorn TCE Sampling Results (ppb)								
Well ID	Total Boring Depth BGS	PVC Screened Interval BGS	Nov-93	Jan-94	Apr-94	Jul-94	Oct-94	Jan-95	Apr-95	08-Aug/ Sept	10-Dec	11-Jan	11-Mar	Il-Jun	11-Sep	11-Dec	12-Feb	12-Jun
DC-I A	60	Open Borehole	16,000	1, 100	58,000	2,000		9,600	6,300	2,400	12,000	12,000	12,000	6,300	6,900	6,000	3,300	12,000
DC-I B	80	60-80	380	370	76	280	440	140	99	500		570	750	97	120	280	240	180
DC-I C	120	100-120	38,000	520	95	88	120	82	60	100		230	24	180	150	250	290	230
DC-I D	160	135-155	9,400	1,300	780	560	480	260	240	13		8.60	6.80	7.10	8.10	7.20	8.00	9.50
DC-2 A	41.5	Open Borehole	800	380	550	2,500	930	1,000	580	51	82		100	62	170	110	32	48
DC-2 B	73.2	49.8-69.8	120	210	3,100	890	730	1,300	1,600	4,800	4,100		2,300	1,700	1,200		2,400	3,400
DC- 2 C	106.5	85.4-105.4	22	10	190	ND	4	7	3	26		12.00	9.10	8.80	7.80	10.00	9.50	9.30
DC-2 D	150.9	130.5-150.5	590	140	1,800	940	14	60	6			0.31	0.31	0.27	0.42	1.00	0.37	0.32
DC-5 A	60.5	Open Borehole	7,300	1,600	20,000	1,300	15,000	36,000	47,000	2,300	3,600		-	1,800	2,400	3,700	2, 700	5,100
DC-5 B	80.5	60-80	770	360	120	270	2,200	250	440	170		310	710	72	90	110	110	74
DC-5 C	132	110.5-130.5	470	350	20	10	15	8	13	2		1.00	1.00	0.24	0.59	0.28	1.00	0.68
DC-5 D	167	144.5-164.5	580	81	18	25	11	17	19	2			0 39	0 44	0 48	0.49	0.35	0.51
DC-06 A	30	Open Borehole		240	980	510	380	220	330	150	74		690	510	500	160	100	140
DC-06 B	55	34.8-54.8	1,100	2,100	480	1,600	1,900	1,400		1,500	5 70		150	76	1,000	3	130	1,100
DC-06 C	92.1	69.8-89.8	ND	4	320	22	ND	11	25	5	3.50		3.30	3.00	2.90	560.00	3.20	2 90
DC-06 D	138	111.8-131.8	26	ND	4	ND	ND	ND		ND	1	1	1	1	1	1	1	1
DC-15 A	65	Open Borehole	13,000	8,900	41,000	6,700	9,800	6,700	3,000	12,000		4,600	3,100	930	11,000	3,300	2,500	3,900
DC-15 B	185	160-180	140	93	47	13	18	19	210	15		5.90	1.60	1.70	2.50	1.30	1.00	1.20
DC-16	169.8	Open Borehole	6,800	1,200	8,500	410	600	3,600	4, 500	6,500		670	3,300	1,600	2,800	1,500	2,100	750
DC-16 C	Not Avail.	Not Avail.											3,200					
35-1	164.8	48.5-53.5	Flute well installed by UMC								2,400		4,500	1,300	1,800	1,200	1,600	2,300
35-2	164.8	58.5-63.5									4,500		3,700	2,600	3,500	4,200	3,100	3,300
35-3	164.8	68.5-73.5									710		220	120	150	370	150	130
35-4	164.8	103.5-108.5									200		130	61	33	43	40	26
35-5	164.8	115.5-120.5									200		60	39				140

Notes: TCE concentrations are in micrograms per liter (µg/l).

Blank values indicate that sampling was not performed.

Table 2-2
Packer Test Groundwater Sample Analytical Results

BVE Data Summary Report

Lehigh Valley Railroad Derailment Superfund Site
Index Number CERCLA-02-2006-2006

Well ID	Sample Depth Interval	Acetone	Bromodichloro-methane	Carbon Disulfide	Chloroform	Dibromochloro-methane	cis-1,2-DCE	Trans-1,2-DCE	Methyl cyclohexane	Methylene Chloride	Toluene	TCE	Vinyl Chloride
LVRR-18	**<58'**	<5.0	<3.8	<1.0	<9.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.8	<2.9	<1.0
	58'- 63'	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.9	<1.0
	63' – 68'	<5.0	<1.2	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.9	<1.0
	76' – 83'	<5.0	<1.3	<1.0	<2.7	0.62 J	<1.0	<1.0	0.22 J	<1.0	1.8	3.1	<1.0
	>140'	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.9	<1.0	<1.0
LVRR-20	**<30'**	2.3 J	<1.0	<1.0	<2.5	<1.0	12	4.3	<1.0	<1.0	<9.6	13	<1.0
	30' – 35'	Dry											
	35' – 40'	Dry											
	40' – 45'	Dry											
	48' – 53'	<5.0	<1.0	<1.0	<1.0	<1.0	1.3	0.42 J	<1.0	<1.0	<2.0	22	<1.0
	48' – 53' DUP	<5.0	<1.0	<1.0	<1.0	<1.0	1.3	0.35 J	<1.0	<1.0	<2.1	22	<1.0
	59' – 64'	<5.0	<1.0	<1.0	<1.0	<1.0	7.1	0.29 J	<1.0	<1.0	<1.4	510	<1.0
	76' – 81'	Dry											
	87' – 92'	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<4.0	<1.0
	>125.5'	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.1	<2.7	<1.0
LVRR-21	**<55'**	Dry											
	59' – 64'	<5.0	<1.3	<1.0	<2.9	<1.0	<1.0	<1.0	<1.0	<1.0	13	3.6	<1.0
	66' – 71'	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	5.0	<1.0	<1.0
	75' – 80'	Dry											
	89' – 94'	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.7	<1.0	<1.0
	>114'	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.6	<1.0	<1.0
LVRR-26	**<58'**	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	4.9	<1.0	<1.0
	61' – 66'	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.5	<1.0	<1.0
	70' – 75'	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.1	<1.0	<1.0
	116' – 121'	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.5	<1.0	<1.0
	128' – 133'	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	<1.0	<1.0
	>145'	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.2	<1.0	<1.0
LVRR-27	**<98''**	Dry											
	103' – 108'	Dry											
	108' – 113'	<10	<2.0	<2.0	1.5 J	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.8	<2.0
	117' – 122'	<5.0	<1.0	<1.0	0.20 J	<1.0	<1.0	<1.0	<1.0	<1.0	0.30 J	1.1	<1.0
	138' – 143'	<5.0	<1.0	<1.0	0.45 J	<1.0	<1.0	<1.0	<1.0	<1.0	0.34 J	0.96 J	<1.0
	>143'	<5.0	<1.0	<1.0	0.78 J	<1.0	<1.0	<1.0	<1.0	<1.0	0.39 J	1.1	<1.0
LVRR-28	**<66'**	<25	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<8.6	16	<5.0
	81' – 86'	<25	<5.0	<5.0	<5.0	<5.0	<1.0	<1.0	<5.0	<5.0	<5.9	17	<5.0
	87' – 92'	<5.0	<1.0	<1.0	<1.0	<1.0	0.24 J	<1.0	<1.0	<1.0	<2.1	<6.4	<1.0
	97' – 102'	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	<1.6	<1.0
	97' – 102' DUP	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.2	<1.8	<1.0
	>151'	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.6	<4.5	<1.0
LVRR-29	**<65'**	Dry											
	65' – 70'	Dry											
	70' – 75'	Dry											
	75' – 80'	<5.0	0.53 J	<1.0	<1.0	0.26 J	<1.0	<1.0	<1.0	<1.0	4.4	<3.8	<1.0
	95' – 100'	<5.0 UJ	0.62 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6.8	<3.7	<1.0
	>113'	Packer Torn											

Table 2-3
Packer Test Groundwater Sample Analytical Results

BVE Data Summary Report

Lehigh Valley Railroad Derailment Superfund Site
Index Number CERCLA-02-2006-2006

Well ID	Sample Depth Interval	Acetone	Bromodichloro-methane	Carbon Disulfide	Chloroform	Dibromochloro-methane	cis-1,2-DCE	Trans-1,2-DCE	Methyl cyclohexane	Methylene Chloride	Toluene	TCE	Vinyl Chloride
LVRR-30	**<94'**	2.4 J	2.4	1.0	1.0	1.0	<1.0	<1.0	<1.0	<1.0	3.5	<14	<1.0
	110' – 115'	<5.0	<1.0	<1.0	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	42	<1.0
	127' – 132'	<5.0	<1.0	<1.0	<1.0	<1.0	0.73 J	<1.0	<1.0	<1.0	<1.5	16	<1.0
	137' – 142'	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.3	<2.9	<1.0
	>161'	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.71 J	<2.4	<1.0
LVRR-31	**<55'**	<10	1.8 J	<2.0	3.4	0.84 J	<2.0	<2.0	<2.0	<2.0	<2.0	11	<2.0
	70' – 75'	Dry											
	75' – 80'	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	7.3	<1.0
	75' – 80' DUP	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	7.3	<1.0
	80' – 85'	Dry											
	104' – 109'	3.9 J	0.43 J	<1.0	0.76 J	0.21 J	<1.0	<1.0	<1.0	<1.0	1.1	2.8	<1.0
	>125'	3.7 J	R	R	R	R	R	R	R	R	<1.0 UJ	1.4 J	R
LVRR-32	**<60'**	Dry											
	75' – 80'	<5.0	<1.0	<1.0	0.50 J	<1.0	0.50 J	<1.0	<1.0	<1.0	1.1	93	<1.0
	75' – 80' DUP	<5.0	<1.0	<1.0	0.52 J	<1.0	0.52 J	<1.0	<1.0	<1.0	1.0	90	<1.0
	80' – 85'	<5.0	1.0	<1.0	2.4	0.57 J	0.41 J	<1.0	<1.0	<1.0	2.8	69	<1.0
	96' – 101'	<5.0	1.4	<1.0	2.6	0.69 J	0.35 J	<1.0	<1.0	<1.0	1.6	69	<1.0
	103' – 108'	<5.0	<1.0	<1.0	0.67 J	0.22 J	0.41 J	<1.0	<1.0	<1.0	2.5	71	<1.0
	>108'	<5.0	<1.0	<1.0	0.36 J	<1.0	0.56 J	<1.0	<1.0	<1.0	2.1	92	<1.0
LVRR-33	**<72'**	<5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	6.5	<2.8	<1.0
	72' – 77'	Dry											
	77' – 82'	Dry											
	82' – 87'	2.3 J	<1.2	0.42 J	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0	23	8.5	<1.0
	87' – 92'	<5.0	<1.0	0.49 J	<1.1	<1.0	<1.0	<1.0	<1.0	<1.0	6.8	11	<1.0
	100' – 105'	2.1 J	<1.4	0.77 J	<3.3	<1.0	<1.0	<1.0	<1.0	<1.0	7.8	5.5	<1.0
	105' – 110'	2.6 J	<1.0	0.58 J	<2.2	<1.0	<1.0	<1.0	<1.0	<1.0	6.6	4.9	<1.0
	>110'	<5.0	<1.0	0.43 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	3.9	<1.2	<1.0
LVRR-34	**60' – 65'**	1.7 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	16	37	<1.0
	66' – 71'	<50 UJ	<10	<10	<10	<10	<10	<10	<10	<10	25	<21	<10
	80' – 85'	<50 UJ	<10	<10	<10	<10	<10	<10	<10	<10	16	<18	<10
	85' – 90'	<50 UJ	<10	<10	<10	<10	<10	<10	<10	<10	8.0 J	<10	<10
	>90'	<5.0 UJ	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.4	<5.0	<1.0
LVRR-35	**<55'**	Dry											
	55' – 60'	<130	<25	<25	<25	<25	27	<25	<25	<25	7.3 J	4400	15 J
	69' – 74'	<25	<5.0	<5.0	<5.0	<5.0	1.7 J	<5.0	<5.0	<5.0	2.1 J	670	<5.0
	76' – 81'	<25	<5.0	<5.0	<5.0	<5.0	3.4 J	<5.0	<5.0	<5.0	8.8	900	<5.0
	76' – 81' DUP	<25	<5.0	<5.0	<5.0	<5.0	3.2 J	<5.0	<5.0	<5.0	11	920	<5.0
	85' – 90'	<10	<2.0	<2.0	<2.0	<2.0	1.3 J	<2.0	<2.0	<2.0	3.4	450	<2.0
	91' – 96'	<10	<2.0	<2.0	<2.0	<2.0	2.7	<2.0	<2.0	<2.0	4.8	340	<2.0
	>106'	<10	<2.0	<2.0	<2.0	<2.0	1.9 J	<2.0	<2.0	1.7 J	2.4	550	0.56 J

Notes:

1) All concentrations are in micrograms per liter (ug/l).
2) J Indicates estimated concentration
3) R Indicates validation rejected results
4) UJ Indicates analyte was not detected above the reporting limit, but is an estimate.
5) <5.0 Indicates not detected at or above the laboratory detection limit.
6) Sample depth intervals are in feet below the ground surface.

Table 3
Summary of Contaminants of Concern and Medium-Specific Exposure Point Concentrations

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater

Exposure Point	Contaminant of Concern (COC)	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration (EPC)	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Shallow Groundwater-(excavation/trench)	Trichloroethylene	0.031 J	12,000 J	µg/L	14/15	6,219	µg/L	95% Adjusted Gamma UCL
Tap Water	Trichloroethylene	0.26 J	12,000 J	µg/L	120/214	852.4	µg/L	97.5% KM (Chebyshev) UCL

Scenario Timeframe: Future
Medium: Soil
Exposure Medium: Soil

Exposure Point	Contaminant of Concern (COC)	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration (EPC)	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
Spill Zone Surface Soil[1]	Trichloroethylene	0.012	810	mg/kg	7/7	460.2	mg/kg	95% Student's t-UCL
Spill Zone Surface and Subsurface Soil[2]	Trichloroethylene	0.012	810	mg/kg	40/40	384.3	mg/kg	97.5% Chebyshev (Mean, Sd) UCL

Scenario Timeframe: Current/Future
Medium: Surface Water
Exposure Medium: Surface Water

Exposure Point	Contaminant of Concern (COC)	Concentration Detected		Concentration Units	Frequency of Detection	Exposure Point Concentration (EPC)	Exposure Point Concentration Units	Statistical Measure
		Min	Max					
SW EU1: Mud Creek	Trichloroethylene	4.8	390	µg/L	5/9	390	Max	Limited Data Set (<10 samples)

Definitions

EPC= exposure point concentration

J = qualifier; the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample

Max= max concentration used as EPC because there were less than 10 samples in the data set

SW EU1= Surface water exposure unit 1; encompasses samples collected from Mud Creek

Footnotes:

(1) Surface soil depth encompasses soils 0.5 ft to 2.5 ft below ground surface

(2) Surface and subsurface soil depth encompasses soil 0.5 ft to 10.5 ft below ground surface

Table 4
Selection of Exposure Pathways in the 2016 HHRA

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Groundwater	Groundwater	Groundwater (Tap Water)	Resident	Adult	Ingestion	None	Residents in the area are connected to the municipal water supply, hence current exposure to site groundwater does not exist.
						Dermal	None	
						Inhalation	None	
					Child (0-6 years old)	Ingestion	None	
						Dermal	None	
						Inhalation	None	
				Commercial/Industrial Worker	Adult	Ingestion	None	Commercial/Industrial workers in the area are connected to the municipal water supply, hence current exposure to site groundwater does not exist.
						Dermal	None	
Current/Future	Groundwater	Indoor Air	Indoor Air	Resident	Adult/Child	Inhalation	Qual	Indoor air vapor intrusion is a potentially completed pathway.
				Commercial/Industrial Worker	Adult			
		Groundwater	Shallow Groundwater	Construction/Utility Worker	Adult	Ingestion	Qual	Incidental ingestion of shallow groundwater while working at the site is expected to be minimal for the Construction/Utility worker.
						Dermal	Quant	Construction/Utility workers may come in contact with shallow groundwater while working at the site.
	Surface water	Surface water	SW EU 1: Mud Creek[1]	Recreational User	Adult	Ingestion	Quant	Recreational users may come into contact with surface water while visiting Mud Creek, Oatka Creek and Spring Creek.
						Dermal	Quant	
					Adolescent (12-18 years old)	Ingestion	Quant	
						Dermal	Quant	
					Child (0-6 years old)	Ingestion	Quant	
						Dermal	Quant	
		Surface water	SW EU2: Oatka Creek and Spring Creek[2]	Recreational User	Adult	Ingestion	Quant	
						Dermal	Quant	
					Adolescent (12-18 years old)	Ingestion	Quant	
						Dermal	Quant	
					Child (0-6 years old)	Ingestion	Quant	
						Dermal	Quant	
	Sediments	Sediments	SED EU 1: Mud Creek[3]	Recreational User	Adult	Ingestion	Quant	Recreational users may come into contact with sediments while visiting Mud Creek, Oatka Creek and Spring Creek.
						Dermal	Quant	
					Adolescent (12-18 years old)	Ingestion	Quant	
						Dermal	Quant	
					Child (0-6 years old)	Ingestion	Quant	
						Dermal	Quant	
		Sediments	SED EU2: Oatka Creek and Spring Creek[4]	Recreational User	Adult	Ingestion	Quant	
						Dermal	Quant	
					Adolescent (12-18 years old)	Ingestion	Quant	
						Dermal	Quant	
					Child (0-6 years old)	Ingestion	Quant	
						Dermal	Quant	
Future	Groundwater	Groundwater	Groundwater (Tap Water)	Resident	Adult	Ingestion	Quant	Groundwater at the site is designated as a potable water supply. Future residents may be exposed to site groundwater through potable uses.
						Dermal	Quant	
						Inhalation	Quant	
					Child (0-6 years old)	Ingestion	Quant	
						Dermal	Quant	
						Inhalation	Quant	
				Commercial/Industrial Worker	Adult	Ingestion	Quant	Groundwater at the site is designated as a potable water supply. Future commercial/industrial workers may be exposed to site groundwater through potable uses.
						Dermal	Quant	

Selection of Exposure Pathways in the 2021 Supplemental Soil Risk Evaluation								
Scenario Timeframe	**Medium**	**Exposure Medium**	**Exposure Point**	**Receptor Population**	**Receptor Age**	**Exposure Route**	**Type of Analysis**	**Rationale for Selection or Exclusion of Exposure Pathway**
Future*	Soil	Surface Soil	Spill Zone Surface Soil	Commercial/Industrial Worker	Adult	Ingestion	Quant	Commercial/Industrial workers may contact surficial soil in the Spill Zone via incidental ingestion and inhalation of volatiles released from soil. The dermal pathway was not quantitatively evaluated as exposure to volatile contaminants, such as TCE, through the dermal pathway is expected to be *de minimus.*
						Dermal	None	
						Inhalation	Quant	
		Surface and Subsurface Soil	Spill Zone Surface and Subsurface Soil	Construction /Utility Worker	Adult	Ingestion	Quant	Construction/Utility workers may contact surface and subsurface soil in the Spill Zone via incidental ingstion and inhalation of volatiles released from soil. The dermal pathway was not quantitatively considered as exposure to volatile contaminants, such as TCE, through the dermal pathway is expected to be *de minimus* .
						Dermal	None	
						Inhalation	Quant	

Definitions:
Quant- quantitative
Qual- qualitative

Footnotes:
* Scenario Timeframe for each receptor has been determined to be "future" as the SVE system interrupts direct contact exposures in the current timeframe. (2021 Supplemental Risk Evaluation incorrectly indicated current and future scenario timeframes)
(1) SW EU1- surface water exposure unit (EU) 1. This EU encompasses samples collected from Mud Creek.
(2) SW EU2- surface water exposure unit 2. This EU encompasses samples collected from Oatka Creek & Spring Creek.
(3) SED EU1- sediment exposure unit 1. This EU encompasses samples collected from Mud Creek.
(4) SED EU2- sediment exposure unit 2. This EU encompasses samples collected from Oatka Creek & Spring Creek.

Table 5
Non-Cancer Toxicity Data Summary

Pathway: Ingestion/Dermal

Contaminant 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
Trichloroethylene	Chronic	5.00E-04	mg/kg-day	1	5.00E-04	mg/kg-day	Endocrine (Thymus), Circulatory (Heart), Developmental Immunotoxicity	10-1,000	IRIS	9/28/2011

Pathway: Inhalation

Contaminant of Concern	Chronic/ Subchronic	Inhalation RfC	Inhalation RfC Units	Inhalation RfD (If available)	Inhalation RfD Units (If available)	Primary Target Organ	Combined Uncertainty /Modifying Factors	Sources of RfD Target Organ	Dates of RfC
Trichloroethylene	Chronic	2.00E-03	mg/m^3	NA	NA	Endocrine (Thymus), Circulatory (Heart)	10, 100	IRIS	9/28/2011

Definitions:

IRIS- Integrated Risk Information System

NA- Not available

Footnotes:

(1) SW EU1- surface water exposure unit 1. This EU encompasses samples collected from Mud Creek.

(2) SW EU2- surface water exposure unit 2. This EU encompasses samples collected from Oatka Creek & Spring Creek.

(3) SED EU1- sediment exposure unit 1. This EU encompasses samples collected from Mud Creek.

(4) SED EU2- sediment exposure unit 2. This EU encompasses samples collected from Oatka Creek & Spring Creek.

Table 6
Cancer Toxicity Data Summary

Pathway: Ingestion/ Dermal

Contaminant of Concern	Oral Cancer Slope Factor	Units	Adjusted Cancer Slope Factor (for Dermal)	Slope Factor Units	Weight of Evidence/ Cancer Guideline	Source	Date
Trichloroethylene (Kidney)	9.3E-03	$(mg/kg\text{-}day)^{-1}$	9.3E-03	$(mg/kg\text{-}day)^{-1}$	CA	IRIS	9/28/2011
Trichloroethylene (NHL)	2.2E-02	$(mg/kg\text{-}day)^{-1}$	2.2E-02	$(mg/kg\text{-}day)^{-1}$	CA	IRIS	9/28/2011
Trichloroethylene (Liver)	1.6E-02	$(mg/kg\text{-}day)^{-1}$	1.6E-02	$(mg/kg\text{-}day)^{-1}$	CA	IRIS	9/28/2011
Trichloroethylene (Total)	4.60E-02	$(mg/kg\text{-}day)^{-1}$	4.6E-02	$(mg/kg\text{-}day)^{-1}$	CA	IRIS	9/28/2011

Pathway: Inhalation

Contaminant of Concern	Unit Risk	Units	Inhalation Cancer Slope Factor	Slope Factor Units	Weight of Evidence/ Cancer Guideline	Source	Date
Trichloroethylene (Kidney)	1.00E-06	$\mu g/m^3$	NA	NA	CA	IRIS	9/28/2011
Trichloroethylene (NHL)	2.10E-06	$\mu g/m^3$	NA	NA	CA	IRIS	9/28/2011
Trichloroethylene (Liver)	1.00E-06	$\mu g/m^3$	NA	NA	CA	IRIS	9/28/2011
Trichloroethylene (total)	4.10E-06	$\mu g/m^3$	NA	NA	CA	IRIS	9/28/2011

Definitions:

IRIS- Integrated Risk Information System

NA- Not available

CA- Carcinogenic to humans (Post-2005 cancer classification guideline)

NHL- non-Hodgkin lymphoma

Table 7
Risk Characterization Summary - Non-Carcinogens

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

Medium	Exposure Medium	Exposure Point	Contaminant of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient*			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Trichloroethylene	Endocrine (Thymus), Circulatory (Heart); Developmental Immunotoxicity	51	--	8.8	60
	Air	Water Vapor from Bathing/Showering	Trichloroethylene	Endocrine (Thymus), Circulatory (Heart)	--	6.9E+03	--	6.9E+03
							Groundwater Hazard Index Total=	**7.0E+03**
							Receptor Hazard Index Total[1]=	**7.0E+03**
							Endocrine (Thymus) Hazard Index=	**7.0E+03**
							Circulatory (Heart) Hazard Index=	**7.0E+03**
							Developmental Immunotoxicity Hazard Index=	**60**

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

Medium	Exposure Medium	Exposure Point	Contaminant of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient*			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Trichloroethylene	Endocrine (Thymus), Circulatory (Heart); Developmental Immunotoxicity	85	--	12	97
	Air	Water Vapor from Bathing/Showering	Trichloroethylene	Endocrine (Thymus), Circulatory (Heart)	--	1.2E+04	--	1.2E+04
							Groundwater Hazard Index Total=	**1.2E+04**
							Receptor Hazard Index Total[1]=	**1.2E+04**
							Endocrine (Thymus) Hazard Index=	**1.2E+04**
							Circulatory (Heart) Hazard Index=	**1.2E+04**
							Developmental Immunotoxicity Hazard Index=	**97**

Scenario Timeframe: Future
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Contaminant of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient*			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Trichloroethylene	Endocrine (Thymus), Circulatory (Heart); Developmental Immunotoxicity	18	--	0.89	19

							Groundwater Hazard Index Total=	**19**
Soil	Surface Soil	Spill Zone Surface Soil	Trichloroethylene	Endocrine (Thymus), Circulatory (Heart); Developmental Immunotoxicity[4]	0.79	24	--	25
							Soil Hazard Index Total[2]=	**25**
							Receptor Hazard Index Total[3]=	**43**
							Endocrine (Thymus) Hazard Index=	**43**
							Circulatory (Heart) Hazard Index=	**43**
							Developmental Immunotoxicity Hazard Index=	**20**

Scenario Timeframe: Future
Receptor Population: Construction/Utility Worker
Receptor Age: Adult

Medium	**Exposure Medium**	**Exposure Point**	**Contaminant of Concern**	**Primary Target Organ**	**Non-Carcinogenic Hazard Quotient***			
					Ingestion	**Inhalation**	**Dermal**	**Exposure Routes Total**
Groundwater	Groundwater	Shallow Groundwater (excavation/trench)	Trichloroethylene	Endocrine (Thymus), Circulatory (Heart); Developmental Immunotoxicity	0.51	--	2.6	3.1
	Air	Shallow Groundwater (trench air)	Trichloroethylene	Endocrine (Thymus), Circulatory (Heart)	--	0.026	--	0.026
							Groundwater Hazard Index Total=	**3.1**
Soil	Surface and Subsurface Soil	Spill Zone Surface and Subsurface Soil	Trichloroethylene	Endocrine (Thymus), Circulatory (Heart); Developmental Immunotoxicity[4]	2.3	89	--	91
							Soil Hazard Index Total[2]=	**91**
							Receptor Hazard Index Total[3]=	**94**
							Endocrine (Thymus) Hazard Index=	**94**
							Circulatory (Heart) Hazard Index=	**94**
							Developmental Immunotoxicity Hazard Index=	**5**

Scenario Timeframe: Current/Future
Receptor Population: Recreator
Receptor Age: Child

Medium	**Exposure Medium**	**Exposure Point**	**Contaminant of Concern**	**Primary Target Organ**	**Non-Carcinogenic Hazard Quotient***			
					Ingestion	**Inhalation**	**Dermal**	**Exposure Routes Total**
Surface Water	Surface Water	SW EU1: Mud Creek	Trichloroethylene	Endocrine (Thymus), Circulatory (Heart); Developmental Immunotoxicity	1.9	--	3.9	5.8
							Surface Water Hazard Index Total[5]=	**14**
							Receptor Hazard Index Total[6]=	**18**
							Endocrine (Thymus) Hazard Index=	**5.9**
							Circulatory (Heart) Hazard Index=	**5.8**
							Developmental Immunotoxicity Hazard Index=	**5.8**

Scenario Timeframe: Current/Future
Receptor Population: Recreator
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Contaminant of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient*			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	SW EU1: Mud Creek	Trichloroethylene	Endocrine (Thymus), Circulatory (Heart); Developmental Immunotoxicity	0.35	--	2.4	2.8
							Surface Water Hazard Index Total[5]=	**6.2**
							Receptor Hazard Index Total[6]=	**6.6**
							Endocrine (Thymus) Hazard Index=	**2.8**
							Circulatory (Heart) Hazard Index=	**2.8**
							Developmental Immunotoxicity Hazard Index=	**2.8**

Scenario Timeframe: Current/Future
Receptor Population: Recreator
Receptor Age: Adolescent

Medium	Exposure Medium	Exposure Point	Contaminant of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient*			
					Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Water	Surface Water	SW EU1: Mud Creek	Trichloroethylene	Endocrine (Thymus), Circulatory (Heart); Developmental Immunotoxicity	0.64	--	2.8	3.4
							Surface Water Hazard Index Total[5]=	**8.0**
							Receptor Hazard Index Total[6]=	**9.1**
							Endocrine (Thymus) Hazard Index=	**3.5**
							Circulatory (Heart) Hazard Index=	**3.4**
							Developmental Immunotoxicity Hazard Index=	**3.4**

Definitions

"--" = not applicable
COC= contaminant of concern
COPC= contaminant of potential concern
HQ= hazard quotient
SW EU1= Surface water exposure unit 1; encompasses samples collected from Mud Creek
SW EU2= surface water exposure unit 2. This EU encompasses samples collected from Oatka Creek & Spring Creek

Footnotes

*All non-cancer risk estimates reported to 2 significant figures
(1) Receptor Hazard Index Total for Residents represents the summed hazard quotients (HQs) for all Contaminants of Potential Concern (COPCs) in groundwater
(2) Soil Hazard Index Total represents summed HQs from exposure to TCE in soil only, not from exposure to all potential COPCs in soil
(3) Receptor Hazard Index Total represents the summed HQs for all COPCs in groundwater plus the HQs from TCE exposure in soil
(4) Developmental immunotoxicity endpoint is for TCE's RfD only (i.e., applicable to ingestion and dermal exposures)
(5) Surface Water Index Total for Recreators represents the summed HQs for all COPCs in surface water of Mud Creek (SW EU1) and Oatka Creek and Spring Creeks (SW EU2)
(6) Receptor Hazard Index Total for Recreators represents the summed HQs for all COPCs in surface water and sediments at the site

Table 8
Risk Characterization Summary - Carcinogens

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

Medium	Exposure Medium	Exposure Point	Contaminant of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Trichloroethylene (Kidney)	3.2E-04	--	5.2E-05	3.7E-04
			Trichloroethylene (NHL)	2.4E-04	--	3.9E-05	2.8E-04
			Trichloroethylene (Liver)	1.7E-04	--	2.8E-05	2.0E-04
	Air	Water Vapor from Bathing/Showering	Trichloroethylene (Kidney)	--	1.7E-02	--	1.7E-02
			Trichloroethylene (NHL)	--	1.3E-02	--	1.3E-02
			Trichloroethylene (Liver)	--	6.1E-03	--	6.1E-03
	Groundwater Cancer Risk Total[1]=						**3.7E-02**
Receptor Total Cancer Risk=							**3.7E-02**

Scenario Timeframe: Future
Receptor Population: Commercial/Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Contaminant of Concern	Carcinogenic Risk			
				Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Tap Water	Trichloroethylene	1.5E-04	--	7.4E-06	1.6E-04
	Groundwater Cancer Risk Total[1]=						**1.6E-04**
Receptor Total Cancer Risk [2]=							**2.3E-04**

Footnotes:
(1) Groundwater Cancer Risk Total represents summed cancer risk from all Contaminants of Potential Concern (COPC) in groundwater
(2) Receptor Total Cancer Risk for Commercial/Industrial Workers represents the summed risk from exposure to all COPCs in groundwater (1.6E-4) and risk from exposure to TCE in soil (7.6E-5)

Table 9: Remediation Goals (RGs)
Lehigh Valley Railroad Derailment Superfund Site, Le Roy, NY

ENVIRONMENTAL MEDIA	CONTAMINANT OF CONCERN	RG	UNITS
Groundwater[1]	Trichloroethene (TCE)	5	µg/L
	cis-1,2-dichloroethene	5	µg/L
	trans-1,2-dichloroethene	5	µg/L
	1,1- dichloroethene	5	µg/L
	Vinyl Chloride	2	µg/L
Surface Water[2]	Trichloroethene (TCE)	40	µg/L
Soil[3]	Trichloroethene (TCE)	200	mg/kg

Footnotes:

[1] "Lower of the NYSDEC Class GA Groundwater Quality Standards and NY state and federal Maximum Contaminant Levels were selected as RGs. These RGs are the ARARs being waived in the TI Zone.

[2] NYSDEC - Part 703: Surface Water Quality Standards for Class C waters (based on designation of Mud Creek).

[3] 6 NYCRR Part 375, Table 375-6.8(b) Commercial use Soil Cleanup Objective. The protection of groundwater SCO was evaluated as part of the Feasibility Study but was not applied because groundwater restoration is not practicable.

TABLE 10 a
CHEMICAL-SPECIFIC ARARs, TBCs, and Other Guidance
FEASIBILITY STUDY
LEHIGH VALLEY RAILROAD DERAILMENT SUPERFUND SITE
LEROY, NEW YORK

Standard, Requirement, Criteria or Limitation	Citation or Reference	Description/Comments
Air:		
New York State Air Quality Classifications and Standards	6 NYCRR Parts 256 and 257	Establishes air quality standards protective of public health. Applicable to point source emissions from treatment technologies. Potentially applicable to disruptive activities.
National Primary and Secondary Ambient Air Quality Standards (NAAQS)	40 CFR Part 50	Establishes primary and secondary ambient air quality standards to protect public health and welfare. Applicable to point source emissions from treatment technologies. Potentially applicable to disruptive activities.
Soil:		
Environmental Remediation Programs	6 NYCRR Part 375-6 Remedial Program SCOs	Applies to the development and implementation of the remedial programs for soil and other media. Includes the SCO tables at 375-6.8.
Soil Cleanup Guidance	DEC Commissioner Policy CP-51 Soil Cleanup Guidance, October 2010	Guidance for NYSDEC and remedial parties to provide a uniform and consistent process in determining soil cleanup levels for SSF, BCP, VCP, ERP, Spill Response Program (SRP), and RCRA Corrective Action Program Sites.
USEPA Superfund Soil Screening Guidance (SSG)	Technical Background Document and Users Guide, 1996 revisions	Presents a framework for developing risk-based, soil screening levels (SSL) for protection of human health. Provides a flexible, tiered approach to site evaluation and screening level development.
USEPA Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites	2002 Companion Guide to the 1996 SSG	Builds upon the soil screening framework in the original 1996 guidance focusing specific elements of soil screening evaluation that differ for residential, non-residential, and construction scenarios.
USEPA Preliminary Remediation Goals (PRGs)	USEPA Region 9, PRG Table, October 2004	Presents contaminant toxicity values, PRGs, and SSL for residential and non-residential scenarios based on human health criteria and groundwater protection.
USEPA Risk Assessment Guidance for Superfund (RAGS) Part C	Publication 9285.7-01C, October 1991	Provides guidance on the human health risk evaluations of remedial alternatives that are conducted during the feasibility study, during selection and documentation of a remedy, and during and after remedy implementation.
USEPA Regional Screening Levels (RSLs) Composite Worker Soil Table	November 2022	Establishes RSLs for the composite worker. https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables
Surface Water:		
Federal Water Pollution Control Act (CWA)	CWA §304 40 CFR Part 131	Establishes criteria for setting water quality standards for surface water bodies based on the latest scientific data on impacts that a constituent concentration has on a particular aquatic species and/or human health; criteria used as guidance by states in setting water quality standards.

National Recommended Water Quality Criteria	63 Federal Register 68354	Established national recommended water quality criteria for a range of contaminants including PCBs in freshwater.
NYSDEC Water Quality Standards and Classifications	6 NYCRR Parts 700-701.14, 701.19-702.17, 702.22-703.5, 703.7-706	Establishes surface water quality standards and effluent limitations.
New York State Division of Water TOGS Ambient Water Quality Standards and Guidance Values	TOGS 1.1.1	Provides screening criteria for groundwater and surface water.
New York State Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations	6 NYCRR Part 703	Establishes numerical standards for groundwater and surface water cleanups.

TABLE 10 b
LOCATION-SPECIFIC ARARs, TBCs, AND OTHER GUIDANCE
FEASIBILITY STUDY
LEHIGH VALLEY RAILROAD DERAILMENT SUPERFUND SITE
LEROY, NEW YORK

Standard, Requirement, Criteria or Limitation	Citation or Reference	Description/Comments
General Requirements for Site Remediation:		
USEPA Corrective Action Management Units (CAMUs)	40 CFR 264.552	Outlines the conditions under which USEPA can designate an area as a CAMU to be used for managing CAMU-eligible wastes for implementing corrective action or facility cleanup. Outlines minimum treatment
The National Historic Preservation Act (NHPA)	16 U.S.C. § 470	A review of the Site's descriptive data suggests the potential for the discovery of both historic and prehistoric resources within the project area. A Stage IA Cultural Resource Survey (CRS) has been carried out for the project area where the waterline was constructed. An additional Stage IA CRS will be conducted within the Spill Zone. These areas will be subject to a subsequent Stage IB CRS field survey where construction-related impacts are scheduled to occur.
The Endangered Species Act	16 U.S.C. § 1531	The U.S. Fish and Wildlife Service will be consulted to determine whether endangered or threatened species and/or their habitats exist on or in the vicinity of the Site during the remedial design phase of the project.
The Fish and Wildlife Coordination Act (FWCA)	16 U.S.C. § 661	In accordance with the FWCA, state and federal wildlife agencies will be consulted when wetlands and water resources may be or are being impacted.
New York State Endangered and Threatened Species of Fish and Wildlife; Species of Concern; Incidental Take Permits Regulations	6 NYCRR Part 182	Establishes lists of endangered, threatened, and special concern species; recovery and restoration plans, experimental population designation; permit requirements; special rules; penalties, and enforcement.
Floodplains and Wetlands:		
Floodplain Management, Executive Order No. 11988		Portions of the project area adjacent to Mud Creek and Spring Creek are located within the 100-year and 500-year floodplain. As remedial activities are proposed for the 100-year or 500-year floodplain, a floodplain assessment will be performed during remedial design to minimize or avoid the adverse effects of a 500-year event, and to protect against the spread of contaminants and the long-term disabling of remedial treatment systems. This assessment will include a delineation of the floodplain on a Site map in relation to areas of contamination and remedial activities, a discussion of the effects of the proposed remedial action on the floodplain, and measures to minimize potentially adverse floodplain impacts.
The Federal Water Pollution Control Act	33 U.S.C. § 1344	A Wetlands Delineation Work Plan will be developed and any requisite mitigative measures resulting from the delineation work will be addressed during remedial design and construction.
Protection of Wetlands, Executive Order No.11990	40 CFR Part 6, Appendix A	

USEPA Statement of Procedures on Floodplain Management and Wetlands Protection	40 CFR Part 6, Appendix A, Sections 3 and 4	Establishes requirements associated with actions that have impacts on wetlands or floodplains.
New York State Freshwater Wetlands Regulations	6 NYCRR Parts 662-665	Establishes permit requirement regulations, wetland maps and classifications. On-site CERCLA response actions are exempt from permit requirements pursuant to CERCLA Section 121(e), although such activities must comply with substantive requirements of these regulations.
New York State Floodplain Development Permits	6 NYCRR Part 500	Describes permitting requirements for development in floodplains. On-site CERCLA response actions are exempt from permit requirements pursuant to CERCLA Section 121 (e), although such activities must comply with substantive requirements of these regulations.
Clean Water Act Section 404	40 CFR Part 230 and 33 CFR Parts 320-330	Prohibits discharge into wetlands.
Waterways:		
New York State – Use and Protection of Waters	6 NYCRR Part 608	Establishes requirements with excavation or placement of fill in navigable waters.

TABLE 10 c
ACTION-SPECIFIC ARARs, TBCs, and Other Guidance
FEASIBILITY STUDY
LEHIGH VALLEY RAILROAD DERAILMENT SUPERFUND SITE
LEROY, NEW YORK

Standard, Requirement, Criteria or Limitation	Citation or Reference	Description/Comments
Air:		
NYSDEC Guidance for Fugitive Dust and Particulate Monitoring	NYSDEC Program Policy DER-10, Appendix 1B	Establishes guidance for community air monitoring and controls to monitor and mitigate fugitive dusts during intrusive activities at NYS SSF, ERP, BCP, and VCP Sites. Potentially applicable for disruptive activities.
National Ambient Air Quality Standards for Hazardous Air Pollutants	40 CRF Part 61	
Excavation and Fugitive Dust Emissions	40 CFR Part 254.25	
Ambient Air Quality Standards	6 New York Code of Rules and Regulations (NYCRR) Part 200.6	
NYSDEC Control of Toxic Ambient Air Contaminants, Air Guide I		
NYSDOH Guidelines for TCE in Air		
ATSDR Environmental Media Evaluation Guides for Indoor Air-Screening Levels		
Solid and Hazardous Waste:		
NYSDEC Solid Waste Management Facilities	6 NYCRR Part 360	Describes procedures for transferring, processing, recovering, storing, reclaiming, or disposing non-hazardous solid waste.
NYSDEC Solid Waste Transporters	6 NYCRR Part 364	Establishes procedures to protect the environment from mishandling and mismanagement of all regulated waste transported from a site of generation to the site of ultimate treatment, storage, or disposal. Potentially applicable for alternatives involving off-site disposal.
NYSDEC Hazardous Waste Manifest System and Related Standards for Generators	6 NYCRR Part 372	Establish standards for generators and transporters of hazardous waste and standards for generators, transporters, and treatment, storage or disposal facilities relating to the use of the manifest system and its recordkeeping requirements.
NYSDEC and USEPA Land Disposal Restrictions	6 NYCRR Part 376 40 CFR 268.40	Identifies hazardous wastes that are restricted from land disposal and defines those limited circumstances under which an otherwise prohibited waste may be land disposed. Describes chemical-specific treatment requirements for land disposal of hazardous waste. Potentially relevant to off-site waste disposal alternatives.
USEPA Corrective Action Management Units (CAMUs)	40 CFR 264.552	Outlines the conditions under which USEPA can designate an area as a CAMU to be used for managing CAMU-eligible wastes for implementing corrective action or facility cleanup. Outlines min. design requirements.
DOT Hazardous Materials Regulations	49 CFR Parts 107 and 171	Establishes requirements for shipping of hazardous materials. Potentially applicable for alternatives involving off-site disposal.

Table 11a: Total Cost for the Selected Remedy

Media	Description	Capital Cost	O&M Cost	Institutional Controls Costs	Present-Worth Cost
Groundwater	TI waiver (includes monitoring)	$0	$2,253,200	$524,000	$2,778,000
Soil Vapor Intrusion	Indoor air	$0	$659,704	$0	$659,704
Bedrock Vadose Zone	Alternative BVZ - 2: ICs and Groundwater Monitoring	$0	$0	$137,250	$137,250
Soil	Alternative 3 - excavation and off-Site disposal	$3,017,897	$62,000	$121,750	$3,202,000
Surface Water	Alternative SW-5: In-situ treatment of contaminated surface water with streambed cover, ICs and monitoring	$4,121,550	$3,102,250	$81,750	$7,305,550
				Total	**$14,082,504**

Note: The soil alternative includes one foot of clean soil cover in areas of the Spill Zone where surface soil exceeds 2 mg/kg, which is the SCO value for the protection of ecological receptors.

Unicorn Management Consultants, LLC

Table 11b

FS TABLE 4.1-1
INSTITUTIONAL CONTROLS AND MONITORING FOR PORTION OF GROUNDWATER PLUME PROPOSED FOR A TECHNICAL IMPRACTICABILITY WAIVER
FEASIBILITY STUDY REPORT
LEHIGH VALLEY RAILROAD DERAILMENT SUPERFUND SITE
INDEX NUMBER: CERCLA-02-2006-2006
LEROY, NEW YORK

Item	Quantity	Units	Unit Cost	Total Cost
Groundwater Sampling[(1)]				
Groundwater Sampling OM&M - Year 1				
Field Labor	2	events	$ 36,000	$ 72,000
Equipment Rentals and Consumables	2	events	$ 14,600	$ 29,200
Hotel, Vehicle, and Per Diem Costs	2	events	$ 11,000	$ 22,000
Laboratory Analytical	2	events	$ 27,900	$ 55,800
Data Validation	2	events	$ 10,000	$ 20,000
Project Management, Notificaitons, Sheduling, and Reporting	1	unit	$ 50,400	$ 50,400
Subtotal Annual Groundwater Sampling OM&M Cost - Year 1				**$ 249,400**
Groundwater Sampling OM&M (Years 2 to 5)				
Field Labor	2	events	$ 24,000	$ 48,000
Equipment Rentals and Consumables	2	events	$ 9,700	$ 19,400
Hotel, Vehicle, and Per Diem Costs	2	events	$ 7,400	$ 14,800
Laboratory Analytical	2	events	$ 16,500	$ 33,000
Data Validation	2	events	$ 10,000	$ 20,000
Project Management, Notificaitons, Sheduling, and Reporting	1	unit	$ 50,400	$ 50,400
Total Annual Groundwater Sampling OM&M Cost (Years 2 to 5)				$ 185,600
Annual Groundwater Sampling OM&M Costs (Years 2 to 5):				
Number of Years (*n*):				4
Discount Rate (*i*):				7%
p/A value:				3.387
Subtotal Groundwater Sampling OM&M Present Worth (Years 2 to 5):				**$ 628,627**
Groundwater Sampling OM&M (Years 6 to 30)				
Field Labor	1	event	$ 24,000	$ 24,000
Equipment Rentals and Consumables	1	event	$ 9,700	$ 9,700
Hotel, Vehicle, and Per Diem Costs	1	event	$ 7,400	$ 7,400
Laboratory Analytical	1	event	$ 16,500	$ 16,500
Data Validation	1	event	$ 10,000	$ 10,000
Project Management, Notificaitons, Sheduling, and Reporting	1	unit	$ 50,400	$ 50,400
Total Annual Groundwater Sampling OM&M Cost (Years 6 to 30)				$ 118,000
Annual Groundwater Sampling OM&M Costs (Years 6 to 30):				
Number of Years (*n*):				25
Discount Rate (*i*):				7%
p/A value:				11.654
Subtotal Groundwater Sampling OM&M Present Worth (Years 6 to 30):				**$ 1,375,172**
Total Groundwater Sampling OM&M Present Worth (Years 1 to 30):				**$ 2,253,199**

(continued on next page)

Unicorn Management Consultants, LLC

Table 11b

FS TABLE 4.1-1
INSTITUTIONAL CONTROLS AND MONITORING FOR PORTION OF GROUNDWATER PLUME PROPOSED FOR A TECHNICAL IMPRACTICABILITY WAIVER
FEASIBILITY STUDY REPORT
LEHIGH VALLEY RAILROAD DERAILMENT SUPERFUND SITE
INDEX NUMBER: CERCLA-02-2006-2006
LEROY, NEW YORK

Item	Quantity	Units	Unit Cost	Total Cost
Institutional Controls (ICs) and Maintenance Costs [2]				
Informational Devices				
Environmental Easements				
Legal Fees	124	parcels	$ 2,000	$ 248,000
Recording Fees	124	parcels	$ 250	$ 31,000
Publications (1 per county/year)	30	years	$ 1,500	$ 45,000
Site Operation And Maintenance [3]	30	years	$ 5,000	$ 150,000
Site Management Plan	1	unit	$ 50,000	$ 50,000
Subtotal				**$ 524,000**
Total Cost				**$ 2,778,000**

Notes and Assumptions:

(1) The groundwater sampling program will be conducted as described below
- The first groundwater monitoring event will include all well/cluster locations (estimated 150 samples in total)
- All subsequent groundwater monitoring events include 22 well/cluster locations (estimated 90 samples in total) as follows:
  - 13 perimeter wells
  - 4 source area wells
  - 5 wells located downgradient of the source area
- Costs assume a semi-annual sampling schedule for Years 1-5, and annual sampling thereafter.
- Modifications to the proposed the long-term monitoring plan may be necessary based on the results of the sampling data

(2) ICs for groundwater media include Governmetal Controls (refer to Appendix C) & Informational Devices (Deed Notices and Publications). Each property within the groundwater plume would require an associated deed notice. Additionally, publication of a notice in the local newspaper of each of the three counties affected by the groundwater plume would be required annually. Note that Informational Devices would also apply to Indoor Air; however costs for these ICs are not included in the cost summary table for Indoor Air in order to avoid duplication of costs. Please note that there are no costs associated with implementation of Governmental Controls.

(3) This includes estimated costs associated with maintenance of the well network, and annual inspections that would include identifying any new homes built within the plume area, any new connections to the public water line, any new SSD system installations, and any soil vapor intrusion investigations that may have been conducted. Findings would be documented in an accompanying annual report.

Unicorn Management Consultants, LLC

Table 11c

FS TABLE 4.2-1

VAPOR INTRUSION ALTERNATIVE COST ESTIMATE
FEASIBILITY STUDY REPORT
LEHIGH VALLEY RAILROAD DERAILMENT SUPERFUND
SITE INDEX NUMBER: CERCLA-02-2006-2006

Item (LEROY, NEW YORK)	Quantity	Units	Unit Cost	Total Cost
Indoor Air OM&M				
Field Labor (Annualized)	1	EST	$ 8,320	$ 8,320
Equipment Rentals and Consumables (Annualized)	1	EST	$ 307	$ 307
Hotel, Vehicle, and Per Diem Costs (Annualized)	1	EST	$ 2,290	$ 2,290
Laboratory Analytical (Annualized)	1	EST	$ 4,845	$ 4,845
Data Validation (Annualized)	1	EST	$ 2,167	$ 2,167
Annual Soil Vapor Intrusion (SVI) Mitigation System Inspections	1	EST	$ 2,535	$ 2,535
Annual Cost of System Operation	1	EST	$ 2,000	$ 2,000
Project Management, Notificaitons, Sheduling, and Reporting	1	EST	$ 5,500	$ 5,500
Annual Reporting	1	EST	$ 25,200	$ 25,200
Total Annual Indoor Air OM&M Cost (Accounts for Annualized Costs)				**$ 53,163**
Annual Indoor Air Monitoring OM&M Costs:				
Number of Years (*n*):				30
Discount Rate (*i*):				7%
p/A value:				12.409
Total Indoor Air OM&M Present Worth (PW):				**$ 659,704**
Total Cost				**$ 659,704**

Notes and Assumptions:

Long-Term Monitoring Scope for Indoor Air:

- Air Samples will be collected every 3 years and analyzed for VOCs by TO-15 analysis.
- In general 3 samples will be collected at 13 locations. Additional samples will be collected as necessary.
- Duplicate samples will be collected at a rate of 1 per 20 samples.
- Analytical cost for TO-15 + Tentatively Identified Compounds (TICs) cost ~ $275 per sample.
- Sampling events may require up to 2 mobilizations based on property owner and subcontractor availability.
- SVI Mitigation System Inspections will be conducted annually.
- Assumes 2 personnel required for sampling events and 1 personnel required for oversight.
- Note that costs associated with new SVI system installations are not included here
- Additional Institutional Controls for VI include Environmental Easements for all 124 parcels within the plume boundary. (See Table 4.1-1; not included here to avoid duplication of costs)

Table 11c

FS TABLE 4.3-1

BEDROCK VADOSE ZONE ALTERNATIVE
#2 INSTITUTIONAL CONTROLS
COST SUMMARY

Item	Quantity	Units	Unit Cost	Total Cost
Institutional Controls [1]				
Informational Devices				
Environmental Easements				
Legal Fees	9	parcels	$ 15,000	$ 135,000
Recording Fees	9	parcels	$ 250	$ 2,250
Subtotal:				**$ 137,250**
Total Cost				**$ 137,250**

Notes:

(1) Insitutional Controls for Bedrock media include Informational Devices only, which consist of Environmental Easements for nine (9) affected parcels

Table 11d

FS TABLE 4.5-7

SOIL ALTERNATIVE #3: EXCAVATION/DISPOSAL USING COMMERCIAL LAND-USE BASED PRG
CLEANUP LEVEL 200 MG/KG
FEASIBILITY STUDY REPORT
LEHIGH VALLEY RAILROAD DERAILMENT SUPERFUND SITE
INDEX NUMBER CERCLA-02-2006-2006

Item	Quantity	Units	Unit [1] Cost	Total Cost
Pre-Remediation Work				
Screening Pilot Study	1	EST	$ 50,000	$ 50,000
Survey Limits of Excavation and Soil Cover System	1	EST	$ 10,000	$ 10,000
Erosion Control	1	EST	$ 10,000	$ 10,000
Temporary Construction Fencing	800	LF	$ 10	$ 8,000
Remedial Action Work Plan	1	EST	$ 40,000	$ 40,000
Subtotal:				**$ 118,000**
Impacted Soil Removal and Treatment				
Excavate Soils for Screening	1900	Ton	$ 7	$ 13,300
Load/Haul/Dispose as Hazardous Waste [2]	1900	Ton	$ 1,000	$ 1,900,000
Backfill and Compaction (Imported Soil) Replace all Less tops	1777	Ton	$ 25	$ 44,432
Topsoil 4" on top of excavation	123	Ton	$ 40	$ 4,909
Post-Excavation Confirmatory Sampling				
Bottom Samples (1/900 sf)	11	EA	$ 100	$ 1,106
Sidewall (1/30LF)	35	EA	$ 100	$ 3,533
Subtotal:				**$ 1,967,280**
Site Restoration				
Removal of stone ballast and vapor barrier liner; placement of additional 6-inches of clean, imported topsoil	1	LS	$ 40,000.00	**$ 40,000**
Subtotal:				**$ 40,000**
Subtotal Capital Cost				**$ 2,125,280**
Contractor Mobilization/Demobilization (5%)				$ 106,264
Health and Safety (2%)				$ 42,506
Engineering/Contingency (35%)				$ 743,848
Total Capital Cost				**$ 3,017,897**
Institutional Controls				
Environmental Easements [3]	1	LS	$ 106,750.00	$ 106,750
O&M Plan	1	LS	$ 15,000.00	$ 15,000
Subtotal:				**$ 121,750**
Total Institutional Controls				**$ 121,750**
Annual Performance Report	1	LS	$ 5,000.00	$ 5,000
Annual Certification OM&M Present Worth (PW):				
Number of Years (n):				30
Interest Rate (I):				7%
p/A value:				12.40
Annual Certification OM&M Present Worth (PW):				**$ 62,000**
Total Institutional Controls and OM&M Present Worth (PW):				**$ 183,750**
Total Cost				**$ 3,202,000**

Notes

1) Unit costs developed based on Benchmark's experience with remedial projects except where noted.

2) Verbal Quote from Waste Management (PQ Canada).Quote from Mitkem Resources July 2022

3) Estimated cost for environmental easements on 7 parcels within Spill Zone having exceedances above Residential use. In addition, deed notices will be required to prevent groundwater use, these costs are included in Table 4.1-1 "Groundwater Cost Table".

Table 11e

FS TABLE 4.4 -5

SURFACE WATER ALTERNATIVE #5
IN-SITU TREATMENT WITH STREAMBED COVER
COST SUMMARY

Item	Quantity	Units	Unit Cost	Total Cost
Pre-Remedial Design Investigation				
Test Well Installation/Sampling				
Workplan Preparation	1	unit	$ 30,000	$ 30,000
Installation of Testing Wells (contractor)	40	wells	$ 10,000	$ 400,000
Field Oversight & sample collection	100	worker-days	$ 2,000	$ 200,000
Periodic/Seaonal data collection & analysis	80	worker-days	$ 2,000	$ 160,000
Laboratory Analysis	400	samples	$ 250	$ 100,000
Data Validation	400	samples	$ 125	$ 50,000
Subtotal:				**$ 940,000**
Pilot Testing - In-Situ Treatment Barrier				
Workplan Preparation	1	unit	$ 30,000	$ 30,000
Installation of Pilot Scale Treatment Barrier	1	unit	$ 200,000	$ 200,000
Reagent/Equipment to be used in Barrier	1	unit	$ 50,000	$ 50,000
Contractor/Equipment Rentals	1	rental	$ 25,000	$ 25,000
Field Oversight & sample collection	20	worker-days	$ 2,000	$ 40,000
Laboratory Analysis	20	samples	$ 250	$ 5,000
Data Validation	20	samples	$ 125	$ 2,500
Remedial System Design	1	unit	$ 70,000	$ 70,000
Subtotal:				**$ 422,500**
Remedial System Installation				
Treatment Barrier Installation				
Construction of Access Roads on Property	1	EST	$ 50,000	$ 50,000
Installation of Treatment Barriers	2	barriers	$ 200,000	$ 400,000
Reagent/Equipment to be used in Barrier	1	unit	$ 100,000	$ 100,000
Consultant Oversight	20	worker-days	$ 2,000	$ 40,000
Subtotal:				**$ 590,000**
Streambed Cover Installation				
Construction of Access Roads on Property	1	unit	$ 50,000	$ 50,000
Materials for Stone Cover	1800	cu. Yards	$ 50	$ 90,000
Installation (Contractor)	1	unit	$ 200,000	$ 200,000
Consultant Oversight	60	worker-days	$ 2,000	$ 120,000
Subtotal:				**$ 460,000**
Piping and Equipment Pad Installation				
Piping Materials and Labor (Contractor)	600	linear feet	$ 200	$ 120,000
Concrete Equipment Pad Installation	1	unit	$ 30,000	$ 30,000
Consultant Oversight	25	worker-days	$ 2,000	$ 50,000
Subtotal:				**$ 200,000**
Equipment Purchase & Installation				
Remedial System Purchase	1	unit	$ 100,000	$ 100,000
Shed/Building Construction for equipment	1	unit	$ 75,000	$ 75,000
System Installation, Startup & Testing (Contractor)	1	unit	$ 30,000	$ 30,000
Electrical Power Drop & Service Installation	1	unit	$ 20,000	$ 20,000
Consultant Oversight	20	worker-days	$ 2,000	$ 40,000
Subtotal:				**$ 265,000**
Operation & Maintenance/Long-term Monitoring Workplan				**$ 25,000**
Subtotal Capital Cost				**$ 2,902,500**
Contractor Mobilization/Demobilization (5%)				$ 145,125
Health and Safety (2%)				$ 58,050
Engineering/Contingency (35%)				$ 1,015,875
Total Capital Cost				**$ 4,121,550**
Institutional Controls [1]				
Informational Devices				
Environmental Easements				
Legal Fees	1	parcel	$ 15,000	$ 15,000
Recording Fees	1	parcel	$ 250	$ 250
Signage [2]	1	parcel	$ 5,000	$ 5,000
Monitoring [3]	30	years	$ 1,050	$ 31,500
Site Operation And Maintenance	30	years	$ 1,000	$ 30,000
Subtotal:				**$ 81,750**
Annual Operation Maintenance & Monitoring (OM&M)				
Labor/Materials & Rentals	1	EST	$ 120,000	$ 120,000
Electrical Costs	1	EST	$ 15,000	$ 15,000
Waste Disposal	1	EST	$ 25,000	$ 25,000
Spare Parts & Miscellaneous Materials	1	EST	$ 30,000	$ 30,000
System Analytical Sampling	1	EST	$ 10,000	$ 10,000
Data Validation	1	EST	$ 10,000	$ 10,000
Quarterly Reporting, Data Review & Project Management	1	EST	$ 40,000	$ 40,000
Total Annual OM&M Cost				**$ 250,000**
Annual OM&M Present Worth (PW):				
Number of Years (n):				$ 30
Discount Rate (I):				$ 0
p/A value:				$ 12
Annual OM&M Present Worth (PW):				**$ 3,102,250**
Total Cost [4]				**$ 7,306,000**

Notes:

(1) Institutional Controls for surface water media include Informational Devices (Environmental Easement & Signage), Monitoring and Maintenance
(2) Signage to be posted along property boundary to indicate that surface water on the property is not suitable for recreational use
(3) Costs presented include annual sampling for up to seven (7) surface water samples per year for TCE analysis
(4) All costs are estimated based on favorable results from the Pre-Remedial Design Investigation (PDI), and are subject to change based on the actual data obtained from the the PDI

APPENDIX III

ADMINISTRATIVE RECORD INDEX

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

08/18/2023

REGION ID: 02

Site Name: LEHIGH VALLEY RAILROAD
CERCLIS ID: NYD986950251
OUID: 02
SSID: 027S
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
615364	08/18/2023	ADMINISTRATIVE RECORD INDEX FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	36	Administrative Record Index		(US ENVIRONMENTAL PROTECTION AGENCY)
611178	Undated	RESTRICTED USE SOIL CLEANUP OBJECTIVES - TABLE 375-6 FOR THE LEHIGH VALLEY RAILROAD SITE	3	Chart / Table		
608837	03/01/1969	GENESEE COUNTY SOIL SURVEY FOR MARCH 1969 FOR LEHIGH VALLEY RAILROAD SITE	252	Report		
391195	12/07/1970	NEWSPAPER ARTICLES - THE DAILY NEWS: HEALTH OFFICIAL CITES DANGERS OF DERAILMENT - THE LEHIGH VALLEY RAILROAD SITE	1	Publication		
114980	03/14/1971	TCE SPILL REPORT AT NORTH LEROY, NEW YORK	26	Report	SOZANSKI,NESTOR (LEHIGH VALLEY RAILROAD COMAPNY)	
115170	03/20/1991	REQUEST OF THE ARRANGEMENT FOR BOTTLED WATER DELIVERY AND INSTALLATION GRANULAR ACTIVATED CARBON WATER TREATMENT SYSTEMS, LEHIGH VALLEY RAILROAD DERAILMENT SITE	2	Letter	CALLAHAN,KATHLEEN (US ENVIRONMENTAL PROTECTION AGENCY)	O TOOLE,MICHAEL,J (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)
391207	04/01/1991	NYSHD FACT SHEET: LEHIGH VALLEY RAILROAD SPILL FOR THE LEHIGH VALLEY RAILROAD SITE	8	Publication		
391173	04/04/1991	POLLUTION REPORT NO. 1 FOR THE LEHIGH VALLEY RAILROAD SITE	3	Report	CALLAHAN,KATHLEEN (US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,RICHARD (US ENVIRONMENTAL PROTECTION AGENCY)|ZACHOS,GEORGE (US ENVIRONMENTAL PROTECTION AGENCY)	MAGRIPLES,NICK (US ENVIRONMENTAL PROTECTION AGENCY)
114977	04/16/1991	ACTION MEMORANDUM: REQUEST FOR BOTTLED WATER EXPEDITED REMOVAL ACTION AT THE LEHIGH VALLEY RAILROAD SITE	3	Memorandum		CALLAHAN,KATHLEEN (US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,RICHARD,C (US ENVIRONMENTAL PROTECTION AGENCY)

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391215	05/01/1991	CORRESPONDENCE REGARDING PROPOSED SITE FOR THE MONROE COUNTY LANDFILL FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	THOMAS,LEE,M (US ENVIRONMENTAL PROTECTION AGENCY)	
391217	05/01/1991	CORRESPONDENCE REGARDING APRIL 24, 1991 PUBLIC MEETING MINUTES FOR THE LEHIGH VALLEY RAILROAD SITE	18	Letter	TAWADROS,GAD (US ENVIRONMENTAL PROTECTION AGENCY)	BASILE,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
391174	05/20/1991	POLLUTION REPORT NO. 3 FOR THE LEHIGH VALLEY RAILROAD SITE	3	Report	CALLAHAN,KATHLEEN (US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,RICHARD (US ENVIRONMENTAL PROTECTION AGENCY)|ZACHOS,GEORGE (US ENVIRONMENTAL PROTECTION AGENCY)	TAWADROS,GAD (US ENVIRONMENTAL PROTECTION AGENCY)
391506	06/24/1991	CORRESPONDENCE REGARDING INVESTIGATION OF RESIDENTIAL WATER TREATMENT SYSTEMS FOR THE LEHIGH VALLEY RAILROAD SITE	2	Letter		TAWADROS,GAD (US ENVIRONMENTAL PROTECTION AGENCY)
391507	06/24/1991	CORRESPONDENCE REGARDING PRE-FILTER MAINTENANCE AND REPLACEMENT FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter		MATHEIS,KEVIN (US ENVIRONMENTAL PROTECTION AGENCY)
391179	07/03/1991	POLLUTION REPORT NO. 4 FOR THE LEHIGH VALLEY RAILROAD SITE	3	Report	CALLAHAN,KATHLEEN (US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,RICHARD (US ENVIRONMENTAL PROTECTION AGENCY)|ZACHOS,GEORGE (US ENVIRONMENTAL PROTECTION AGENCY)	TAWADROS,GAD (US ENVIRONMENTAL PROTECTION AGENCY)

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391175	07/16/1991	POLLUTION REPORT NO. 5 FOR THE LEHIGH VALLEY RAILROAD SITE	4	Report	CALLAHAN,KATHLEEN (US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,RICHARD (US ENVIRONMENTAL PROTECTION AGENCY)|ZACHOS,GEORGE (US ENVIRONMENTAL PROTECTION AGENCY)	TAWADROS,GAD (US ENVIRONMENTAL PROTECTION AGENCY)
488496	08/01/1991	FRACTURE TRACE ANALYSIS FOR THE LEHIGH VALLEY RAILROAD SITE	13	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(BIONETICS CORPORATION)
391170	09/23/1991	FINAL DRAFT PRELIMINARY ASSESSMENT REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	163	Report		
391210	10/01/1991	US EPA REGION II FACT SHEET: LEHIGH VALLEY RAILROAD DERAILMENT SITE FOR THE LEHIGH VALLEY RAILROAD SITE	2	Publication		
391238	10/03/1991	CORRESPONDENCE REGARDING EPA SITE ACTIVITIES FOR THE LEHIGH VALLEY RAILROAD SITE	5	Letter	D AMATO,ALFONSE,M (US CONGRESS)	SIDAMON-ERISTOFF,CONSTANTINE (US ENVIRONMENTAL PROTECTION AGENCY)
391239	10/04/1991	CORRESPONDENCE REGARDING EPA SITE ACTIVITIES FOR THE LEHIGH VALLEY RAILROAD SITE	5	Letter	MOYNIHAN,DANIEL,P (UNITED STATES SENATE)	SIDAMON-ERISTOFF,CONSTANTINE (US ENVIRONMENTAL PROTECTION AGENCY)
391219	10/08/1991	CORRESPONDENCE REGARDING REQUEST FOR COMMENTS ON PUBLIC MEETING NOTICE FOR THE LEHIGH VALLEY RAILROAD SITE	7	Letter		
391197	10/18/1991	NEWSPAPER ARTICLE - DEMOCRAT AND CHRONICLE: 1970 SPILL STILL HAUNTS 3 COUNTIES - THE LEHIGH VALLEY RAILROAD SITE	1	Publication		
391220	10/22/1991	PUBLIC MEETING AGENDA - OCTOBER 22, 1991 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Meeting Document		
391212	10/22/1991	PUBLIC MEETING NOTICE FOR THE LEHIGH VALLEY RAILROAD SITE	4	Publication		

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114979	11/04/1991	NOTICE OF POTENTIAL LIABILITY AND REQUEST FOR INFORMATION SUBMITTED TO LEHIGH VALLEY RAILROAD COMPANY, LEHIGH VALLEY RAILROAD DERAILMENT SITE	12	Letter	SCHWAB,JAMES,E (LEHIGH VALLEY RAILROAD COMAPNY)	CALLAHAN,KATHLEEN (US ENVIRONMENTAL PROTECTION AGENCY)
120574	11/20/1991	POLLUTION REPORT NO. 7 FOR THE LEHIGH VALLEY RAILROAD SITE	4	Report	CALLAHAN,KATHLEEN (US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,RICHARD,C (US ENVIRONMENTAL PROTECTION AGENCY)|ZACHOS,GEORGE (US ENVIRONMENTAL PROTECTION AGENCY)	MATHEIS,KEVIN (US ENVIRONMENTAL PROTECTION AGENCY)
110139	12/01/1991	REMOVAL ADMINISTRATIVE RECORD INDEX AND DOCUMENTS FOR THE LEHIGH VALLEY RAILROAD SITE	282	List/Index	MATHEIS,KEVIN,M (US ENVIRONMENTAL PROTECTION AGENCY)	(US ENVIRONMENTAL PROTECTION AGENCY)
391505	12/05/1991	CORRESPONDENCE REGARDING CONCERN FROM RESIDENTS REGARDING EPA RESPONSE ACTIVITIES FOR THE LEHIGH VALLEY RAILROAD SITE	4	Letter		
391176	12/06/1991	POLLUTION REPORT NO. 8 FOR THE LEHIGH VALLEY RAILROAD SITE	3	Report	CALLAHAN,KATHLEEN (US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,RICHARD (US ENVIRONMENTAL PROTECTION AGENCY)|ZACHOS,GEORGE (US ENVIRONMENTAL PROTECTION AGENCY)	MATHEIS,KEVIN (US ENVIRONMENTAL PROTECTION AGENCY)
391205	12/20/1991	LEHIGH VALLEY RAILROAD COMPANY (LVRR) RESPONSE TO US EPA 104E REQUEST FOR INFORMATION REGARDING THE LEHIGH VALLEY RAILROAD SITE	183	Letter		

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120575	12/26/1991	POLLUTION REPORT NO. 9 FOR THE LEHIGH VALLEY RAILROAD SITE	4	Report	CALLAHAN,KATHLEEN (US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,RICHARD,C (US ENVIRONMENTAL PROTECTION AGENCY)|ZACHOS,GEORGE (US ENVIRONMENTAL PROTECTION AGENCY)	MATHEIS,KEVIN (US ENVIRONMENTAL PROTECTION AGENCY)
391616	01/15/1992	PUBLIC NOTICE - DEMOCRAT AND CHRONICLE: THE US EPA ANNOUNCES THE AVAILABILITY OF THE ADMINISTRATIVE RECORD FOR THE LEHIGH VALLEY RAILROAD DERAILMENT SITE - THE LEHIGH VALLEY RAILROAD SITE	2	Publication		
391201	01/16/1992	NEWSPAPER ARTICLE - CALEDONIA ADVERTISER: EPA INSTALLS CARBON FILTER SYSTEMS FOR HOMES AFFECTED BY LEHIGH VALLEY RAILROAD - THE LEHIGH VALLEY RAILROAD SITE	4	Publication		
391202	01/21/1992	NEWSPAPER ARTICLE -EPA FILES FROM SPILL AVAILABLE AT LIBRARY - THE LEHIGH VALLEY RAILROAD SITE	4	Publication		
391203	01/21/1992	NEWSPAPER ARTICLE -EPA INSTALLS CARBON FILTER SYSTEMS FOR HOMES AFFECTED BY LEHIGH VALLEY RAILROAD SPILL - THE LEHIGH VALLEY RAILROAD SITE	1	Publication		
120570	01/28/1992	POLLUTION REPORT NO. 10 FOR THE LEHIGH VALLEY RAILROAD SITE	4	Report	CALLAHAN,KATHLEEN (US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,RICHARD,C (US ENVIRONMENTAL PROTECTION AGENCY)|ZACHOS,GEORGE (US ENVIRONMENTAL PROTECTION AGENCY)	MATHEIS,KEVIN (US ENVIRONMENTAL PROTECTION AGENCY)

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120571	02/21/1992	POLLUTION REPORT NO. 11 FOR THE LEHIGH VALLEY RAILROAD SITE	4	Report	CALLAHAN,KATHLEEN (US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,RICHARD,C (US ENVIRONMENTAL PROTECTION AGENCY)|ZACHOS,GEORGE (US ENVIRONMENTAL PROTECTION AGENCY)	MATHEIS,KEVIN (US ENVIRONMENTAL PROTECTION AGENCY)
391504	04/01/1992	NYSDOH SITE UPDATE - APRIL 1992 FOR THE LEHIGH VALLEY RAILROAD SITE	2	Other		
391503	04/08/1992	CORRESPONDENCE REGARDING REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) UPDATE TO RESIDENTS FROM NYSDEC FOR THE LEHIGH VALLEY RAILROAD SITE	3	Letter		
391259	04/16/1992	CORRESPONDENCE REGARDING COMPLETED INSTALLATION OF GRANULATED ACTIVATED CARBON WATER TREATMENT SYSTEMS AT RESIDENCES AND TRANSMITTAL OF SAMPLING RESULTS FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	O TOOLE,MICHAEL,J (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)	SALKIE,RICHARD (US ENVIRONMENTAL PROTECTION AGENCY)
391177	05/06/1992	POLLUTION REPORT NO. 12 FOR THE LEHIGH VALLEY RAILROAD SITE	3	Report	CALLAHAN,KATHLEEN (US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,RICHARD (US ENVIRONMENTAL PROTECTION AGENCY)|ZACHOS,GEORGE (US ENVIRONMENTAL PROTECTION AGENCY)	MATHEIS,KEVIN (US ENVIRONMENTAL PROTECTION AGENCY)
188617	05/08/1992	DEPOSITION OF NESTOR SOZANSKI - LEHIGH VALLEY RAILROAD DERAILMENT SITE	44	Meeting Document		

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391230	05/08/1992	CONCURRENCE COPY OF US EPA 104E SUPPLEMENTAL REQUEST FOR INFORMATION SENT TO LEHIGH VALLEY RAILROAD COMPANY FOR THE LEHIGH VALLEY RAILROAD SITE	4	Letter	OLSON,ROBERT,W (LEHIGH VALLEY RAILROAD COMPANY)	CALLAHAN,KATHLEEN (US ENVIRONMENTAL PROTECTION AGENCY)
188616	05/27/1992	DEPOSITION OF GEORGE L. MARSHALL - LEHIGH VALLEY RAILROAD DERAILMENT SITE	43	Meeting Document		
120573	06/02/1992	POLLUTION REPORT NO. 13 FOR THE LEHIGH VALLEY RAILROAD SITE	4	Report	CALLAHAN,KATHLEEN (US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,RICHARD,C (US ENVIRONMENTAL PROTECTION AGENCY)|ZACHOS,GEORGE (US ENVIRONMENTAL PROTECTION AGENCY)	MATHEIS,KEVIN (US ENVIRONMENTAL PROTECTION AGENCY)
391178	06/02/1992	POLLUTION REPORT NO. 13 FOR THE LEHIGH VALLEY RAILROAD SITE	3	Report	CALLAHAN,KATHLEEN (US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,RICHARD (US ENVIRONMENTAL PROTECTION AGENCY)|ZACHOS,GEORGE (US ENVIRONMENTAL PROTECTION AGENCY)	MATHEIS,KEVIN (US ENVIRONMENTAL PROTECTION AGENCY)
114981	06/17/1992	RESPONSE TO THE REQUEST FOR INFORMATION SUBMITTED TO THE LEHIGH VALLEY RAILROAD CO., LEHIGH VALLEY RAILROAD DERAILMENT SITE	152	Letter	FISCHER,DOUGLAS (US ENVIRONMENTAL PROTECTION AGENCY)	CAPRA,JAMES,J (LAW OFFICES OF DONOVAN LEISURE NEWTON & IRVINE)

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539191	06/17/1992	LEHIGH VALLEY RAILROAD COMPANY'S SUPPLEMENTAL RESPONSE TO US EPA 104E REQUEST FOR INFORMATION FOR THE LEHIGH VALLEY RAILROAD SITE	51	Document Packet		
114982	09/03/1992	RESPONSE TO THE REQUEST FOR INFORMATION SUBMITTED TO THE LEHIGH VALLEY RAILROAD CO., LEHIGH VALLEY RAILROAD DERAILMENT SITE (WITH ATTACHMENTS)	59	Letter	FISHER,DOUGLAS (US ENVIRONMENTAL PROTECTION AGENCY)	CAPRA,JAMES,J (LAW OFFICES OF DONOVAN LEISURE NEWTON & IRVINE)
391222	11/19/1992	PUBLIC MEETING AGENDA - NOVEMBER 19, 1992 FOR THE LEHIGH VALLEY RAILROAD SITE	2	Meeting Document		
391199	11/20/1992	NEWSPAPER ARTICLE: CONTAMINATED WATER HASN'T HARMED - THE LEHIGH VALLEY RAILROAD SITE	1	Publication		
539190	03/25/1993	LEHIGH VALLEY RAILROAD COMPANY'S SUPPLEMENTAL RESPONSE TO US EPA 104E REQUEST FOR INFORMATION FOR THE LEHIGH VALLEY RAILROAD SITE	3	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|FISCHER,DOUGLAS (US ENVIRONMENTAL PROTECTION AGENCY)	(LAW OFFICES OF DONOVAN LEISURE NEWTON & IRVINE)|CAPRA,JAMES,J (LAW OFFICES OF DONOVAN LEISURE NEWTON & IRVINE)
115169	05/13/1993	FINAL POLLUTION REPORT, POLREP 15, LEHIGH VALLEY RAILROAD DERAILMENT SITE	6	Report	PAVLOU,GEORGE (US ENVIRONMENTAL PROTECTION AGENCY)|SALKIE,RICHARD,C (US ENVIRONMENTAL PROTECTION AGENCY)|ZACHOS,GEORGE (US ENVIRONMENTAL PROTECTION AGENCY)	MATHEIS,KEVIN,M (US ENVIRONMENTAL PROTECTION AGENCY)

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391211	05/14/1993	US EPA REGION II FACT SHEET: SUPERFUND RESPONSE ALERT FOR THE LEHIGH VALLEY RAILROAD SITE	1	Publication		
391502	05/26/1993	CORRESPONDENCE REGARDING NYSDEC TAKE OVER OF OPERATIONS AND MAINTENANCE FOR THE 35 GAC WATER TREATMENT SYSTEMS FOR THE LEHIGH VALLEY RAILROAD SITE	2	Letter	PAVLOU,GEORGE (US ENVIRONMENTAL PROTECTION AGENCY)	VICKERSON,TOM (NYS DEC)
115005	10/01/1996	REMEDIAL INVESTIGATION REPORT, VOLUMES 1-3, THE LEHIGH VALLEY RAILROAD SITE	1208	Report	(NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)	(RUST ENVIRONMENT & INFASTRUCTURE)
188544	10/01/1996	HYDROGEOLOGIC INVESTIGATION AND FISH AND WILDLIFE IMPACT ANALYSIS FOR THE LEHIGH VALLEY RAILROAD SITE	323	Report	(NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)	(RUST ENVIRONMENT & INFASTRUCTURE)
188545	10/01/1996	ADDENDUM TO HYDROGEOLOGIC INVESTIGATION REPORT - LEHIGH VALLEY RAILROAD DERAILMENT SITE	43	Report	(NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)	(RUST ENVIRONMENT & INFASTRUCTURE)
115007	01/01/1997	FEASIBILITY STUDY REPORT, LEHIGH VALLEY RAILROAD SITE	569	Report	(NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)	(RUST ENVIRONMENT & INFASTRUCTURE)|(TAMS CONSULTANTS INCORPORATED)
611277	01/08/1997	WATER SUPPLY ALTERNATIVES MAP FOR THE LEHIGH VALLEY RAILROAD SITE	1	Figure/Map/ Drawing		(RUST ENVIRONMENT & INFASTRUCTURE)
115004	02/01/1997	FACT SHEET: PROPOSED REMEDIAL ACTION PLAN, AND PUBLIC MEETING INVITATION, LEHIGH VALLEY RAILROAD DERAILMENT SITE, TOWN OF LEROY, GENESEE COUNTY, NEW YORK	4	List/Index		(NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)
115006	02/01/1997	FEASIBILITY STUDY REPORT, INACTIVE HAZARDOUS WASTE SITE, SURFACE SOIL REMEDIATION, LEHIGH VALLEY RAILROAD SITE	55	Report		(NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)

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391206	02/01/1997	NYSDEC FACT SHEET: PROPOSED REMEDIAL ACTION PLAN FEBRUARY 1997 - THE LEHIGH VALLEY RAILROAD SITE	4	Publication		
391172	03/24/1997	HEALTH CONSULTATION FOR THE LEHIGH VALLEY RAILROAD SITE	26	Report		
488828	03/28/1997	NYSDEC RECORD OF DECISION MARCH 1997 FOR THE LEHIGH VALLEY RAILROAD SITE	74	Report		(NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)
188534	04/01/1997	HAZARD RANKING SYSTEM SITE INSPECTION QUESTIONNAIRE FOR THE LEHIGH VALLEY RAILROAD SITE	162	Report		(NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)
655886	11/06/1997	REVISED SVE PERFORMANCE TEST REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	138	Report	(RUETGERS NEASE CHEMICAL COMPANY)	(GOLDER ASSOCIATES INCORPORATED)
188536	12/18/1997	HEALTH CONSULTATION - LEHIGH VALLEY RAILROAD DERAILMENT SITE	28	Report		(DEPARTMENT OF HEALTH AND HUMAN SERVICES)
204463	03/01/1998	HAZARD RANKING SYSTEM DOCUMENTATION PACKAGE, VOLUME 1 OF 3 FOR LEHIGH VALLEY RAILROAD SITE	66	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(ROY F. WESTON INCORPORATED)
204464	03/01/1998	HAZARD RANKING SYSTEM DOCUMENTATION PACKAGE, VOLUME 2 AND 3 OF 3 FOR LEHIGH VALLEY RAILROAD SITE	2454	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(ROY F. WESTON INCORPORATED)
188480	09/01/1998	PROPOSED WATER DISTRIBUTION SYSTEM FOR THE LEHIGH VALLEY RAILROAD SITE	21	Report	(NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)	(STEARNS & WHELER, LLC)
188479	10/07/1998	SUBMITTAL OF LEHIGH VALLEY PROPOSED WATER DISTRIBUTION SYSTEM	1	Letter	OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	MOLOUGHNEY,JOSEPH (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)
363475	01/01/1999	NPL SITE LISTING NARRATIVE	2			
188527	01/08/1999	REVIEW OF REMEDIAL INVESTIGATION (OCTOBER 1996), FEASIBILITY STUDY FOR OPERABLE UNIT 1 (JANUARY 1997) AND OPERABLE UNIT 2 (FEBRUARY 1997), RECORD OF DECISION (MARCH 1997) - LEHIGH VALLEY RAILROAD SITE	4	Memorandum	LYNCH,KEVIN (US ENVIRONMENTAL PROTECTION AGENCY)	MUSUMECI,GRACE (US ENVIRONMENTAL PROTECTION AGENCY)

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114983	01/19/1999	FEDERAL REGISTER NOTICES 1998 & 1999 (NATIONAL PRIORITIES LIST PROPOSED AND FINAL RULES), LEHIGH VALLEY RAILROAD DERAILMENT SITE	1	Other		
488769	01/25/1999	PHASE 1A CULTURAL RESOURCE SURVEY - LEHIGH VALLEY WATER PROJECT FOR THE LEHIGH VALLEY RAILROAD SITE	68	Report	(IT CORPORATION)	
115009	02/01/1999	FINAL ENVIRONMENTAL IMPACT STATEMENT, GENESEE COUNTY PUBLIC WATER SUPPLY PROGRAM, LEHIGH VALLEY RAILROAD SITE	249	Report		(CLARK PATTERSON ASSOCIATES)
188551	03/02/1999	COMPLETION OF DESIGN OF WATERLINE IN THE CALEDONIA-LEROY AREA - LEHIGH VALLEY RAILROAD DERAILMENT SITE	1	Letter	OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	MOLOUGHNEY,JOSEPH (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)
114184	04/09/1999	DRAFT EX-SITU SOIL VAPOR EXTRACTION AND IN-SITU BEDROCK VAPOR EXTRACTION PILOT TEST REPORT FOR THE LEHIGH VALLEY RAILROAD DERAILMENT SITE, PREPARED BY NYSDEC - NO FINAL REPORT WAS PUBLISHED BY THE NYSDEC	844	Report	(NEW YORK DEPARTMENT OF ENVIRONMENTAL CONSERVATION)	(IT CORP)
188501	06/25/1999	INTENTION OF THE TOWN OF LEROY TO FORM A WATER DISTRICT IN THE LIME ROCK PORTION OF THE TOWN - LEHIGH VALLEY RAILROAD SITE	1	Letter	MOLOUGHNEY,JOSEPH (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)	KEMP,JOHN,T (NONE)
488770	07/14/1999	PHASE 1B CULTURAL RESOURCE SURVEY - LEHIGH VALLEY WATER PROJECT FOR THE LEHIGH VALLEY RAILROAD SITE	59	Report	(IT CORPORATION)	
114180	07/23/1999	MEMORANDUM TO JEANNE M. FOX, REGIONAL ADMINISTRATOR, U.S. EPA, FROM RICHARD L. CASPE, P.E., DIRECTOR, EMERGENCY AND REMEDIAL RESPONSE DIVISION, U.S. EPA, REGARDING CONCURRENCE WITH THE RECORD OF DECISION FOR THE LEHIGH VALLEY RAILROAD DERAILMENT SITE	3	Memorandum	FOX,JEANNE,M (US ENVIRONMENTAL PROTECTION AGENCY)	CASPE,RICHARD,L (US ENVIRONMENTAL PROTECTION AGENCY)
114181	07/27/1999	LETTER TO MICHAEL J. O'TOOLE, JR., P.E., NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION FROM JEANNE M. FOX, REGIONAL, U.S. EPA, REGARDING THE RECORD OF DECISION FOR THE LEHIGH VALLEY RAILROAD DERAILMENT SITE	2	Letter	O TOOLE,MICHAEL,J (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)	FOX,JEANNE,M (US ENVIRONMENTAL PROTECTION AGENCY)

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188530	07/27/1999	RECORD OF DECISION FOR THE LEHIGH VALLEY RAILROAD DERAILMENT SITE	75	Report	FOX,JEANNE,M (US ENVIRONMENTAL PROTECTION AGENCY)	CASPE,RICHARD,L (US ENVIRONMENTAL PROTECTION AGENCY)
114182	08/27/1999	LETTER TO RICHARD L. CASPE, U.S. EPA, REGION II, FROM MICHAEL J. O'TOOLE, JR., NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION REGARDING THE LEHIGH VALLEY RAILROAD DERAILMENT SITE	1	Letter	CASPE,RICHARD,L (US ENVIRONMENTAL PROTECTION AGENCY)	O TOOLE,MICHAEL,J (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)
488475	08/27/1999	CORRESPONDENCE REGARDING CONSTRUCTION OF THE WATERLINE REMEDY FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|CASPE,RICHARD,L (US ENVIRONMENTAL PROTECTION AGENCY)	(NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION)|O'TOOLE,MICHAEL (NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION)
188487	09/08/1999	INITIAL RELEASE PUBLIC HEALTH ASSESSMENT - LEHIGH VALLEY RAILROAD SITE	25	Memorandum		(NEW YORK STATE DEPARTMENT OF HEALTH)
115018	10/01/1999	FACT SHEET: UPDATE ON WATERLINE INSTALLATION PLANS, LEHIGH VALLEY RAILROAD SPILL AREA	4	Report		(NYS DEC)
188513	03/03/2000	GENESEE COUNTY WATER SUPPLY SYSTEM PROGRAM - PROPOSED MODIFICATIONS - LEHIGH VALLEY RAILROAD SITE	5	Memorandum		PAOLETTA,DAVID,P (NONE)
188564	03/14/2000	SUBMITTAL OF 95% DESIGN OF WATER DISTRIBUTION SYSTEM - LEHIGH VALLEY RAILROAD DERAILMENT SITE	1	Letter	ENGLISH,ANDREW (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)	LYNCH,KEVIN (US ENVIRONMENTAL PROTECTION AGENCY)
188623	04/14/2000	US ENVIRONMENTAL PROTECTION AGENCY REQUEST FOR ASSISTANCE OF THE DEPARTMENT OF JUSTICE WITH ISSUES RELATING TO THE LIABILITY OF THE LEHIGH VALLEY RAILROAD DERAILMENT SITE	2	Letter	CAPRA,JAMES,J (LAW OFFICES OF DONOVAN LEISURE NEWTON & IRVINE)	TENENBAUM,ALAN (US DEPARTMENT OF JUSTICE)
197280	04/18/2000	CONTRACT DRAWINGS WATER DISTRIBUTION SYSTEM LEHIGH VALLEY RAILROAD DERAILMENT SITE NEW YORK NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION CONTRACT NO. 1 2000 FOR THE LEHIGH VALLEY RAILROAD SITE	34	Figure/Map/ Drawing		(STEARNS & WHELER, LLC)
488771	08/06/2000	PHASE 1B CULTURAL RESOURCE SURVEY - LEHIGH VALLEY WATER PROJECT FOR THE LEHIGH VALLEY RAILROAD SITE	63	Report	(IT CORPORATION)	

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188531	12/13/2000	CORRESPONDENCE PERTAINING TO NYSDEC MARCH 1997 RECORD OF DECISION FOR THE LEHIGH VALLEY RAILROAD SITE	3	Letter	O TOOLE,MICHAEL,J (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)	FOX,JEANNE,M (US ENVIRONMENTAL PROTECTION AGENCY)
539245	01/01/2001	UNICORN MANAGEMENT CONSULTANTS QUALITY MANAGEMENT PLAN FOR THE LEHIGH VALLEY RAILROAD SITE	31	Work Plan		(UNICORN MANAGEMENT CONSULTANTS, LLC)
188567	03/07/2001	TRANSMITTAL OF VISUAL CLASSIFICATION OF ROCK - LEHIGH VALLEY RAILROAD DERAILMENT SITE	13	Correspondence	TREJO,FRANCISCO (LEHIGH VALLEY ROAD DERAILMENT SUPERFUND SITE)	OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)
115017	03/13/2001	PUBLIC HEALTH ASSESSMENT FOR THE LEHIGH VALLEY RAILROAD SITE	26	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(NYS Department of Health)
188519	10/29/2001	PROPERTY OWNERS REQUESTING NECESSARY LEGAL AND GOVERNMENTAL ACTION TO PROVIDE AND INSURE THAT THE CURRENT PUBLIC WATER INSTALLATION PROJECT IN NEGOTIATIONS LEADING UP TO THE DESIGN AND CONSTRUCTION PHASE - LEHIGH VALLEY RAILROAD SITE	5	Memorandum	(LEROY TOWN BOARD)	MOLOUGHNEY,JOSEPH (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)
188609	12/21/2001	FACT SHEET - WATERLINE INSTALLATION AT THE LEHIGH VALLEY RAILROAD DERAILMENT SITE	2	Other		
488477	01/14/2002	CORRESPONDENCE REGARDING REVISED RISK ASSESSMENT FOR THE LEHIGH VALLEY RAILROAD SITE	6	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	(US ENVIRONMENTAL PROTECTION AGENCY)|NACE,CHARLES (US ENVIRONMENTAL PROTECTION AGENCY)
188532	05/21/2002	CORRESPONDENCE PERTAINING TO NYSDEC MARCH 1997 RECORD OF DECISION FOR THE LEHIGH VALLEY RAILROAD SITE	10	Letter	O TOOLE,MICHAEL,J (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)	KENNY,JANE,M (US ENVIRONMENTAL PROTECTION AGENCY)
182586	08/26/2002	AERIAL PHOTOGRAPHIC LAND USE/LAND COVER AND WETLAND ANALYSIS FOR THE LEHIGH VALLEY RAILROAD SITE	26	Report		GAROFALO,DONALD (ENVIRONMENTAL PHOTOGRAPHIC INTERPRETATION CENTER (EPIC))
114996	02/01/2003	FACT SHEET: STATUS REPORT FOR WATERLINE INSTALLATION, LEHIGH VALLEY RAILROAD SPILL SITE	2	Other		(NYS DEC)
114986	08/01/2003	FINAL REMEDIATION REPORT: WATER DISTRIBUTION SYSTEM, LEHIGH VALLEY RAILROAD DERAILMENT SITE	8	Report	(NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)	(STEARNS & WHELER, LLC)
188612	09/23/2003	REVIEW AND COMMENTS ON FINAL REMEDIATION REPORT - LEHIGH VALLEY RAILROAD DERAILMENT SITE	1	Letter	FALKENBURG,TITUS,J (STEARNS & WHELER)	CRUDEN,MICHAEL (NY STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)

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188613	09/30/2003	REVIEW OF FINAL REMEDIATION REPORT WATER DISTRIBUTION SYSTEM - LEHIGH VALLEY RAILROAD DERAILMENT SITE	1	Letter	CRUDEN,MICHAEL (NY STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)	OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)
115016	10/01/2003	FINAL REMEDIATION REPORT, WATER DISTRIBUTION SYSTEM, LEHIGH VALLEY RAILROAD DERAILMENT SITE	732	Report	(NYS DEC)	(STEARNS & WHELER, LLC)
539214	12/16/2004	CORRESPONDENCE REGARDING AMERICAN PREMIER UNDERWRITERS' CONCERNS ON REVISED VERSION OF APPENDIX 2 ADDENDUM TO FOSTER WHEELER'S WORK PLAN FOR THE LEHIGH VALLEY RAILROAD SITE	3	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|WIEDER,MARLA (US ENVIRONMENTAL PROTECTION AGENCY)	(BLANK ROME LLP)|CONTE,JONATHAN,A (BLANK ROME LLP)
539274	09/27/2005	ADDENDUM TO THE DOCUMENT ENTITLED FINAL WORK PLAN FOR REMEDIAL INVESTIGATION/FEASIBILITY STUDY DATED 02/2002 FOR THE LEHIGH VALLEY RAILROAD SITE	11	Work Plan		
114989	09/22/2006	SETTLEMENT AGREEMENT AND ORDER ON CONSENT FOR PRE-REMEDIAL DESIGN INVESTIGATIONS, REMEDIAL DESIGN, AND REMEDIAL INVESTIGATION/FEASIBILITY STUDY, LEHIGH VALLEY RAILROAD SITE	38	Legal Instrument	KENNEDY,JAMES,C (LEHIGH VALLEY RAILROAD COMPANY)	(US ENVIRONMENTAL PROTECTION AGENCY)
488789	09/22/2006	STATEMENT OF WORK FOR THE LEHIGH VALLEY RAILROAD SITE	14	Report		
488774	10/01/2006	FINAL GUIDANCE FOR EVALUATING SOIL VAPOR INTRUSION IN THE STATE OF NEW YORK FOR THE LEHIGH VALLEY RAILROAD SITE	92	Other		(NEW YORK STATE DEPARTMENT OF HEALTH)
165607	10/23/2006	SUBMITTAL OF THE PROJECT SCHEDULE TO IMPLEMENT THE WORK PLAN AND THE STATEMENT OF WORK FOR THE LEHIGH VALLEY RAILROAD COMPANY	8	Letter	OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	TREJO,FRANCISCO (LEHIGH VALLEY ROAD DERAILMENT SUPERFUND SITE)
165610	11/06/2006	QUALITY ASSURANCE PROJECT PLAN FOR SAMPLING AND ANALYSIS - LEHIGH VALLEY RAILROAD COMPANY	117	Work Plan	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
165613	11/06/2006	HEALTH AND SAFETY PLAN SITE INVESTIGATIONA ACTIVITIES - LEHIGH VALLEY RAILROAD COMPANY	163	Work Plan	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
608705	02/28/2008	CORRESPONDENCE REGARDING COMMENTS FOR DRAFT LETTER DATED 02/26/2008 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	(LEHIGH VALLEY ROAD DERAILMENT SUPERFUND SITE)|TREJO,FRANCISCO (LEHIGH VALLEY ROAD DERAILMENT SUPERFUND SITE)

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114990	03/01/2008	FACT SHEET: COMMUNITY UPDATE, LEHIGH VALLEY RAILROAD DERAILMENT SITE	2	List/Index		(US ENVIRONMENTAL PROTECTION AGENCY)
115013	03/14/2008	INDOOR AIR MONITORING PLAN, LEHIGH VALLEY RAILROAD DERAILMENT SITE	15	Report	TREJO,FRANCISCO (LEHIGH VALLEY ROAD DERAILMENT SUPERFUND SITE)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
608708	03/19/2008	CORRESPONDENCE REGARDING INDOOR AIR MONITORING PLAN DATED 03/14/2008 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(LEHIGH VALLEY ROAD DERAILMENT SUPERFUND SITE)|TREJO,FRANCISCO (LEHIGH VALLEY ROAD DERAILMENT SUPERFUND SITE)	(US ENVIRONMENTAL PROTECTION AGENCY)|OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)
115010	03/26/2008	QUALITY ASSURANCE PROJECT PLAN FOR SAMPLING AND ANALYSIS, LEHIGH VALLEY RAILROAD SITE	123	Report	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
115012	03/26/2008	SITE HEALTH AND SAFETY PLAN, SITE INVESTIGATION ACTIVITIES, LEHIGH VALLEY RAILROAD SITE	162	Report	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
488536	04/01/2008	EPA APPROVAL OF THE QUALITY ASSURANCE PROJECT PLAN AND THE HEALTH AND SAFETY PLAN BOTH DATED 03/26/2008 FOR THE LEHIGH VALLEY RAILROAD SITE	3	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)
114998	04/04/2008	COMMUNITY INVOLVEMENT PLAN, LEHIGH VALLEY RAILROAD DERAILMENT SITE, TOWN OF LEROY, GENESEE COUNTY, NEW YORK	33	Work Plan	(US ENVIRONMENTAL PROTECTION AGENCY)	(ECOLOGY AND ENVIRONMENT INCORPORATED)
488539	06/26/2008	CORRESPONDENCE REGARDING THE RI/FS WORK PLAN SECTION 3.3.1 (SITE RECONNAISSANCE) TASKS FOR THE LEHIGH VALLEY RAILROAD SITE	14	Email	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)
115011	11/12/2008	VLF SURVEY, LEHIGH VALLEY RAILROAD SITE	23	Report	(UNICORN MANAGEMENT CONSULTANTS, LLC)	(HAGER-RICHTER GEOSCIENCE)
610996	01/12/2009	NPL LISTING HISTORY FOR THE LEHIGH VALLEY RAILROAD SITE	2	Other		
189962	02/12/2009	SUBMITTAL OF AMENDMENT NUMBER 2 FOR INDOOR AIR MONITORING PLAN - LEHIGH VALLEY RAILROAD DERAILMENT SITE	2	Letter	OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
672262	02/12/2009	LVRR DERAILMENT SITE HISTORICAL TCE SAMPLING DATA SUMMARY FOR THE LEHIGH VALLEY RAILROAD SITE	1	Figure/Map/ Drawing		(UNICORN MANAGEMENT CONSULTANTS, LLC)

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488547	03/19/2009	CORRESPONDENCE REGARDING SUBMITTAL OF AMENDMENT NO. 3 FOR INDOOR AIR MONITORING PLAN - RESAMPLING ACTIVITIES FOR THE LEHIGH VALLEY RAILROAD SITE	2	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
608827	04/01/2009	FIELD INVESTIGATION FOR REMEDIAL INVESTIGATION WORK PLAN FOR LEHIGH VALLEY RAILROAD SITE	8	List/Index		
611014	04/01/2009	STATEMENT OF WORK FOR REMEDIAL INVESTIGATION / FEASIBILITY STUDY OVERSIGHT FOR THE LEHIGH VALLEY RAILROAD SITE	6	Report		
488834	04/24/2009	SITE RECONNAISSANCE TECHNICAL MEMORANDUM 01 FOR THE LEHIGH VALLEY RAILROAD SITE	121	Report	(LEHIGH VALLEY RAILROAD COMAPNY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
488837	05/06/2009	CORRESPONDENCE REGARDING THE MEETING ON 05/12/2009 FOR PRESENTATION OF TECHNICAL MEMORANDUM - DERAILMENT PROJECT / UMC 2032 FOR THE LEHIGH VALLEY RAILROAD SITE	2	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
488835	05/12/2009	TECHNICAL MEMORANDUM MEETING: PROPOSED CHANGES TO PHASE I REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) FOR THE LEHIGH VALLEY RAILROAD SITE	44	Publication		(UNICORN MANAGEMENT CONSULTANTS, LLC)
611024	06/15/2009	CORRESPONDENCE REGARDING ORIGINAL LIST OF DOMESTIC WELLS WITH GAC ACCESS STATUS FOR THE LEHIGH VALLEY RAILROAD SITE	5	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	(NJ DEPARTMENT OF ENVIRONMENTAL PROTECTION)|MORAS,JAMES (NJ DEPARTMENT OF ENVIRONMENTAL PROTECTION)
115070	07/02/2009	UNICORN MANAGEMENT CONSULTANTS RESPONSE TO EPA COMMENTS FROM THE MAY 12, 2009 SITE RECONNAISSANCE TECHNICAL MEMORANDUM MEETING FOR THE LEHIGH VALLEY RAILROAD SITE	49	Letter	OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
488838	07/02/2009	CORRESPONDENCE REGARDING 05/12/2009 SITE RECONNAISSANCE TECHNICAL MEMORANDUM MEETING FOR REMEDIAL INVESTIGATION / FEASIBILITY STUDY FOR THE LEHIGH VALLEY RAILROAD SITE	4	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)

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608874	09/01/2009	FACT SHEET PRE-DESIGN ACTIVITIES TO BEGIN AT STATE SUPERFUND SITE FOR LEHIGH VALLEY RAILROAD SITE	2	Letter		(NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)
152556	10/02/2009	FINAL SCOPE OF WORK FOR VAPOR INTRUSION MITIGATION AND ADDITIONAL INVESTIGATION FOR LEHIGH VALLEY RAILROAD SITE	11	Report	(US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
115000	10/13/2009	REMEDIAL DESIGN WORK PLAN, LEHIGH VALLEY RAILROAD DERAILMENT SITE, LEROY, NEW YORK	58	Work Plan	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
114999	10/16/2009	CORRESPONDENCE REGARDING REMEDIAL DESIGN WORK PLAN, LEHIGH VALLEY RAILROAD DERAILMENT SITE, LEROY, NY	4	Letter	OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	TREJO,FRANCISCO (LEHIGH VALLEY ROAD DERAILMENT SUPERFUND SITE)
608881	10/28/2009	LETTER PERTAINING TO THE FINAL SCOPE OF WORK DATED 10/02/2009 REGARDING VAPOR INTRUSION MITIGATION AND ADDITIONAL INVESTIGATION FOR THE LEHIGH VALLEY RAILROAD SITE	4	Letter	TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)
115071	10/30/2009	ADDENDUM 2 REMEDIAL INVESTIGATION / FEASIBILITY STUDY WORK PLAN FOR THE LEHIGH VALLEY RAILROAD SITE	21	Work Plan		HANLON,KERRY,M (UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
488553	10/30/2009	CORRESPONDENCE REGARDING REMEDIAL INVESTIGATION / FEASIBILITY STUDY WORKPLAN ADDENDUM 2 FOR THE LEHIGH VALLEY RAILROAD SITE	6	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	(US ENVIRONMENTAL PROTECTION AGENCY)|SIMON,MICHELLE (US ENVIRONMENTAL PROTECTION AGENCY)
526643	12/07/2009	CORRESPONDENCE REGARDING REMEDIAL DESIGN WORK PLAN COMMENTS CONFERENCE CALL FOR THE LEHIGH VALLEY RAILROAD SITE	4	Email	OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	HANLON,KERRY,M (UNICORN MANAGEMENT CONSULTANTS, LLC)
608884	12/07/2009	CORRESPONDENCE REGARDING NYSDEC'S 11/03/2009 COMMENTS FOR LEHIGH VALLEY RAILROAD SITE	3	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	(LEHIGH VALLEY ROAD DERAILMENT SUPERFUND SITE)|TREJO,FRANCISCO (LEHIGH VALLEY ROAD DERAILMENT SUPERFUND SITE)
488779	12/09/2009	CORRESPONDENCE REGARDING EPA'S APPROVAL OF THE REMEDIAL DESIGN WORK PLAN DATED 10/13/2009 REVISED BY THE AMENDING LETTER DATED 12/09/2009 FOR THE LEHIGH VALLEY RAILROAD SITE	2	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)

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488561	12/14/2009	SUBMITTAL REGARDING CONCEPTUAL DESIGNS OF PROPOSED SOIL VAPOR INTRUSION MITIGATION SYSTEMS FOR THE LEHIGH VALLEY RAILROAD SITE	30	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|SIMON,MICHELLE (US ENVIRONMENTAL PROTECTION AGENCY)	(US ENVIRONMENTAL PROTECTION AGENCY)|OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)
480503	02/11/2010	CORRESPONDENCE REGARDING SOIL VAPOR MITIGATION AND SAMPLING SCHEDULE FOR THE LEHIGH VALLEY RAILROAD SITE	3	Email		
114997	06/01/2010	FACT SHEET: COMMUNITY UPDATE, LEHIGH VALLEY RAILROAD DERAILMENT SITE	2	List/Index		(US ENVIRONMENTAL PROTECTION AGENCY)
488792	06/15/2010	UPDATED COMBINED PROJECT SCHEDULES FOR THE LEHIGH VALLEY RAILROAD SITE	12	Chart / Table		
488797	07/22/2010	CORRESPONDENCE REGARDING REMEDIAL INVESTIGATION / FEASIBILITY STUDY WELLS INSTALLATION STATUS AND THE PROPOSED FIELD MODS FOR THE REMAINING MONITORING WELLS FOR THE LEHIGH VALLEY RAILROAD SITE	9	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
488803	07/28/2010	ADDENDUM 3 TO THE REMEDIAL INVESTIGATION / FEASIBILITY STUDY WORK PLAN FOR THE LEHIGH VALLEY RAILROAD SITE	11	Work Plan	(LEHIGH VALLEY RAILROAD COMAPNY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
488807	09/07/2010	ADDENDUM 4 TO THE REMEDIAL INVESTIGATION / FEASIBILITY STUDY WORK PLAN FOR THE LEHIGH VALLEY RAILROAD SITE	12	Work Plan	(LEHIGH VALLEY RAILROAD COMAPNY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
480509	12/17/2010	CORRESPONDENCE REGARDING SUBMITTAL OF REVISED ESA MEMORANDUM FOR THE LEHIGH VALLEY RAILROAD SITE	55	Email	(UNICORN MANAGEMENT CONSULTANTS)	
488850	01/27/2011	TRANSMITTAL OF THE PRE-REMEDIAL DESIGN SOIL DATA SUMMARY REPORT ADDENDUM FOR THE LEHIGH VALLEY RAILROAD SITE	2	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
610677	01/27/2011	CORRESPONDENCE REGARDING PRE-REMEDIAL DESIGN SOIL DATA SUMMARY REPORT ADDENDUM FOR THE LEHIGH VALLEY RAILROAD SITE	2	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|OLIVO,PAUL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
488781	02/01/2011	PRE-REMEDIAL DESIGN BEDROCK DATA SUMMARY REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	5146	Report	(LEHIGH VALLEY RAILROAD COMAPNY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
610678	02/01/2011	INDOOR AIR MONITORING PROGRAM SUMMARY FOR THE LEHIGH VALLEY RAILROAD SITE	2	Other		

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610696	03/08/2011	PROJECT SCHEDULE FOR THE LEHIGH VALLEY RAILROAD SITE	2	Other		
488858	08/02/2011	UNICORN MANAGEMENT CONSULTANTS, LLC'S REVISED FIGURE 2 - PLUME, DATED 08/02/2011 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Figure/Map/ Drawing		(UNICORN MANAGEMENT CONSULTANTS, LLC)
348908	09/01/2011	HISTORICAL MONITORING WELL TCE ANALYTICAL RESULTS FOR THE LEHIGH VALLEY RAILROAD SITE	3	Chart / Table		
348905	12/01/2011	HISTORICAL MONITORING WELL TCE ANALYTICAL RESULTS FOR THE LEHIGH VALLEY RAILROAD SITE	2	Chart / Table		
114991	01/01/2012	APPROXIMATE EXTENT OF GROUNDWATER CONTAMINATION AREA, LEHIGH VALLEY RAILROAD SITE	1	Figure/Map/ Drawing		
611070	01/05/2012	NY STATE HISTORIC PRESERVATION OFFICE'S REVIEW AND OPINION ON THE PHASE I CULTURAL RESOURCES INVESTIGATION REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	2	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	
114992	01/30/2012	MONITORING WELLS WITH TCE CONCENTRATIONS IN BETWEEN HIGH SCHOOL AND SPILL AREA IN LE ROY, NY, LEHIGH VALLEY RAILROAD SITE	1	Figure/Map/ Drawing		(UNICORN MANAGEMENT CONSULTANTS, LLC)
348907	02/02/2012	GENESEE, MONROE AND LIVINGSTON COUNTIES SITE UPDATE FOR THE LEHIGH VALLEY RAILROAD SITE	2	Report		(US ENVIRONMENTAL PROTECTION AGENCY)
611092	03/30/2012	EXPOSURE SCENARIOS AND ASSUMPTIONS MEMORANDUM FOR OU1 INDEX NO. CERCLA-02-2006-2006 FOR THE LEHIGH VALLEY RAILROAD SITE	60	Memorandum		
611094	04/03/2012	SIGN-IN SHEET FOR MEETING HELD ON 04/03/2012 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Meeting Document		
611065	04/09/2012	NEWSPAPER ARTICLE - DEMOCRAT AND CHRONICLE: 41 YEARS LATER AND NO CLEANUP DATED 04/01/2012 AND US EPA RCRA SUBTILE C SITE IDENTIFICATION FORM FOR THE LEHIGH VALLEY RAILROAD SITE	9	Other		
611099	04/10/2012	ADDENDUM 5 TO THE REMEDIAL INVESTIGATION / FEASIBILITY WORK PLAN FOR THE LEHIGH VALLEY RAILROAD SITE	10	Work Plan		

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611097	04/12/2012	VAPOR INTRUSION INVESTIGATION RESULTS FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter		(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
689611	05/01/2012	INDOOR AIR MONITORING MAP FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Figure/Map/ Drawing		(UNICORN MANAGEMENT CONSULTANTS, LLC)
611066	06/25/2012	NEWSPAPER ARTICLE - FREE DAILY: GRADUATION CLEARS UPSTATE STUDENTS' MYSTERY TWITCHING FOR THE LEHIGH VALLEY RAILROAD SITE	1	Publication		
348903	08/01/2012	COMMUNITY UPDATE AUGUST 2012 FOR THE LEHIGH VALLEY RAILROAD SITE	2	Publication		(US ENVIRONMENTAL PROTECTION AGENCY)
611119	08/23/2012	NPL LISTING HISTORY FOR THE LEHIGH VALLEY RAILROAD SITE	3	Other		
611107	09/25/2012	CORRESPONDENCE REGARDING PROJECT COORDINATION FINAL SCHEDULE AND ACTION ITEMS FROM MEETING HELD 09/19/2012 FOR THE LEHIGH VALLEY RAILROAD SITE	4	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
471679	10/01/2012	BEDROCK DATA SUMMARY REPORT PRE-REMEDIAL DESIGN FOR THE LEHIGH VALLEY RAILROAD SITE	5163	Report		(UNICORN MANAGEMENT CONSULTANTS, LLC)
611111	10/09/2012	CORRESPONDENCE REGARDING RESPONSE TO US EPA'S LETTER DATED 09/25/2012 ADDRESSING THE PROJECT COORDINATION FINAL SCHEDULE AND ACTION ITEMS FROM MEETING HELD 09/19/2012 FOR THE LEHIGH VALLEY RAILROAD SITE	4	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
611114	10/19/2012	CORRESPONDENCE REGARDING RISK ASSESSMENT DELIVERABLE UPDATE FOR THE LEHIGH VALLEY RAILROAD SITE	2	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
580262	12/01/2012	DRAFT TECHNICAL MEMORANDUM REMEDIAL ALTERNATIVE SCREENING AND REMEDIAL ALTERNATIVE EVALUATION FOR THE LEHIGH VALLEY RAILROAD SITE	19	Report		(UNICORN MANAGEMENT CONSULTANTS)
610580	01/10/2013	CORRESPONDENCE REGARDING RESPONSE TO RECOMMENDATIONS OUTLINED IN LETTER REFERENCING VAPOR INTRUSION DATED 11/27/2012 FOR THE LEHIGH VALLEY RAILROAD SITE	10	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)

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610581	01/14/2013	CORRESPONDENCE REGARDING REVIEW OF PATHWAY ANALYSIS REPORT SUBMITTED ON 11/21/2012 FOR THE LEHIGH VALLEY RAILROAD SITE	41	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
610582	01/22/2013	TRANSMITTAL OF THE UNIFORM HAZARDOUS WASTE MANIFEST AND CERTIFICATE OF DISPOSAL FOR DRUMS REMOVED FROM THE LEHIGH VALLEY RAILROAD SITE	3	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
610587	02/08/2013	CORRESPONDENCE ACKNOWLEDGING RECEIPT OF COMMENTS ON PATHWAY ANALYSIS REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	8	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
610602	02/18/2013	CORRESPONDENCE REGARDING REPLY TO PATHWAY ANALYSIS CONFERENCE CALL MINUTES FOR THE LEHIGH VALLEY RAILROAD SITE	7	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
543504	03/01/2013	REVISED SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT FOR THE LEHIGH VALLEY RAILROAD SITE	888	Report	LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(URS CORPORATION)
610604	03/01/2013	REVISED SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT FOR THE LEHIGH VALLEY RAILROAD SITE	37	Report		(URS CORPORATION)
610607	03/21/2013	CORRESPONDENCE REGARDING SUBCONTRACTOR SOIL VAPOR EXTRACTION REMEDIAL DESIGN PROPOSAL: OBJECTIVES, BASIS AND CONDITIONS FOR THE LEHIGH VALLEY RAILROAD SITE	14	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
610609	03/25/2013	PATHWAY ANALYSIS REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	111	Report	(UNICORN MANAGEMENT CONSULTANTS, LLC)	
543509	05/15/2013	ADDENDUM 1 INDOOR AIR MONITORING REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	233	Report		(UNICORN MANAGEMENT CONSULTANTS, LLC)
610624	07/02/2013	CORRESPONDENCE REGARDING ADDENDUM 1 TO THE STATEMENT OF WORK - BEDROCK VAPOR SAMPLING PROPOSED MONITORED NATURAL ATTENUATION SAMPLING FOR THE LEHIGH VALLEY RAILROAD SITE	16	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)

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610625	07/02/2013	CORRESPONDENCE REGARDING SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT - REVISION 1 AND RESPONSE TO COMMENTS FOR THE LEHIGH VALLEY RAILROAD SITE	2	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
610177	07/19/2013	LVRR'S RESPONSE TO EPA 06/10/2013 COMMENTS ON THE DRAFT INDOOR AIR MONITORING REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	5	Letter	LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
610627	08/14/2013	CORRESPONDENCE REGARDING REVIEW OF QUALITY ASSURANCE PROJECT PLAN FOR THE LEHIGH VALLEY RAILROAD SITE	2	Email	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
610629	08/14/2013	CORRESPONDENCE REGARDING MONITORED NATURAL ATTENUATION OF GROUNDWATER SAMPLING FOR THE LEHIGH VALLEY RAILROAD SITE	4	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
610630	08/15/2013	CORRESPONDENCE REGARDING BEDROCK VAPOR SAMPLING FOR THE LEHIGH VALLEY RAILROAD SITE	12	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
610632	08/27/2013	CORRESPONDENCE REGARDING SOIL REMEDIAL DESIGN PID DOCUMENTATION FOR THE LEHIGH VALLEY RAILROAD SITE	13	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
580265	09/01/2013	REVISED SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT FOR THE LEHIGH VALLEY RAILROAD SITE	897	Report		(URS CORPORATION)
610633	09/04/2013	CORRESPONDENCE IN RESPONSE TO LETTER OF 08/14/2013 REGARDING MONITORED NATURAL ATTENUATION OF GROUNDWATER SAMPLING FOR THE LEHIGH VALLEY RAILROAD SITE	9	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
610640	09/16/2013	CORRESPONDENCE REGARDING MONITORED NATURAL ATTENUATION GROUNDWATER SAMPLING FOR THE LEHIGH VALLEY RAILROAD SITE	5	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
543516	09/25/2013	SOIL REMEDIAL DESIGN REPORT COMPLETION FOR THE LEHIGH VALLEY RAILROAD SITE	347	Report	LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC)

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610643	10/01/2013	BEDROCK DATA SUMMARY REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	88	Report		(UNICORN MANAGEMENT CONSULTANTS, LLC)
610644	10/10/2013	TRANSMITTAL OF BEDROCK DATA SUMMARY REPORT AND RESPONSE TO EPA COMMENTS ON BEDROCK DATA SUMMARY REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	14	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
610650	11/04/2013	CORRESPONDENCE REGARDING 2013 VAPOR INTRUSION RESULTS AND PRELIMINARY RECOMMENDATIONS FOR THE LEHIGH VALLEY RAILROAD SITE	7	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
611554	01/29/2014	CORRESPONDENCE REGARDING SOIL VAPOR INTRUSION MITIGATION INSPECT TRIP REPORT FOR JANUARY 13-16, 2014, FOR THE LEHIGH VALLEY RAILROAD SITE	2	Memorandum		(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
283851	03/21/2014	ADMINISTRATIVE ORDER NO. CERCLA-02-2014-2010 FOR REMEDIAL ACTION FOR THE LEHIGH VALLEY RAILROAD SITE	20	Legal Instrument		MUGDAN,WALTER,E (US ENVIRONMENTAL PROTECTION AGENCY)
689612	04/01/2014	WATERFALL AND SEEP PHOTOGRAPHS APRIL 2014 FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	3	Photograph		
453629	04/14/2014	NOTICE OF INTENT TO COMPLY INDEX NUMBER CERCLA-02-2014-2010 FOR REMEDIAL ACTION SOIL VAPOR EXTRACTION FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	HILL,MARGARET,A (BLANK ROME LLP)
611575	05/20/2014	CORRESPONDENCE REGARDING QUALITY MANAGEMENT PLAN FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
526645	06/19/2014	ADDENDUM 1 TO THE INDOOR AIR MONITORING REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	570	Report		(UNICORN MANAGEMENT CONSULTANTS, LLC)
611578	06/23/2014	TECHNICAL IMPRACTICABILITY WAIVER PRESENTATION FOR THE LEHIGH VALLEY RAILROAD SITE	71	Other		
611580	06/26/2014	CORRESPONDENCE REGARDING MONITORED NATURAL ATTENUATION SAMPLING FOR THE LEHIGH VALLEY RAILROAD SITE	31	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(US ENVIRONMENTAL PROTECTION AGENCY)|LAPOMA,JENNIFER (US ENVIRONMENTAL PROTECTION AGENCY)
611583	07/31/2014	DATA EVALUATION REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	21	Report		

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611584	08/01/2014	REMEDIAL ACTION WORK PLAN COMPENDIUM VOLUME 1 FOR THE LEHIGH VALLEY RAILROAD SITE	26	Work Plan		
611586	08/06/2014	CORRESPONDENCE REGARDING TECHNICAL MEMORANDUM DATA EVALUATION REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
568524	09/01/2014	REMEDIAL ACTION WORKPLAN COMPENDIUM OU-1 FOR THE LEHIGH VALLEY RAILROAD SITE	962	Work Plan		
611589	09/05/2014	PUBLIC COMMENT DRAFT HEALTH CONSULTATION FOR LEHIGH VALLEY RAILROAD SITE	27	Email		
611593	09/19/2014	CORRESPONDENCE REGARDING SAMPLING OF CALEDONIA LEROY ROAD FOR THE LEHIGH VALLEY RAILROAD SITE	3	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	
611597	10/02/2014	CORRESPONDENCE REGARDING PROPOSED DISCRETE FRACTURE NETWORK NUMERICAL MODELING OF MASS TRANSFER BACK DIFFUSION FOR THE LEHIGH VALLEY RAILROAD SITE	5	Letter		(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
611600	10/29/2014	CORRESPONDENCE REGARDING REMEDIAL ACTION STATEMENT OF WORK FOR SOIL VAPOR EXTRACTION INSPECTION OF THE PILOT TEST SYSTEM FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
611601	10/29/2014	TRANSMITTAL OF REMEDIAL ACTION WORK PLAN FOR THE LEHIGH VALLEY RAILROAD SITE	4	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
611154	10/30/2014	ADDENDUM 7 TO THE REMEDIAL INVESTIGATION / FEASIBILITY STUDY WORK PLAN FOR THE LEHIGH VALLEY RAILROAD SITE	24	Work Plan		
611602	10/30/2014	ADDENDUM 7 REMEDIAL INVESTIGATION / FEASIBILITY STUDY WORK PLAN FOR THE LEHIGH VALLEY RAILROAD SITE	22	Work Plan		(UNICORN MANAGEMENT CONSULTANTS, LLC)
689638	11/06/2014	TRANSMITTAL OF THE PRE-REMEDIAL DESIGN BEDROCK VAPOR EXTRACTION DATA SUMMARY REPORT FOR OU1 FOR THE LEHIGH VALLEY RAILROAD SITE	2	Letter	INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)

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689637	11/06/2014	PRE-REMEDIAL DESIGN BEDROCK VAPOR EXTRACTION DATA SUMMARY REPORT FOR OU1 FOR THE LEHIGH VALLEY RAILROAD SITE	6837	Report		(UNICORN MANAGEMENT CONSULTANTS, LLC)
611156	11/12/2014	US EPA'S REVIEW OF THE REVISED DRAFT REMEDIAL INVESTIGATION REPORT AND RESPONSES TO COMMENTS DATED 08/2014 FOR THE LEHIGH VALLEY RAILROAD SITE	6	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
611157	12/03/2014	CORRESPONDENCE REGARDING RESPONSE TO US EPA'S REVIEW AND COMMENT LETTER DATED 11/12/2014 ON THE REMEDIAL INVESTIGATION REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	5	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
488822	12/04/2014	TRILLIUM INCORPORATED'S REVISED DATA EVALUATION REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	18	Report		
471828	12/10/2014	FINAL REMEDIAL INVESTIGATION REPORT - GROUNDWATER PLUME - PART 1 FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	382	Report	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
471829	12/10/2014	FINAL REMEDIAL INVESTIGATION REPORT - GROUNDWATER PLUME - PART 2 TABLES 1 - 23O FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	17692	Report	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
471830	12/10/2014	FINAL REMEDIAL INVESTIGATION REPORT - GROUNDWATER PLUME - APPENDICES A - E FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	805	Report	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
471831	12/10/2014	FINAL REMEDIAL INVESTIGATION REPORT - GROUNDWATER PLUME - APPENDICES F - H FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	2549	Report	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
471832	12/10/2014	FINAL REMEDIAL INVESTIGATION REPORT - GROUNDWATER PLUME - APPENDICES I - K FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	3193	Report	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
471833	12/10/2014	FINAL REMEDIAL INVESTIGATION REPORT - GROUNDWATER PLUME - APPENDICES L - O FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	3011	Report	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
471834	12/10/2014	FINAL REMEDIAL INVESTIGATION REPORT - GROUNDWATER PLUME - APPENDIX P FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	1811	Report	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
471835	12/10/2014	FINAL REMEDIAL INVESTIGATION REPORT - GROUNDWATER PLUME - APPENDICES Q - U FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	2230	Report	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)

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471836	12/10/2014	FINAL REMEDIAL INVESTIGATION REPORT - GROUNDWATER PLUME - APPENDICES V - X FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	440	Report	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
471837	12/10/2014	FINAL REMEDIAL INVESTIGATION REPORT - GROUNDWATER PLUME - APPENDIX Y FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	8137	Report	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
471838	12/10/2014	FINAL REMEDIAL INVESTIGATION REPORT - GROUNDWATER PLUME - APPENDIX Z FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	180	Report	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
471839	12/10/2014	FINAL REMEDIAL INVESTIGATION REPORT - GROUNDWATER PLUME - APPENDIX AA FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	175	Report	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
611158	12/16/2014	US EPA'S APPROVAL OF THE QUALITY ASSURANCE PROJECT PLAN DATED 08/2014 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
611159	12/16/2014	US EPA'S APPROVAL OF THE REVISED DRAFT REMEDIAL INVESTIGATION REPORT DATED 12/2014 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
611607	12/16/2014	CORRESPONDENCE REGARDING PATHWAYS ANALYSIS REPORT DRAFT DATED NOVEMBER 24, 2014, FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
610843	02/10/2015	CORRESPONDENCE REGARDING REVISED SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT REPORT - FEBRUARY 2015 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
610844	02/10/2015	CORRESPONDENCE REGARDING REVIEW OF PROPOSED DISCRETE FRACTURE NETWORK NUMERICAL MODELING FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
348906	03/01/2015	COMMUNITY UPDATE MARCH 2015 FOR THE LEHIGH VALLEY RAILROAD SITE	2	Publication		(US ENVIRONMENTAL PROTECTION AGENCY)
672287	03/01/2015	SVE PILOT TEST REPORT, REVISED FOR THE LEHIGH VALLEY RAILROAD SITE	152	Report	(LEHIGH VALLEY RAILROAD COMPANY)	(BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC)

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610856	03/05/2015	CORRESPONDENCE REGARDING REVIEW AND COMMENTS ON THE SOIL VAPOR EXTRACTION PILOT TEST REPORT FOR JANUARY 2015 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
610872	06/03/2015	SUPPLEMENTAL MONITORED NATURAL ATTENUATION WORKPLAN USEPA OPERABLE UNIT 2 FOR THE LEHIGH VALLEY RAILROAD SITE	87	Work Plan		(UNICORN MANAGEMENT CONSULTANTS, LLC)
610874	06/08/2015	CORRESPONDENCE REGARDING SOIL VAPOR EXTRACTION SYSTEM INSTALLATION TRIP REPORT - JUNE 1 TO JUNE 5, 2015, FOR THE LEHIGH VALLEY RAILROAD SITE	5	Memorandum	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	
610875	06/09/2015	CORRESPONDENCE REGARDING SUPPLEMENTAL MNA SAMPLING FOR THE LEHIGH VALLEY RAILROAD SITE	2	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(US ENVIRONMENTAL PROTECTION AGENCY)|LOPEZ,SERGIO (US ENVIRONMENTAL PROTECTION AGENCY)
610882	06/25/2015	CORRESPONDENCE REGARDING REVIEW AND COMMENTS ON THE SUPPLEMENTAL MONITORED NATURAL ATTENUATION SAMPLING FOR THE LEHIGH VALLEY RAILROAD SITE	3	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	
610887	07/24/2015	ADDENDUM 2 TO THE INDOOR AIR MONITORING REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	35	Report		(UNICORN MANAGEMENT CONSULTANTS, LLC)
610889	08/27/2015	MONITORED NATURAL ATTENUATION WORKPLAN USEPA OPERABLE UNIT 2 FOR THE LEHIGH VALLEY RAILROAD SITE	27	Work Plan		(UNICORN MANAGEMENT CONSULTANTS, LLC)
610890	08/27/2015	TRANSMITTAL OF MONITORED NATURAL ATTENUATION WORKPLAN USEPA OPERABLE UNIT 2 FOR THE LEHIGH VALLEY RAILROAD SITE	2	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
610893	08/28/2015	CORRESPONDENCE REGARDING REVISED MONITORED NATURAL ATTENUATION DISCRETE FRACTURE NUMERICAL MODELING FOR THE LEHIGH VALLEY RAILROAD SITE	6	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
610894	09/08/2015	FINAL MONITORING NATURAL ATTENUATION WORKPLAN USEPA OPERABLE UNIT 2 FOR THE LEHIGH VALLEY RAILROAD SITE	19	Work Plan		(UNICORN MANAGEMENT CONSULTANTS, LLC)

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610895	09/08/2015	TRANSMITTAL OF MONITORED NATURAL ATTENUATION WORKPLAN USEPA OPERABLE UNIT 2 FOR THE LEHIGH VALLEY RAILROAD SITE	2	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
610896	09/16/2015	CORRESPONDENCE REGARDING COMMENTS ON THE DRAFT BASELINE HUMAN HEALTH RISK ASSESSMENT DATED FEBRUARY 2015 FOR THE LEHIGH VALLEY RAILROAD SITE	4	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
610897	10/06/2015	CORRESPONDENCE REGARDING RESPONSE TO COMMENTS ON THE DRAFT BASELINE HUMAN HEALTH RISK ASSESSMENT DATED FEBRUARY 2015 FOR THE LEHIGH VALLEY RAILROAD SITE	7	Memorandum	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	
655870	11/11/2015	TECHNICAL MEMORANDUM FOR RESULTS FROM BRAVO BEDROCK VAPOR EXTRACTION TREATABILITY STUDY FOR THE LEHIGH VALLEY RAILROAD SITE	50	Memorandum		(CH2M HILL)
611307	01/01/2016	COMMUNITY UPDATE JANUARY 2016 FOR THE LEHIGH VALLEY RAILROAD SITE	2	Other		(US ENVIRONMENTAL PROTECTION AGENCY)
611339	01/07/2016	AECOM'S RESPONSE TO 09/16/2015 REVIEW OF THE DRAFT BASELINE HUMAN HEALTH RISK ASSESSMENT DATED 02/2015, REVISED FOR THE LEHIGH VALLEY RAILROAD SITE	8	Memorandum	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	
611334	01/11/2016	TRANSMITTAL OF THE FINAL BASELINE HUMAN HEALTH RISK ASSESSMENT FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
611337	02/04/2016	SIX MONTH REMEDIAL STATUS REPORT FOR OU1 FOR THE LEHIGH VALLEY RAILROAD SITE	10	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC)|FORBES,TOM (BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC)
611336	02/23/2016	US EPA REVIEW OF THE SOIL VAPOR EXTRACTION SIX-MONTH PROGRESS REPORT, 02/2016 FOR OU1 FOR THE LEHIGH VALLEY RAILROAD SITE	2	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)

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610916	02/24/2016	REVISED SIX MONTH REMEDIAL STATUS REPORT FOR OU1 FOR THE LEHIGH VALLEY RAILROAD SITE	17	Report	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC)|FORBES,TOM (BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC)
689574	02/26/2016	FINAL BASELINE HUMAN HEALTH RISK ASSESSMENT FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	335	Report		(AECOM)
610917	02/26/2016	TRANSMITTAL OF THE SOIL VAPOR EXTRACTION SIX-MONTH PROGRESS REPORT FOR OU1 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
611332	02/26/2016	TRANSMITTAL OF THE FINAL BASELINE HUMAN HEALTH RISK ASSESSMENT FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
611331	03/01/2016	US EPA APPROVAL OF THE FINAL BASELINE HUMAN HEALTH RISK ASSESSMENT FOR 03/01/2016 FOR THE LEHIGH VALLEY RAILROAD SITE	2	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
611322	03/15/2016	ADDENDUM 3 TO THE INDOOR AIR MONITORING REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	17	Report	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
611343	06/24/2016	CORRESPONDENCE REGARDING SOIL VAPOR EXTRACTION NETWORK FIELD TESTING FOR OU1 FOR THE LEHIGH VALLEY RAILROAD SITE	5	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC)|FORBES,TOM (BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC)
611344	07/06/2016	TRANSMITTAL OF THE SOIL VAPOR EXTRACTION SYSTEM EVALUATION FOR OU1 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
611342	07/31/2016	CORRESPONDENCE REGARDING THE SOIL VAPOR EXTRACTION NETWORK FIELD TESTING WORK PLAN FOR OU1 FOR THE LEHIGH VALLEY RAILROAD SITE	3	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC)|FORBES,TOM (BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC)

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611328	09/07/2016	CORRESPONDENCE REGARDING THE PLANNED INITIAL POST-REMEDIAL CONFIRMATORY BORING PROGRAM FOR THE LEHIGH VALLEY RAILROAD SITE	4	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC)|FORBES,TOM (BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC)
610934	02/10/2017	TRANSMITTAL OF INDOOR AIR MONITORING LOCATION MAPS FOR THE LEHIGH VALLEY RAILROAD SITE	4	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
610950	03/29/2017	CORRESPONDENCE REGARDING REVIEW AND COMMENTS ON THE DRAFT ASSESSMENT OF GROUNDWATER RESTORATION POTENTIAL AND TECHNICAL IMPRACTICABILITY FOR THE LEHIGH VALLEY RAILROAD SITE	11	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
610958	05/15/2017	CORRESPONDENCE REGARDING RESPONSE TO EPA COMMENTS RECEIVED ON MARCH 29, 2017, REFERENCE: OP-3689 FOR THE LEHIGH VALLEY RAILROAD SITE	25	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
610965	06/29/2017	PRESENTATION SLIDES FOR LEHIGH VALLEY RAILROAD AND EPA MEETING FOR THE LEHIGH VALLEY RAILROAD SITE	57	Other	(US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS)
610967	07/19/2017	CORRESPONDENCE REGARDING RESPONSE TO SETTLEMENT AGREEMENT ISSUES FOR THE LEHIGH VALLEY RAILROAD SITE	6	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
610974	11/01/2017	TECHNICAL EVALUATION - BEDROCK VAPOR EXTRACTION FOR SOURCE AREA REMEDIATION - FOR THE LEHIGH VALLEY RAILROAD SITE	7	Letter		(UNICORN MANAGEMENT CONSULTANTS, LLC)
610975	12/07/2017	CORRESPONDENCE REGARDING DRAFT ASSESSMENT OF GROUNDWATER RESTORATION POTENTIAL AND TECHNICAL IMPRACTICABILITY - SEPTEMBER 2016 - MEETING FOR THE LEHIGH VALLEY RAILROAD SITE	6	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|BADALAMENTI,SALVATORE (US ENVIRONMENTAL PROTECTION AGENCY)	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)
611486	01/31/2018	CORRESPONDENCE REGARDING DRAFT ASSESSMENT OF GROUNDWATER RESTORATION POTENTIAL AND TECHNICAL IMPRACTICABILITY REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)

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610978	03/01/2018	FOCUSED ALTERNATIVES ANALYSIS REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	31	Report		(BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC)
689691	03/01/2018	VAPOR INTRUSION EVALUATION FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	135	Report		(AECOM)
611487	04/05/2018	CORRESPONDENCE REGARDING RESPONSE TO EPA COMMENTS ON THE DRAFT ASSESSMENT OF GROUNDWATER RESTORATION POTENTIAL AND TECHNICAL IMPRACTICABILITY REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|INFURNA,MICHAEL (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
620714	04/28/2018	ADDENDUM 5 TO THE INDOOR TO THE INDOOR AIR MONITORING REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	283	Report	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
689575	07/01/2018	REVISED TCE DATA FOR MUD CREEK SAMPLING FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	2	Figure/Map/ Drawing		(UNICORN MANAGEMENT CONSULTANTS)
611492	07/02/2018	CORRESPONDENCE REGARDING REVIEW OF FOCUSED ALTERNATIVES ANALYSIS REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	2	Letter	MAGEE,CHRISTOPHER (NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)	DOROSKI,MELISSA,A (NEW YORK STATE DEPARTMENT OF HOUSING)
611498	10/22/2018	CORRESPONDENCE REGARDING EVALUATION OF BEDROCK VAPOR EXTRACTION PILOT TESTING FOR THE LEHIGH VALLEY RAILROAD SITE	3	Memorandum	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	
543524	02/19/2019	REVISED SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT FOR THE LEHIGH VALLEY RAILROAD SITE	125	Report		(URS CORPORATION)
689556	04/04/2019	REVISED EVALUATION OF BEDROCK VAPOR EXTRACTION PILOT TESTING FOR THE LEHIGH VALLEY RAILROAD SITE	4	Memorandum		(UNICORN MANAGEMENT CONSULTANTS, LLC)
655871	05/13/2019	A PILOT STUDY OF TCE VAPOR EXTRACTION IN FRACTURED LIMESTONE FOR THE LEHIGH VALLEY RAILROAD SITE	15	Report		(NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC))
689617	06/04/2019	GROUNDWATER ASSESSMENT, RESTORATION ALTERNATIVES AND TECHNICAL IMPRACTICABILITY FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	479	Report		(UNICORN MANAGEMENT CONSULTANTS, LLC)
689618	06/04/2019	TRANSMITTAL OF THE GROUNDWATER ASSESSMENT, RESTORATION ALTERNATIVES AND TECHNICAL IMPRACTICABILITY FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)

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628292	07/03/2019	WORK PLAN FOR THE SAMPLING OF EMERGING CONTAMINATES (PFAS AND 1,4-DIOXANE) FOR THE LEHIGH VALLEY RAILROAD SITE	70	Work Plan	(NY STATE DEPT OF ENVIRONMENTAL CONSERVATION (NYSDEC))	(UNICORN MANAGEMENT CONSULTANTS)
628293	07/24/2019	CORRESPONDENCE REGARDING TRIP REPORT EMERGING CONTAMINATE SAMPLING 7/16/2019 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Memorandum		(UNICORN MANAGEMENT CONSULTANTS)
689577	11/26/2019	NYSDEC'S COMMENTS ON THE DRAFT FEASIBILITY STUDY REPORT FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	9	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	(NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)
689571	02/06/2020	CORRESPONDENCE REGARDING INDIVIDUAL TOWN ZONING MAPS FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	8	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
590428	03/30/2020	TRANSMITTAL OF THE ADDENDUM 7 TO THE INDOOR AIR MONITORING REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS)
590429	03/30/2020	ADDENDUM 7 TO THE INDOOR AIR MONITORING REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	249	Letter	(LEHIGH VALLEY RAILROAD COMPANY)	(UNICORN MANAGEMENT CONSULTANTS)
689564	05/12/2020	CORRESPONDENCE REGARDING NYSDEC CONCERNS WITH THE RAOS BEING PROPOSED FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	3	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	(NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)
689566	05/27/2020	CORRESPONDENCE REGARDING THE MODIFICATION TO THE SUGGESTED RAOS FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	5	Email	(NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)
689554	07/15/2020	US EPA AND NYSDEC COMMENTS ON THE JUNE 2019 DRAFT FEASIBILITY STUDY REPORT FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	14	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)
689557	08/17/2020	UNICORN MANAGEMENT CONSULTANTS' RESPONSE TO US EPA AND NYSDEC COMMENTS ON THE JUNE 2019 DRAFT FEASIBILITY STUDY REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	12	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
689590	10/28/2020	REVISED HEALTH AND SAFETY PLAN FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	161	Work Plan		(UNICORN MANAGEMENT CONSULTANTS, LLC)

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689560	11/02/2020	CORRESPONDENCE REGARDING TAX PARCELS WITHIN THE SPILL ZONE/SOURCE AREA FOR THE LEHIGH VALLEY RAILROAD SITE	7	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|WIEDER,MARLA (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
689576	12/11/2020	CORRESPONDENCE REGARDING PARCELS, ZONING, CURRENT SOIL CONCENTRATIONS AND ICIAP FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	281	Memorandum	(US ENVIRONMENTAL PROTECTION AGENCY)|WIEDER,MARLA (US ENVIRONMENTAL PROTECTION AGENCY)	
689569	12/16/2020	CORRESPONDENCE REGARDING THE STUDY AREA TO BE INCLUDED IN THE REVISED FEASIBILITY STUDY FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	2	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
689603	02/09/2021	CORRESPONDENCE REGARDING THE RESPONSE TO US EPA EMAIL ON 02/03/2021 FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	4	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|WIEDER,MARLA (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
689579	03/25/2021	NYSDEC PRESENTATION ON THE OUTSTANDING ISSUES WITH EPA REGARDING THE FEASIBILITY STUDY, SOIL CLEANUP OBJECTIVE AND TI WAIVER FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	11	Meeting Document		(NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)
625501	06/13/2021	REMEDIAL EVALUATION WORK PLAN FOR THE LEHIGH VALLEY RAILROAD SITE	28	Work Plan	(UNICORN MANAGEMENT CONSULTANTS)	(BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC)
692960	10/05/2021	ADDENDUM 8 TO THE INDOOR AIR MONITORING REPORT FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	48	Report	JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
689065	10/26/2021	SUPPLEMENTAL RISK EVALUATION FOR THE LEHIGH VALLEY RAILROAD SITE	18	Memorandum	JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	FILIPOWICZ,URSZULA (US ENVIRONMENTAL PROTECTION AGENCY)
689066	10/29/2021	SUPPLEMENTAL ECOLOGICAL RISK EVALUATION FOR THE LEHIGH VALLEY RAILROAD SITE	5	Memorandum	JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	Debofsky,Abigail,R (U.S. ENVIRONMENTAL PROTECTION AGENCY)
689570	11/29/2021	CORRESPONDENCE REGARDING THE BEDROCK VAPOR EVALUATION AREAS FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	2	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)

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689565	11/30/2021	DOMESTIC WELL STATUS FOR 2019 TO 2021 FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	94	Memorandum	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
689609	12/15/2021	ZONING MAPS AROUND PLUME FOOTPRINT REFERENCE MAP FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Figure/Map/ Drawing		(UNICORN MANAGEMENT CONSULTANTS, LLC)
689584	01/26/2022	TRANSMITTAL OF THE DRAFT PROPOSED APPROACH FOR SPILL AREA SOILS FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
655878	02/25/2022	CORRESPONDENCE REGARDING DRAFT OUTLINE FOR FEASIBILITY STUDY ALTERNATIVES EVALUATION BEDROCK VADOSE ZONE FOR US EPA TO REVIEW FOR THE LEHIGH VALLEY RAILROAD SITE	10	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
689593	04/28/2022	CORRESPONDENCE REGARDING THE MUD CREEK SURFACE WATER SAMPLING FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	3	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
689552	05/06/2022	CORRESPONDENCE REGARDING THE REVISED FEASIBILITY STUDY SCHEDULE FOR THE LEHIGH VALLEY RAILROAD SITE	2	Email	(UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)
629303	08/03/2022	US EPA NOTICE OF DISAPPROVAL OF THE DRAFT REVISED FEASBILITY STUDY REPORT FOR THE LEHIGH VALLEY RAILROAD SITE	3	Letter	(BLANK ROME LLP)|(UNICORN MANAGEMENT CONSULTANTS, LLC)	DUDA,DAMIAN (US ENVIRONMENTAL PROTECTION AGENCY)
580288	08/03/2022	LETTER OF FEASIBILITY STUDY DISAPPROVAL FOR THE LEHIGH VALLEY RAILROAD SITE	3	Letter	HILL,MARGARET,A (BLANK ROME LLP)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	DUDA,DAMIAN (US ENVIRONMENTAL PROTECTION AGENCY)
629648	09/30/2022	REMEDIAL ACTION REPORT FOR SOIL VAPOR EXTRACTION FOR OU1 FOR THE LEHIGH VALLEY RAILROAD SITE	9	Report		

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629649	09/30/2022	EPA APPROVAL OF THE REMEDIAL ACTION REPORT FOR IN SITU SOIL VAPOR EXTRACTION FOR OU1 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Memorandum		
654292	12/15/2022	US EPA NOTICE OF DISAPPROVAL OF DRAFT REVISED FEASIBILITY STUDY REPORT 09/12/2022 IN ACCORDANCE WITH THE INDEX NO. CERCLA -02-2006-2006 FOR THE LEHIGH VALLEY RAILROAD SITE	299	Letter	(BLANK ROME LLP)|(UNICORN MANAGEMENT CONSULTANTS, LLC)	DUDA,DAMIAN (US ENVIRONMENTAL PROTECTION AGENCY)
692961	01/10/2023	ADDENDUM 9 TO THE INDOOR AIR MONITORING REPORT FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE		Report	JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
689586	03/30/2023	US EPA COMMENTS ON THE DRAFT REVISED FEASIBILITY STUDY REPORT FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	5	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|DUDA,DAMIAN (US ENVIRONMENTAL PROTECTION AGENCY)
689596	04/11/2023	UNICORN MANAGEMENT CONSULTANTS' RESPONSE TO US EPA COMMENTS ON THE DRAFT REVISED FEASIBILITY STUDY REPORT FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	3	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|DUDA,DAMIAN (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
689587	05/01/2023	US EPA RESPONSE TO UNICORN MANAGEMENT CONSULTANTS LETTER DATED 04/11/2023 FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	3	Memorandum		(US ENVIRONMENTAL PROTECTION AGENCY)
689599	05/08/2023	NYSDEC COMMENTS ON THE DRAFT FEASIBILITY STUDY SUBMITTED 02/10/2023 FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	212	Memorandum	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	(NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)
689613	05/16/2023	US EPA TRANSMITTAL OF THE NYSDEC COMMENTS ON THE DRAFT REVISED FEASIBILITY STUDY REPORT FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	10	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|DUDA,DAMIAN (US ENVIRONMENTAL PROTECTION AGENCY)

ADMINISTRATIVE RECORD INDEX OF DOCUMENTS

FINAL

08/18/2023

REGION ID: 02

Site Name: LEHIGH VALLEY RAILROAD
CERCLIS ID: NYD986950251
OUID: 02
SSID: 027S
Action:

DocID:	Doc Date:	Title:	Image Count:	Doc Type:	Addressee Name/Organization:	Author Name/Organization:
689604	05/18/2023	CORRESPONDENCE REGARDING THE RESPONSE TO US EPA AND NYSDEC COMMENTS ON THE FEBRUARY 2023 FEASIBILITY STUDY REPORT FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	5	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|DUDA,DAMIAN (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
689610	05/22/2023	CORRESPONDENCE REGARDING COMMENTS ON THE REVISED FEASIBILITY STUDY FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	2	Email	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|DUDA,DAMIAN (US ENVIRONMENTAL PROTECTION AGENCY)
689602	06/29/2023	NYSDEC COMMENTS ON THE FEASIBILITY STUDY SUBMITTED JUNE 15, 2023 FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	2	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	(NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION)
689615	07/18/2023	US EPA AND NYSDEC COMMENTS ON THE DRAFT FEASIBILITY STUDY REPORT FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	3	Letter	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)	(US ENVIRONMENTAL PROTECTION AGENCY)|DUDA,DAMIAN (US ENVIRONMENTAL PROTECTION AGENCY)
689605	07/27/2023	FINAL FEASIBILITY STUDY REPORT FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	506	Report		(UNICORN MANAGEMENT CONSULTANTS, LLC)
689606	07/27/2023	TRANSMITTAL OF THE FINAL FEASIBILITY STUDY REPORT FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	1	Letter	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)|TREJO,FRANCISCO (UNICORN MANAGEMENT CONSULTANTS, LLC)
689616	07/28/2023	CORRESPONDENCE REGARDING REVISED FIGURES FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	3	Email	(US ENVIRONMENTAL PROTECTION AGENCY)|JON,MARIA (US ENVIRONMENTAL PROTECTION AGENCY)	(UNICORN MANAGEMENT CONSULTANTS, LLC)
692975	8/17/2023	PROPOSED PLAN FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	28	Publication		(US ENVIRONMENTAL PROTECTION AGENCY)
692975	8/17/2023	PROPOSED PLAN FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	28	Publication		(US ENVIRONMENTAL PROTECTION AGENCY)
689553	08/26/2021	CORRESPONDENCE REGARDING A PATH FORWARD ON THE FEASIBILITY STUDY REPORT FOR OU2 FOR THE LEHIGH VALLEY RAILROAD SITE	15	Letter		DUDA,DAMIAN (US ENVIRONMENTAL PROTECTION AGENCY)

APPENDIX IV

STATE LETTER OF CONCURRENCE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Office of the Director
625 Broadway, 12th Floor, Albany, New York 12233-7011
P: (518) 402-9706 | F: (518) 402-9020
www.dec.ny.gov

September 28, 2023

Pat Evangelista, Director
Emergency and Remedial Response Division
U.S. Environmental Protection Agency Region II
290 Broadway
New York, NY 10007-1866

RE: USEPA Record of Decision
Lehigh Valley Railroad Derailment (NYS ID 819014)
LeRoy, Genesee County

Dear Pat Evangelista,

The New York State Department of Environmental Conservation (Department) has completed its review of the U.S. Environmental Protection Agency's (EPA) Record of Decision (ROD) for Operable Units (OU) 1 and 2, received on September 21, 2023, for the Lehigh Valley Railroad Derailment Superfund Site (New York Site ID 819014). The ROD addresses groundwater, bedrock vapor, soil, soil vapor, and surface water while proposing amendments to the Department's Record of Decision (1997) for bedrock vapor, soil, and surface water. As noted below, the Department concurs with the selected remedies for common elements, groundwater, bedrock vapor, soil vapor, soil, and surface water; however, the Department does not concur with the preliminary remediation goal for soil.

I. **The Department concurs with the following:**
- **Common Elements** – Institutional controls (ICs); long-term monitoring of groundwater, surface water, soil vapor, and indoor air; maintenance of existing sub-slab depressurization systems; connection to the municipal water supply for new construction over the groundwater plume (or installation of a point-of-entry system to be provided by EPA or the responsible party(s));
- **Groundwater** – Sitewide groundwater monitoring and Technical Impracticability (TI) Waiver for the TI Zone;
- **Bedrock Vapor** – Alternative 2: ICs and Groundwater Monitoring;
- **Soil Alternative 3** – Excavation and off-site disposal (see below regarding the soil cleanup objective);
- **Surface Water Alternative 5** – In-situ treatment of contaminated surface water with streambed cover and ICs and monitoring;
- Development of a Site Management Plan;
- Incorporation of green remediation techniques and technologies; and
- Select modifications to the NYSDEC 1997 OU1 ROD:
    i. Eliminating ex-situ soil vapor extraction;

ii. Updating the surface water standard from 11 µg/L to the current NYSDEC standard of 40 µg/L; and
iii. Addressing soil contamination beneath Gulf Road by implementing ICs to restrict access and to require proper soil management if the roadbed is disturbed in the future.

II. **The Department does not concur with the following:**

- **Soil Cleanup Objective/preliminary remediation goals** – The Department does not concur with the soil alternative because the Department believes the protection of groundwater soil cleanup objectives, not the commercial use soil cleanup objectives, should be utilized to prevent further groundwater contamination from the remaining contaminated soil. EPA should consider applying the more restrictive state standard and EPA has not given an acceptable justification for refusing to apply the standard that New York State would apply at this site. The Department of Health (DOH) also suggests that EPA consider using the protection of groundwater soil cleanup objectives. Please see the attached letter from DOH.

The Department appreciates the opportunity to review the ROD for this site. Please feel free to reach out to the project manager, Jenelle Gaylord, at 518-402-9791 or Jenelle.gaylord@dec.ny.gov with any questions.

Sincerely,

Andrew Guglielmi

Andrew Guglielmi - Director
New York State Department of Environmental Conservation
Division of Environmental Remediation

Enclosure

ec: David Harrington, NYSDEC, David.harrinton@dec.ny.gov
Michael Cruden, NYSDEC, michael.cruden@dec.ny.gov
Jeffrey Dyber, NYSDEC, Jeffrey.dyber@dec.ny.gov
Jenelle Gaylord, NYSDEC, Jenelle.gaylord@dec.ny.gov
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Doug Garbarini, Garbarini.Doug.epa.gov
Maria Jon, EPA, Jon.Maria@epa.gov

NEW YORK STATE | Department of Health

KATHY HOCHUL
Governor

JAMES V. McDONALD, M.D., M.P.H.
Commissioner

MEGAN E. BALDWIN
Acting Executive Deputy Commissioner

August 16, 2023

Andrew Guglielmi, Director
Division of Environmental Remediation
NYS Dept. of Environmental Conservation
625 Broadway
Albany, NY 12233

Re: **Proposed Plan**
Lehigh Valley Railroad
Site #819014
LeRoy, Genesee County

Dear Andrew Guglielmi,

We have reviewed the U.S. Environmental Protection Agency's (EPA) August 2023 *Proposed Plan* for the referenced site to determine whether the remedy is protective of public health. I understand that human exposures to contamination associated with this site will be addressed by the remedy as described below.

- Soil: Soil exceeding 6 NYCRR Part 375 soil cleanup objectives for commercial use will be excavated and properly disposed of off-site. The area will be backfilled using clean, imported soil and/or stone underlain by a demarcation layer. Future excavations at the site will be conducted in accordance with an approved excavation plan to properly manage human exposures to remaining contaminated soil. While the use of soil cleanup objectives for commercial use is protective of public health, given the intended use of the site we recommend that EPA consider using the soil cleanup objective for the protection of groundwater.

- Groundwater: For an approximately four-mile trichloroethene (TCE) plume, the remedy will include a combination of monitoring and institutional controls to prevent exposure to contaminated groundwater. A long-term groundwater monitoring program will be implemented to track and to monitor changes in the groundwater contamination to ensure the RAOs are attained. Use of groundwater at the site, without approved water quality treatment, will be restricted by an environmental easement placed on the site. New homes constructed over the groundwater plume will be connected to the current municipal water supply system or provided with a point-of-entry treatment system (if connection to the municipal system is not feasible) as needed.

Surface Water: Surface water will be treated in-situ, a streambed cover will be constructed, and monitoring will be conducted.

- Soil Vapor: Existing sub-slab depressurization systems will be maintained, and new systems will be installed, as needed.

Periodic reviews will be completed to certify that these elements of the remedy are in place and remain effective. Based on this information, and with the understanding that protections will be in place during the remediation to prevent the community from being exposed to site-related contaminants and particulates, I believe the proposal is protective of public health and concur with the remedial plan. If you have any questions, please contact me at (518) 402-0445.

Sincerely,

Christine Vooris

Christine N. Vooris, P.E., Director
Bureau of Environmental Exposure Investigation

ec: K. Malone / J. Deming / C. Budd / e-File
A. Bonamici / C. Nicastro – NYSDOH WRO
D. Brodie – GCHD
M. Grove – LCDOH
S. O'Neil – MCDPH
D. Harrington / M. Cruden / J. Dyber / J. Gaylord – NYSDEC Central Office
D. Pratt – NYSDEC Region 8

APPENDIX V

RESPONSIVENESS SUMMARY

APPENDIX V

RESPONSIVENESS SUMMARY

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RESPONSIVENESS SUMMARY FOR THE RECORD OF DECISION LEHIGH VALLEY RAILROAD DERAILMENT SUPERFUND SITE LEROY, GENNESSEE COUNTY, NEW YORK

INTRODUCTION

This Responsiveness Summary provides a summary of citizens' comments and concerns received during the public comment period for the Lehigh Valley Railroad Derailment Superfund Site (Site) selected remedy as presented in the Proposed Plan. A Responsiveness Summary is required by the regulations promulgated under the Superfund statute. This summary also provides the responses by the U.S. Environmental Protection Agency (EPA) to those comments and concerns. All comments received were considered in EPA's selection of the comprehensive remedy covering Operable Units (OUs) 1 and 2 for the Site.

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

The Remedial Investigation (RI), Risk Assessment, and Feasibility Study (FS) for the Site describe the nature and extent of the contamination, identify the risks to human health and the environment, and evaluate remedial alternatives to address the contamination, respectively. EPA, in consultation with the New York State Department of Environmental Conservation (NYSDEC), identified the preferred remedy and the basis for that preference in an August 2023 Proposed Plan. These documents, including the Proposed Plan, were made available to the public in information repositories maintained at the EPA Docket Room in the Region 2 offices in New York, New York, the Caledonia Public Library in Caledonia, New York, and the Woodward Memorial Library LeRoy, New York. The documents were also made available on EPA's website for the LVRR Site located at www.epa.gov/superfund/lehigh-valley-rr.

A notice of the commencement of the public comment period, the public meeting date, a description of EPA's preferred remedy, EPA contact information, and the availability of the above-referenced documents were published online and in the Batavia News, a local newspaper, on August 18, 2023. The 30-day public comment period ran from August 18, 2023 to September 18, 2023.

EPA held a public meeting on August 29, 2023 at 6:00 P.M. at the Caledonia Mumford High School in Caledonia, New York to discuss the findings of the RI, the remedial alternatives in the FS, and the proposed remedy. Fourteen (14) persons attended the meeting, including federal, state and local governmental officials, as well as area businesspeople, residents, journalists and representatives of the Lehigh Valley Railroad Company (LVRR), a potentially responsible party (PRP) for the Site.

SUMMARY OF COMMENTS AND EPA RESPONSES

A summary of the comments/questions received at the public meeting on August 29, 2023, and those received in writing, as well as EPA's responses to those comments is provided below. A comment letter was received during the public comment period from Unicorn Management Consultants, LLC (UMC) on behalf of the Lehigh Valley Railroad Company (LVRR), a potentially responsible party for the Site. A copy of the comment letter is provided in Attachment D of this Responsiveness Summary. EPA's responses to this letter refer to the commenter as LVRR rather than UMC.

Part 1: Comments Received at the Public Meeting

Comment #1: A local resident made a statement that essentially said his home was not affected by the Site contamination and that it appears that EPA has spent enough taxpayer money already on this 1970 spill.

EPA Response #1: EPA has a longstanding policy to pursue "enforcement first" throughout the entire Superfund cleanup process. Under this policy, EPA seeks, as appropriate, to find potentially responsible parties to perform response actions before EPA proceeds with an action funded by the Hazardous Substance Trust Fund (Fund). This policy promotes the "polluter pays" principle and helps to conserve the scarce resources of the Fund for the cleanup of those sites where liable and viable responsible parties do not exist. At the LVRR Site, EPA has successfully employed this policy for most of the investigations and cleanup work that has been performed since EPA became the lead agency for the Site nearly 25 years ago. While some taxpayer monies have been spent at this Site, EPA will pursue recovery of such costs from the PRP.

Comment #2: The same resident also questioned EPA's preferred alternative for the soil and suggested that moving soil from the LVRR Site to another location is simply moving the problem, since the soil remains contaminated and poses a risk to wherever it is moved.

EPA Response #2: The excavated, contaminated soil will be transported off-Site to a facility licensed to receive such materials. The excavated soil will be managed under a land disposal permit identified for that specific facility where it will no longer pose a risk to human health or the environment. The details of where the contaminated soil will ultimately be moved and how it will be managed will be determined during the remedial design or RD phase of the project.

Comment #3: The same resident also questioned why it took EPA 30 years to install the waterline and take care of the most immediate danger to the public.

EPA Response #3: Measures have already been implemented to address the most immediate threats posed by the contamination at the Site. These measures included a waterline extension to affected homes, which was successfully

implemented in 2003. The remedy selected in this ROD, calls for the connection of new homes constructed over the groundwater plume to the current municipal water supply system or the provision of a point-of-entry treatment system if connection to the municipal system is not feasible.

During 1990 and 1991, in response to public health concerns, EPA installed point-of-entry carbon treatment units on all contaminated private wells. Following assuming the role as lead agency on the Site in 1998, EPA continued to work with the State on the waterline. The waterline was finished in 2003 and connections were completed in all four of the municipalities that were affected by the TCE plume (Town of Wheatland, Town of Le Roy, and the Town and Village of Caledonia). The waterline is currently providing potable water to approximately 70 affected residences and businesses in the area.

Comment #4: The same resident also expressed concerns that LVRR will declare bankruptcy and the taxpayers will ultimately have to pay the $14 million for the selected remedy.

EPA Response #4: Since 2006, LVRR has been performing work at the Site, with EPA oversight, under two different enforcement agreements to complete the RI/FS and implement the soil portion of the remedy. In addition, LVRR has reimbursed EPA for all costs EPA incurred overseeing the work. EPA expects to continue to work with LVRR for the implementation of the ROD remedy for the Site. In the event of bankruptcy, EPA may pursue certain claims against a PRP through the bankruptcy process. The obligation to perform the ROD remedy would not be affected by a bankruptcy.

Part 2: Written Comments Received During the Comment Period

This section presents written comments from LVRR, Dolomite Products Company, and a local resident received during the public comment period and EPA's responses to those comments. The comments from LVRR are presented verbatim and identified in italicized print. For ease of reference, the comment numbering matches the numbering in LVRR's comment letter.

LVRR Comment #1: *The cost to implement the USEPA's Preferred Remedy ($14,082,504) is unreasonable when considering the incomplete risk pathways to human health and the environment after the installation of the waterline, vapor intrusion mitigation systems, proposed institutional controls (ICs) and monitoring.*

EPA Response #1: LVRR's statement that the risk pathways to human health and the environment are incomplete is incorrect. The baseline risk assessment summarizes site risks in the absence of any proposed action or institutional control. The risk assessment for the Site identified existing complete exposure pathways for human health and the environment in media of concern in both the current and future scenarios. While the early response actions taken at the Site have mitigated certain risks, the risk assessment shows that exposure risks

remain, which will be addressed by implementation of the selected remedy. Based on the comparison of the overall effectiveness of the remedy to the cost, the selected remedy meets the statutory requirement that Superfund remedies be cost effective in that it represents reasonable value for the money to be spent.

LVRR Comment #2.a: *The Preferred Surface Water Remedy ($7,305,550) proposes the implementation of in-situ treatment of contaminated surface water with streambed cover, ICs, and monitoring. The Site remedial investigations, conceptual Site model, and feasibility study identify the technical impracticability challenges with in-situ treatment of surface water with or without a streambed cover. These challenges include but are not limited to… [that] it is unlikely that the in-situ treatment can be effectively dispersed or emplaced within the fractured bedrock media underneath Mud Creek which acts as a continuing source of TCE to the groundwater and surface water within the Study Area and Mud Creek Area of Interest. To implement a surface water in-situ technology would require extensive knowledge of the fracture networks and connectivity of the seep areas, which has been determined to be technically impractical when evaluating remedial options for other media. Even with extensive fracture network knowledge, successful implementation of in-situ technologies may not be possible or at best may require trial-and-error installations that may inadvertently cause new contaminated seeps. Regardless, the in-situ technology will not address the TCE source (bedrock microfractures and pore spaces) to surface water.*

EPA Response to #2.a: When restoration of groundwater to beneficial uses is not practicable, EPA selects an alternative remedial strategy that is technically practicable, protective of human health and the environment, and satisfies statutory and regulatory requirements of CERCLA. Consistent with the National Contingency Plan (NCP), alternative remedial strategies for Technical Impracticability (TI) sites typically address three site concerns: 1) exposure control; 2) source control; and 3) aqueous plume migration control. Surface water data collected during the RI were used to perform a human health risk assessment for this medium. As demonstrated in the human health risk assessment, recreational exposure to surface water in Mud Creek resulted in noncancer hazards above EPA's threshold of 1. Concentrations in surface water are significantly above the surface water standard of 40 ug/L for TCE as a result of groundwater contamination migrating from the Spill Zone and daylighting in Mud Creek. TCE at these levels indicate that the source area groundwater is migrating. In order to fully address and meet the conditions for a groundwater TI waiver, a remedy for surface water is required.

Further, there is sufficient information for EPA to select the surface water component of the remedy. After thoroughly reviewing all the surface water alternatives, EPA has determined that the surface water component of the selected remedy – In-situ Treatment with Streambed Cover Alternative – will provide protection through both a containment mechanism and a treatment

process and achieve the remediation goal of 40 µg/L for TCE, while also satisfying CERCLA's statutory preference for treatment.

The FS, prepared by LVRR and reviewed and approved by EPA, did not evaluate the technical impracticability of EPA's surface water remedy. Rather, the FS acknowledged some challenges associated with the surface water alternatives and anticipated a Preliminary Design Investigation (PDI) as part of each alternative in order to refine certain assumptions and provide additional data to aid in the remedy design. PDIs are frequently conducted at Superfund sites to provide additional information, including additional sampling and treatability studies, needed to aid in RD. They can include the collection of surface water data that would be representative of fluctuations in concentrations, evaluation of appropriate amendments through treatability studies, and refinement of the location and configuration of potential treatment areas. EPA believes the challenges referenced by LVRR in its letter will be appropriately addressed during the development and implementation of the PDI and the RD.

The in-situ treatment approach can be refined in the PDI and the RD. Further information on the fracture networks and connectivity of the seep areas can be obtained during the PDI. The statement that knowledge of the fracture networks and connectivity of the seep areas has been determined to be technically impracticable is incorrect. Methods exist to refine the location of seeps and gain the required information to design the in-situ surface water remedy.

LVRR Comment #2.b: *Fouling of in-situ treatment points, associated fractures, and seeps may occur and can result in the inadvertent daylighting of contaminated groundwater at previously uncontaminated seep locations following a path of least resistance. Also, the treatments for fouling typically use acidic solutions to dissolve precipitates. The applications of these fouling treatments may negatively alter surface water characteristics.*

EPA Response to #2.b: The potential for fouling of in-situ treatment points, associated fractures, and seeps is typically addressed during remedial design. Additional sampling in the PDI can be used to further understand the geochemistry of the groundwater and surface water in the area targeted for treatment and an appropriate treatment approach and routine maintenance plan can be designed to address these potential challenges.

LVRR Comment #2.c: *It will be challenging to achieve remediation goals if the location, orientation, and hydraulic conductivity of the fractures and other subsurface flow paths that may be contributing to the flows and seeps are technically impracticable to identify. Also, it will be challenging to achieve remediation goals if the water flow is too high/turbulent to allow for appropriate contact time with media.*

EPA Response to #2.c: The location, orientation and hydraulic connectivity of flows and seeps contributing contaminated groundwater to the surface water

area of interest can be refined with existing technologies. The RD will take into consideration the fluctuations in stream levels and flow over time.

LVRR Comment #2.d: *The routine maintenance and repair of the in-situ technology beneath or within proximity to the streambed cover could prove challenging especially during precipitation and/or flooding events that occur in the vicinity and upgradient/upstream of the Mud Creek Area of Interest.*

EPA Response to #2.d: The RD may have some complex components but is implementable. The remedial design will take into consideration the fluctuations in stream levels and flow over time to arrive at the most appropriate in-situ treatment approach. If applicable, water level indicators and automatic shut off controls can be incorporated into the design to account for high precipitation events.

LVRR Comment #2.e: *The preferred surface water remedy would include the clearing of vegetation and trees, construction of access roads, installation of in-situ treatment infrastructure and other support structures within and in the vicinity of the streambed, excavation of the streambed associated with the in-situ treatment, establishment of power source and backup power source, etc.*

EPA Response to #2.e: The impacts of the various aspects of the surface water remedy identified in this comment, were considered in the discussion of the proposed alternative and will be further addressed during the RD and implementation of the remedy. Furthermore, other alternatives considered in the FS, including Surface Water Alternative 4, Streambed cover with ICs and monitoring, as recommended by LVRR (see LVRR Comment #2.g, below), require the clearing of vegetation and trees, construction of access roads for transport of materials and equipment, for temporary on-Site storage of equipment necessary for the installation of this remedial alternative. With respect to the establishment of power source and backup power source, a temporary portable generator can be brought to the Site during the construction period, which is a common practice at construction sites where there is no utility power or permanent utility power has not been installed.

LVRR Comment #2.f: *TCE data from surface water samples that have been collected at various locations along Mud Creek show a 50% decrease in TCE concentrations after only flowing 200 feet along the creek bed (Mudcreek-03 to Mudcreek-02). These data and observations suggest that the surface water flowing along the streambed of Mud Creek is subjected to natural degradation processes that likely include aeration, volatilization, and/or dilution. Turbulent flow along the streambed has been observed due to the presence of rocks in the streambed that create obstacles to the natural flow of surface water which promotes volatilization and likely accounts for the significant reduction of TCE in downstream surface water samples from the Mud Creek Falls to below 40 µg/L (remedial goal) at the southern inlet to Mud Creek Pond. The streambed cover alone could help to enhance the natural process by creating more obstacles for*

surface water flow while minimizing changes to the chemistry of Mud Creek and maintaining a low carbon footprint over time.

EPA Response to #2.f: There is an unacceptable exposure in the Mud Creek surface water as determined by the risk assessment. The selected remedy includes treatment of contaminants by the installation of an in-situ treatment system to mitigate this exposure. Natural degradation, as presented by LVRR in its comment 2.f., is not a protective remedial approach because it will not reliably prevent exposure and will not address contaminant migration from the Spill Zone to Mud Creek.

LVRR Comment #2.g: *A pre-remedial design investigation will not change the fact that it is technically impractical to obtain extensive knowledge of the fracture networks and connectivity of the seep areas with current technology or to anticipate precipitation events within the areas contributing to the fluxes of allogenic water into the Mud Creek area of interest (approximately 484 million gallons per month).*

UMC respectfully requests the USEPA to review the above comments and consider the Surface Water Alternative 4, Streambed cover with ICs and monitoring, as the preferred USEPA surface water remedy."

EPA Response to #2g: An exhaustive knowledge of the fracture networks is not necessary to implement the selected surface water remedy. Technologies exist to define areas where groundwater is discharging to surface water. The remedial design will take into consideration the fluctuations in stream levels and flow over time to arrive at the most appropriate in-situ treatment approach. If applicable, water level indicators and automatic shut off controls can be incorporated into the design to account for high precipitation events.

Dolomite Comment: A representative of the Dolomite Products Company (Dolomite) stated that the company was never permitted to connect to the waterline or public water supply, which was installed in 2003, despite the company's proximity to the original spill area.

EPA Response to Dolomite: The waterline was constructed following NYSDEC's 1997 Record of Decision, which EPA concurred upon in 1998. The connection of affected properties to the waterline was undertaken by NYSDEC and the New York State Department of Health (NYSDOH). According to NYSDEC, it installed a new well with a granular activated carbon (GAC) system for Dolomite in 2003 and maintained the system until September 2005, despite Dolomite being located upgradient of the Site and the associated groundwater contamination. While NYSDOH determined that the water at Dolomite was safe for consumption, NYSDEC recommended that the treatment system remain in place in the event of future contamination from Dolomite itself or from remedial activities associated with the Site. EPA believes that the remedy selected in the ROD will not negatively impact the quality of water in the Dolomite well and suggests

contacting the Town of LeRoy for further information on connecting to the public water supply system if that is desired.

Resident Comment: One resident was concerned about recent soil disturbances near the original spill location and questioned whether this was the result of any work that is being undertaken by EPA or NYSDEC.

EPA Response to Resident: Neither EPA, NYSDEC nor any authorized entity has conducted any work in the Spill Zone in recent months. EPA will investigate this situation and contact the resident in the near future.

ATTACHMENT A

PROPOSED PLAN

Lehigh Valley Railroad Derailment Superfund Site
LeRoy, New York

August 2023

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan describes remedial alternatives that the United States Environmental Protection Agency (EPA) considered to address contamination in the groundwater, soil, bedrock, soil vapor and surface water associated with the Lehigh Valley Railroad Derailment Superfund Site (the Site), including the source of the Site contamination located in the Town of LeRoy, Genesee County, New York, as well as groundwater contamination in Genesee, Monroe, and Livingston Counties, and also identifies the preferred remedial alternative for all media along with the rationale for the preference.

This Proposed Plan describes EPA's preferred comprehensive remedy for two operable units (OUs) or cleanup phases for the Site. The Proposed Plan proposes an amendment to a portion of the original OU1 remedy, associated with contamination in soil and bedrock in specific areas of the Site. It also proposes a remedy for OU2 for the four-mile groundwater plume contaminated with trichloroethene (TCE) where contaminated groundwater discharges to surface water and contaminated soil vapors previously impacted indoor air as a result of soil vapor intrusion in properties located in areas of groundwater contamination at the Site.

This Proposed Plan was developed by EPA, the lead agency for the Site, in consultation with the New York State Department of Environmental Conservation (NYSDEC), the support agency. EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, also known as Superfund), as amended, and Sections 300.430(f) and 300.435(c) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The nature and extent of contamination at the Site and the remedial alternatives summarized in this Proposed Plan are further described in the 2014 Remedial Investigation OU2 (RI) Report, the 2023 Feasibility Study (FS) Report and the 2019 Assessment of Groundwater Restoration Potential and Technical Impracticability (AGTI) Report, as well as other documents in the Administrative Record file for the Site. EPA encourages the public to review these documents to gain a more comprehensive understanding of the Site, the Superfund activities that have been conducted there, and the preferred remedial alternative that is being proposed.

MARK YOUR CALENDAR

Public Comment Period:
August 18, 2023 to September 18, 2023
EPA will accept written comments on the Proposed Plan during the public comment period. Send comments on the Proposed Plan to:

Ms. Maria Jon, Remedial Project Manager
U.S. Environmental Protection Agency
290 Broadway, 19th Floor
New York, NY 10007-1866
Email: jon.maria@epa.gov

Public Meeting:
August 29, 2023 at 6:00 P.M.
EPA will hold a public meeting to discuss the Proposed Plan and all the alternatives presented in the Feasibility Study at the Caledonia Mumford High School, 99 North Street, Caledonia, New York. To learn more about the public meeting, please contact:

Mr. Michael Basile, Community Involvement Coordinator
U.S. Environmental Protection Agency
Email: basile.michael@epa.gov
Phone: 646-369-0055

The Administrative Record (supporting documentation) for public review is available at:
https://www.epa.gov/superfund/lehigh-valley-rr

Caledonia Public Library
3108 Main Street, Caledonia, NY 14423

Woodward Memorial Library
Wolcott Street, LeRoy, NY 14482

EPA Records Center, Region 2
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637-4308
Hours: Monday-Friday – 9 A.M. to 5 P.M.

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COMMUNITY ROLE IN SELECTION PROCESS

The purpose of this Proposed Plan is to inform the public of EPA's Preferred Remedial Alternative and to solicit public comments, pertaining to all the remedial alternatives evaluated in the FS, including EPA's Preferred Alternative. EPA's final decision regarding the selected remedy will be made after EPA has taken into consideration all public comments.

A public meeting will be held during the public comment period to present this Proposed Plan and information regarding the investigations at the Site and to receive public comment. Some investigative information, including the conclusions of the various studies that were performed to assess treatment options, to elaborate on the reasons for proposing the Preferred Remedial Alternative and to receive comments from the public. Information on the public meeting and how to submit written comments can be found in the above-noted "Mark Your Calendar" text box.

Comments received at the public meeting, as well as written comments received during the comment period, will be addressed and documented in the Responsiveness Summary section of the forthcoming OU2 Record of Decision (ROD) and OU1 ROD Amendment. The ROD is the document that memorializes the alternative that has been selected as a remedy and the basis for the selection of the remedy.

SCOPE AND ROLE OF ACTION

Site remediation activities are sometimes segregated into different phases or operable units (OUs), so that remediation of different, discrete environmental media or geographic areas of a site can proceed separately, whether sequentially or concurrently. EPA has designated two OUs for the Site. OU1 addresses the provision of an alternate water supply to area residences and businesses that have been or have the potential to be impacted by the LVRR contaminated groundwater plume, as well as contamination within the Spill Zone, present in soil and extending into the bedrock. OU2 addresses the approximately four-mile contaminated groundwater plume, contaminated groundwater discharging to surface water, as well as contaminated vapors that may migrate into residences as a result of soil vapor intrusion.

In March of 1997, prior to the Site being proposed for listing on the National Priorities List (NPL), NYSDEC selected a remedy for the Site which included: 1) the installation of a waterline to provide potable water to approximately 70 affected residences and businesses near the Site; 2) the installation of an in-situ bedrock vapor extraction (BVE) system within a 10-acre dense nonaqueous phase liquid (DNAPL) zone (Spill Zone); and 3) ex-situ soil vapor extraction (SVE) of approximately 10,000 cubic yards of TCE-contaminated soil. In July of 1999, following the January 1999 final listing of the Site on the NPL, EPA concurred with the waterline component of the NYSDEC remedy, and, subsequently, in May 2002, concurred with the BVE and SVE components of the NYSDEC remedy.

The waterline component of the selected remedy was successfully implemented in 2003. However, as explained in more detail in the Site History section below, the components of the remedy addressing contaminated soil and bedrock have not been successfully implemented.

This Proposed Plan contemplates a comprehensive remedy for the Site through both a ROD amendment for OU1 and ROD for OU2, which would comprise the final comprehensive remedy for the Site.

SITE BACKGROUND

The Site is located in Genesee, Monroe and Livingston Counties, New York, in a rural setting. The surrounding area is used for residential, recreational, and commercial purposes. The Site is generally divided into two areas of interest, the Spill Zone and Study Area, which are both shown on Figure 1.

The Spill Zone is approximately 10 acres in size and is defined as the physical location of the 1970 train derailment which resulted in contamination of overburden soils and bedrock with TCE, in the vicinity of the former LVRR crossing at Gulf Road. The Spill Zone also includes a former railroad bed, a former quarry material staging area, and the foundation of a former hotel. Currently, the 10-acre Spill Zone is mostly undeveloped industrial, commercial, residential, and passive recreational land, largely covered with grass, brush, and wooded areas.

The larger Study Area is roughly bounded by the Oatka Creek Valley to the north, the Dolomite Quarry and Hanson Quarry to the west, Route 5 to the south, and Spring Creek Valley to the east. The Study Area includes a TCE-impacted groundwater plume emanating from the Spill Zone which extends eastward approximately four miles to Spring Creek. Mud Creek, an area of interest, is a frequently dry stream bed which carries substantial water

flow during flood events and is located approximately 600 feet (ft) to the east of the Site.

According to EPA's EJSCREEN, there are no demographic indicators for the area that would indicate a community with environmental justice concerns. Therefore, it is not anticipated that implementation of the proposed action will result in adverse impacts to environmental resources that would affect low income, minority populations living within the vicinity of, or using, the Site.

Site History

The Site is the location of a former train derailment that occurred on December 6, 1970, at the Gulf Road railroad crossing in the Town of LeRoy. The train, operated by the potentially responsible party (PRP), Lehigh Valley Railroad Company, derailed, and two tank cars containing trichloroethene (TCE) ruptured and spilled their contents (estimated 30,000 gallons) onto the ground. This area is referred to as the 10-acre Spill Zone. TCE is the primary contaminant of concern (COC) and is a chlorinated volatile organic compound (VOC), commonly used as a solvent. A third car containing a crystalline form of cyanide was also reported to have partially spilled. The cyanide was recovered shortly after the derailment; however, the TCE infiltrated into the ground and was not recovered.

In early 1971, residents near the Site complained of TCE odors in homes and reported contamination of nearby drinking water wells. The PRP conducted limited cleanup activities at the spill location in response to the residents' concerns. Ditches were constructed in the Spill Zone and were flooded with water to flush the TCE out of the ground. Carbon filters were installed on several private wells to remove TCE from drinking water.

In 1990 and 1991, the New York State Department of Health (NYSDOH) sampled private water wells east of the Site and discovered TCE concentrations in more than 35 residential wells above the NYSDOH drinking water standard of 5 micrograms per liter (µg/L). Based on this information, EPA installed point-of-entry carbon treatment units on all contaminated private wells. In November 1991, the Site was added to the New York State (NYS) Registry of Inactive Hazardous Waste Disposal Sites.

In 1992, NYSDEC initiated a remedial investigation and feasibility study (RI/FS) at the Site. NYSDEC completed the RI Report in 1996, and two FS Reports in early 1997. The NYSDEC RI found TCE concentrations in soil ranging from 46 to 840,000 micrograms per kilogram (µg/kg) and that a source of TCE contamination remained in the unsaturated soil and bedrock in the Study Area, the nearby surface water, and the groundwater with a plume extending almost four miles east and southeast of the Spill Zone.

As noted above, in 1997, prior to the Site being listed on the NPL, NYSDEC selected a remedy for the Site which included ex-situ SVE and in-situ BVE as source-control measures, and a waterline extension to provide a potable water supply to affected residents and businesses.

On August 7, 1998, NYSDEC requested that EPA approve its ROD and assume responsibility for the source-control components of the remedy. At the same time, the State agreed to continue its work on the waterline component of the selected remedy.

The waterline component of the remedy was completed by NYSDEC in 2003. The carbon treatment units installed on all affected domestic wells were removed and the properties were connected to the waterline. The waterline connections were completed in all four of the municipalities that were affected by the TCE plume (Town of Wheatland, Town of LeRoy, and the Town and Village of Caledonia). The waterline is currently providing potable water to approximately 70 affected residences and businesses in the area.

In September 2006, EPA signed an Administrative Settlement Agreement and Order on Consent with LVRR requiring the company to undertake certain investigations and design work needed for an SVE system. The investigations focused on determining the extent of the groundwater contamination and investigating whether vapors from the groundwater were affecting homes above the plume. LVRR was also required to install systems to vent vapors at the homes if vapor intrusion was found to be an issue.

WHAT IS NEEDED TO HAVE A COMPLETE VAPOR INTRUSION PATHWAY?

In order for a vapor intrusion pathway to be complete, there must be volatilization of contaminants from contaminated groundwater or other subsurface sources through the vadose zone, *i.e.*, above the water table, to the soil vapor underneath a structure (*i.e.*, sub-slab soil vapor). These contaminants can then migrate through the sub-slab into indoor air. Contaminant vapors move from an area of higher concentration to an area of lower concentration. The vapor intrusion pathway is complete when Site-related contaminants migrate into indoor air where vapors may be inhaled.

Starting in 2008, measures were initiated to protect property owners from exposure to vapors arising from contamination in groundwater volatilizing into soils and subsequently into residences, a process known as soil vapor intrusion. To date, more than 35 properties have been sampled to determine if contamination has migrated into indoor air. As a result of the sampling, sub-slab depressurization systems (SSDSs) were installed in 12 homes to mitigate potential exposures associated with soil vapor intrusion (SVI).

On March 21, 2014, EPA issued an Administrative Order to LVRR for the remediation of soil using SVE. The in-situ SVE system was installed and became operational during July 2015. The SVE system operated continuously in the Spill Zone for two years until it was shut down in July 2017. Despite removing over 284 pounds of VOCs, the post-SVE data indicated that cleanup goals had not been achieved. The residual concentrations above cleanup goals were likely associated with rock fines present in the overburden materials that are highly diffused into the rock matrix. EPA determined that continued SVE cleanup would not attain cleanup levels or accomplish RAOs.

A BVE pilot study was performed by NYSDEC in 1999. The NYSDEC's pilot study indicated that, while there were uncertainties, ex-situ SVE and in-situ BVE should be effective in achieving the soil cleanup objectives (SCOs) in the State ROD. LVRR agreed to conduct pre-remedial design investigations while undertaking the remedial design of the SVE system and the groundwater RI/FS. LVRR pursued additional evaluations of the feasibility of BVE, as documented in reports from 2011 through 2014, a BVE Memorandum in 2018 and a focused BVE Report in 2019. The potential effectiveness of BVE, given additional information gained during the RI/FS process, was discussed at length throughout this period into 2023. Based upon review of the results of the pilot study and subsequent evaluations, EPA has concluded that given the nature of the vadose zone (bedrock) and the large fluctuations in groundwater levels found at the Site, as well as the size, migration, and location of the TCE mass (diffused into the saturated and unsaturated bedrock), implementation of BVE would not remove enough mass to result in significant improvement of contamination in the bedrock or groundwater. This decision is discussed in further detail below as it relates to the bedrock vadose zone (BVZ) alternatives. The BVZ is defined as the portion of subsurface bedrock media that is the zone above the water table which fluctuates up to 40 ft seasonally and may be influenced by pumping from the adjacent quarry typically from approximately May 1st through January 1st each year; and that is generally located within the immediate vicinity of the Spill Zone. Typically, a portion of the BVZ that is unsaturated exists from 0-25 ft below ground surface (bgs) with a portion of the BVZ that is seasonally saturated between 25 – 70 ft bgs.

SITE CHARACTERISTICS

Site Topography, Geology and Hydrogeology

The Site is located in the Allegheny Plateau Physiographic Province in western New York. The northeastern portion of the Study Area slopes downward toward the northeast and Mud Creek. East of the Spill Zone, the topography slopes generally downward toward Spring Creek along an undulating surface. North of Gulf Road/Flint Hill Road, the topography slopes downward to the north toward Oatka Creek. The southeastern portion of the Spill Zone slopes downward to the east and southeast to Mud Creek. The western section of the Spill Zone is generally higher in elevation and contains piles of quarried rock debris, remnant of historical quarrying activities in the area.

The major surface drainage feature at the Site includes Oatka Creek, which generally defines the northern boundary of the Site. Mud Creek, a seasonal tributary of Oatka Creek, flows from south to north through the western portion of the Site and hydraulically downgradient of the Spill Zone. Other seasonal surface water features are generally defined by the west-to-east-oriented NYS Route 5. South to north-flowing Spring Creek (a tributary of Oatka Creek) generally defines the eastern-most distal end of the TCE plume with monitoring wells beyond that define the eastern-most portion of the Site.

The geology of the Site area generally consists of unconsolidated overburden material, underlain by glacial till (matrix of fine to coarse grained gravel and sand and clayey silt) and glacial fluvial deposits underlain by sedimentary bedrock dipping gently to the south. In the eastern portion of the Site, overburden materials are underlain by weathered limestone bedrock. However, along Spring Creek, bedrock was encountered at depths, considerably deeper than in borings advanced west of Spring Creek. Over most of the Study Area, the Onondaga Formation is the upper most rock unit, dipping gently to the south. However, in the northern and eastern portions of the Study Area, some formations are exposed north and east of an erosional line resulting in an erosional surface sloping north and east into the Oatka Creek and Spring Creek drainages.

Owing to the predominantly carbonate/dolomite nature of the bedrock, the Study Area is characterized by karstic features, including sinkholes, swallets, and sinking streams, as well as numerous springs/seeps along Oatka Creek, Mud Creek, and Spring Creek. The karstic nature of the Study Area bedrock has a dramatic effect on the overall hydrogeology of the area and TCE-impacted groundwater transport mechanisms, including documented groundwater elevation fluctuations of up to 50 ft or more over short time periods.

Conceptual Site Model

The conceptual site model or CSM is based on data collected during Site investigation activities and remedial activities and integrates information on geology, hydrogeology, source areas and receptors.

Sources

As discussed earlier, the 1970 train derailment resulted in approximately 30,000 gallons of TCE and one ton of cyanide crystals being released into the Spill Zone. Immediate cleanup of the spill included the removal of cyanide crystals and the spreading of neutralizers to counteract the effects of any remaining cyanide that could not be removed. TCE released by two ruptured tank cars could not be recovered at the time of the derailment and ultimately migrated into the ground and groundwater. Figure 3 illustrates the extent of the TCE contamination in groundwater.

Since the spill, remedial actions were taken to remove the TCE contamination from the Site with limited success. While the extent of the plume boundary is near steady state, the presence of TCE within the bedrock continues to be a long-term source of contamination. The current source for the dissolved-phase TCE is contamination located in the bedrock matrix porosity, microfractures and matrix pore spaces above and below the water table. Even though Site contaminants were released as DNAPL, it was not observed during the installation and sampling of groundwater monitoring wells during the RI.

Nature and Extent of Contamination

TCE is the principal contaminant of concern at this Site. Many groundwater, surface water, soil and sediment samples were collected at the Site to characterize the nature and extent of contamination. The following summarizes the results of Site investigations conducted by the NYSDEC in 1990 and LVRR from 2008 through 2015:

- Soil sampling activities were conducted in the Spill Zone. The sampling included the collection of approximately 250 soil samples from a total of 174 test borings. Analysis of 28 of the samples detected TCE at concentrations ranging between 7.6 and 460 milligrams per kilogram (mg/kg), exceeding NYSDEC Soil Cleanup Objectives.

- Groundwater samples collected from monitoring wells located in the Spill Zone ((DC-01, DC-02, DC-05, DC-15, DC-16, LVRR-35 and LVRR-36) detected TCE at levels ranging from 450 - 4,400 µg/L, exceeding the drinking water standard of 5 µg/L.

- Wells immediately downgradient of the Spill Zone (DC-03, DC-06, DC-17, LVRR-20, LVRR-34, and LVRR-37) detected TCE at levels ranging from 40 - 760 µg/L.

- Groundwater samples collected from downgradient monitoring wells located by Spring Street (DC-13, DC-14, GCM, LVRR-22, and LVRR-23) detected TCE at levels ranging from non-detect or ND - 11 µg/L, slightly exceeding the drinking water standard of 5 µg/L.

- Groundwater samples collected from downgradient monitoring wells located East of Spring Creek (LVRR-38, LVRR-39, LVRR-40, LVRR-41, and LVRR-42) detected TCE at an estimated concentration of 0.27 µg/l in well LVRR-38C. Analysis of the remaining groundwater samples collected from wells east of Spring Creek did not detect TCE in concentrations exceeding laboratory reporting limits.

Mud Creek, a seasonal tributary of Oatka Creek, flows from south to north through the western portion of the Site and hydraulically downgradient of the Spill Zone. TCE was detected at 320 µg/l in surface water samples collected at the Mud Creek area, including the waterfall and downstream of the waterfall at 380 µg/l. These TCE concentrations exceed the NYSDEC Class C surface water quality standard of 40 µg/L. Additionally, natural volatilization, as well as the rapid rise in the water table displaces TCE-impacted vapor and pushes it upward. This phenomenon results in periodic TCE-impacted VI into residences in down-plume areas.

The DNAPL likely reached a stable position within a relatively short period after the release occurred and then began to dissolve into groundwater that was flowing through fractures in the rock matrix and diffusing into

pore spaces within the rock matrix. The TCE mass is essentially immobile relative to the flow of groundwater in the fractures, and back diffusion of contamination provides a long-term source of contamination to the groundwater in the fractures.

Dissolved TCE in groundwater moves eastward with the regional groundwater flow. The groundwater flow also has a vertical component where deeper geologic formations are also impacted by TCE. As groundwater moves eastward it discharges into springs near Oatka Creek and at Spring Creek which manifest themselves as ponds or wetlands south of the Oatka Creek channel.

Currently, the majority of the TCE mass is located in the rock matrix, in micro fractures and in pore spaces above the saturated zone dissolved into pore space groundwater, sorbed onto the bedrock, or as vapors. The diffusion of TCE into and out of the rock matrix occurs dynamically within the entire plume (present day and historic) both in the saturated and vadose zones during times of high water. This process has been documented in the AGTI report from the Spill Zone approximately 2 miles eastward to Limerock Road. As such, the rock matrix provides a continuous source of TCE impacts to groundwater via back diffusion. This occurs when groundwater in the fractures has TCE concentrations that are lower than those in the adjacent bedrock matrix. This is the cause of long-term plume persistence despite the depletion of DNAPL within the Spill Zone. While diffusion processes have been beneficial in causing strong attenuation of the TCE plume and in reducing mass discharge to surface water, it also presents an impediment to plume cleanup in a reasonable timeframe.

The AGTI proposed a variety of remedial alternatives (bedrock vapor extraction, in-situ thermal desorption, groundwater extraction and treatment and subsurface barrier or other in situ injection scenario) and concluded that the restoration of groundwater to its most beneficial use is not technically practical within a reasonable timeframe.

In addition to field data and observations, a Discrete Fracture Network (DFN) model was created, to understand how the various processes controlling plume behavior interact to result in the observed (and interpolated) plume configuration and behavior over various time and distance scales.

The modeling indicates that even complete removal of TCE mass from the Spill Zone or from other areas of the overall plume footprint, will not restore groundwater to its most beneficial use or eliminate risk to human health or the environment within any reasonable timeframe. However, TCE concentrations within the plume and downgradient discharges to surface water will continue to decline due to natural processes.

WHAT IS ROCK MATRIX DIFFUSION?

A highly interconnected fracture network such as the Onondaga Formation provides a relatively large surface area for VOCs to sorb onto and then diffuse, or move, into the pore spaces in the rock itself- a process known as matrix diffusion. The pore volume of the rock matrix at the site is nearly two orders of magnitude larger than the fracture network, allowing it to hold the majority of the contaminant mass. Once the VOCs diffuse into the rock, they are left nearly immobile because of the low hydraulic conductivity of the rock matrix.

In the early stages after a release, diffusion into the matrix can slow the advance of the dissolved plume through the fractures. At first, the diffused mass penetrates only a short distance into the bedrock, but in cases with very large initial DNAPL releases (as at the LVRR site), matrix diffusion can drive high VOC concentrations until it fully penetrates the matrix block. This effect more commonly occurs in source areas, where aqueous mass concentrations are highest and the residence time is the longest.

After a significant period of time (*e.g.*, 50 years) in the fractured bedrock environment, contaminant mass that has moved into the rock matrix, will be higher in concentration than the groundwater within the fractures. At this point, the process of matrix diffusion will reverse, (this is known as back diffusion), slowly releasing the mass in the rock matrix pore water back to the fractures. Back diffusion occurs slowly over a very long period of time (usually in multi-century timeframe). So while contaminant movement through a bedrock aquifer can be retarded or slowed down by diffusion into the rock matrix, this same process is a major limiting factor in effective remediation due to the slow back diffusion process.

SUMMARY OF SITE RISKS

As part of the RI/FS for the Site, a baseline risk assessment (BRA) and a supplemental risk evaluation for soil were conducted to estimate the current and future effects of contaminants on human health and the environment. A BRA is an analysis of the potential adverse human health and ecological effects of releases of hazardous substances from a site if no actions to mitigate such releases are taken, under current and future land and groundwater uses. The BRA includes a human health risk assessment (HHRA, 2016) and a screening-level ecological risk assessment (SLERA). In 2021, EPA conducted a soil risk evaluation that supplemented the baseline risk assessment for the Site.

In the HHRA, cancer risk and noncancer health hazard estimates are based on current reasonable maximum exposure (RME) scenarios and were developed by taking into account various health protective estimates about the concentrations, frequency and duration of an individual's exposure to chemicals selected as contaminants of potential concerns (COPCs), as well as the toxicity of these contaminants. The RME is intended to estimate a conservative exposure scenario that is still within the range of possible exposures.

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 COPCs, Exposure Assessment, Toxicity Assessment, and Risk Characterization (see text box titled "What is Risk and How is it Calculated" for additional explanation of these terms).

Human Health Risks

The current land use at the Site, including the approximate 10-acre Spill Zone and the resultant 4.1-mile plume, designated as the Study Area, is mixed use, including residential, recreational, agricultural, and commercial/industrial. Future land use is expected to remain the same. The identification and selection of potential receptor populations was based on both current and potential future land uses of the Site. Media of concern evaluated in the 2016 HHRA included groundwater, as well as surface water and sediments in nearby Mud Creek, Oatka Creek and Spring Creek. As such, the following receptor populations and pathways were quantitatively evaluated in the 2016 HHRA:

- Future Resident (Adult/Child)- Ingestion of groundwater as drinking water, dermal contact with groundwater while bathing or showering, and inhalation of VOCs released during bathing or showering.
- Future Commercial/Industrial Worker- Ingestion of groundwater as drinking water and dermal contact while hand washing.
- Current/Future Construction/Utility Worker- Incidental ingestion of and dermal contact with shallow groundwater in a trench, and inhalation of vapor phase chemicals released from groundwater to a confined space (trench).
- Current/Future Recreational User (Adult/Adolescent/Child)- incidental ingestion of and dermal contact with surface water and sediment while wading or swimming in Mud, Oatka, and Spring Creeks.

In 2021, to supplement the HHRA, EPA conducted an additional risk evaluation for residual TCE source in the Spill Zone soils post-treatment with a SVE system. Residual TCE contamination in the Spill Zone is present on land zoned industrial; therefore, the following receptor populations and pathways were evaluated:

- Current/Future Commercial Worker- incidental ingestion and inhalation of soil particulates released from Spill Zone soils; and
- Current/Future Construction Workers - incidental ingestion and inhalation of soil particulates released from Spill Zone soils.

Two types of toxic effects were evaluated for each receptor in the risk assessments: carcinogenic effects and non-carcinogenic effects. Calculated risk estimates for each receptor were compared to EPA's target threshold values for carcinogenic risk of 1×10^{-6} (one-in-one million) to 1×10^{-4} (one-in-ten thousand) and calculated hazard index (HI) to a target value of 1.

Summary of HHRA Results

This section provides a summary of the conclusions of the HHRA documents (both the 2016 HHRA and 2021 supplemental soil risk evaluation) per media. The bolded values in Tables 1 through 3 highlight the cancer risk and noncancer hazards estimates that exceed EPA's threshold criteria for site-related contaminants. Further, media specific COCs were identified in instances when the threshold criteria were exceeded. A complete discussion of the exposure pathways and estimates of risk can be found in the final 2016 HHRA and 2021 supplemental risk evaluation which are available in the administrative record for the Site.

➢ ***Groundwater***

Risk and hazards were evaluated for current and future exposure to contaminated groundwater beneath the Site. The populations of interest included the following receptors: Future child and adult residents, future commercial/industrial worker and current/future construction/excavation worker. As summarized in Table 1 below, the hazard indices for the child resident (12,000), adult resident (7,000), commercial/industrial worker (19) and construction/excavation worker (3.1) exceeded EPA's threshold value of 1. In addition, the combined cancer risk estimates for the child an adult resident of 3.7×10^{-2} and that of a commercial/industrial worker of 1.6×10^{-4} exceeded EPA's threshold range of 1×10^{-6} to 1×10^{-4}. TCE in groundwater was the main contaminant driving unacceptable risk and hazard estimates.

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 releases under current - and anticipated future - land uses. A four-step process is utilized for assessing site-related human health risks for reasonable maximum exposure scenarios.

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

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

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

Risk Characterization: This step summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site risks for all COPCs. Exposures are evaluated based on the potential risk of developing cancer and the potential for non-cancer health hazards. The likelihood of an individual developing cancer is expressed as a probability. For example, a 1×10^{4} cancer risk means a "one-in-ten thousand excess cancer risk"; or one additional cancer may be seen in a population of 10,000 people as a result of exposure to site contaminants under the conditions identified in the Exposure Assessment. Current Superfund regulations for exposures identify the range for determining whether remedial action is necessary as an individual excess lifetime cancer risk of 1×10^{4} to 1×10^{6}, corresponding to a one-in- ten thousand to a one-in-one-million excess cancer risk. For non-cancer health effects, a "hazard index" (HI) is calculated. The key concept for a non-cancer HI is that a "threshold" (measured as an HI of less than or equal to 1) exists below which non-cancer health hazards are not expected to occur. The goal of protection is 1×10^{-6} for cancer risk and an HI of 1 for a noncancer health hazard. Chemicals that exceed a 1×10^{-4} cancer risk or an HI of 1 are typically those that will require remedial action at the site.

Table 1: Summary of total hazard and risks associated with groundwater[1]

RECEPTOR	Hazard Index	Cancer Risk
Future Child Resident	**12,000**	**3.7E-02**
Future Adult Resident	**7,000**	
Future Commercial/Industrial Worker	**19**	**1.6E-04**
Current/Future Construction/Excavation Worker	**3.1**	1.1E-06

The potential for subsurface vapor intrusion (SVI) is evaluated when Site soils and/or groundwater are known or suspected to contain chemicals that are volatile. Since TCE is considered volatile, a comparison of detected concentrations of TCE found in sitewide groundwater were compared to EPA's chemical-specific, risk-based groundwater vapor intrusion screening levels (VISLs). The VISLs provide groundwater levels associated with an indoor air concentration that represents a cancer risk ranging from 1×10^{-4} and 1×10^{-6} or a noncancer hazard quotient of 1. Concentrations exceeding these groundwater screening values indicate the potential for vapor intrusion exists. Results of the screening evaluation indicate that TCE is present in groundwater at concentrations well above the chemical specific groundwater VISL for TCE of 1.19 ug/L. Based on the results of the screening evaluation, the potential for vapor intrusion exists at the Site and should continue to be evaluated in both the current and future timeframes.

- ***Soil***

Risks and hazards were evaluated for future exposure to residual TCE source within the Spill Zone soil by current/future commercial and construction workers. For the commercial worker, surface soil down to 2 ft bgs was evaluated while for the construction worker, soil down to 10 ft bgs was considered. As summarized in Table 2, the estimated noncancer hazards for these two receptors exceeded 1 with estimates of 25 and 91 for the commercial worker and construction worker, respectively. The noncancer risk driver was TCE in both instances. The estimated cancer risks for these receptor populations evaluated were found to be within EPA's target threshold range of 1×10^{-6} to 1×10^{-4}.

[1] Bolded values indicate risk exceedances.

Table 2: Summary of hazard and risks associated with residual TCE source in soil[2]		
RECEPTOR	Hazard Index	Cancer Risk
Current/Future Commercial Worker	**25**	7.6E-05
Current/Future Construction Worker	**91**	1.1E-05

- ***Surface Water and Sediments in the Mud Creek area, Oatka Creek and Spring Creek.***

Risk and hazard were evaluated for current and future exposure by a child, adolescent and adult recreators who may be wading or swimming in nearby Mud, Oatka, and Spring Creeks. Based on the distribution of constituent concentrations in these surface waters, two exposure unit (EU) were designated for use in the HHRA. Mud Creek located adjacent and hydraulically downgradient from the Spill Zone comprises the first EU. Hydraulically downgradient from Mud Creek is Oatka Creek and Spring Creek which were designated as EU 2. The results of the risk assessment are summarized per media and EU in Table 3 below.

Table 3: Summary of total hazard and risks associated with surface water and sediment[3]		
RECEPTOR	Hazard Index	Cancer Risk
Exposure Media: Surface Water in Mud Creek (EU1)		
Current/Future Child Recreator	**14**	6.1E-05
Current/Future Adult Recreator	**6.2**	
Current/Future Adolescent Recreator	**7.9**	NC
Exposure Media: Sediment in Mud Creek (EU1)		
Current/Future Child Recreator	1.5*	2.1E-06
Current/Future Adult Recreator	0.14	
Current/Future Adolescent Recreator	0.73	NC
Exposure Media: Surface Water in Oatka & Spring Creek (EU2)		
Current/Future Child Recreator	0.14	1.7E-05
Current/Future Adult Recreator	0.036	
Current/Future Adolescent Recreator	0.055	NC
Exposure Media: Sediment in Oatka & Spring Creek (EU2)		
Current/Future Child Recreator	2.6*	8.3E-06
Current/Future Adult Recreator	0.24	
Current/Future Adolescent Recreator	0.44	NC

Footnotes:
NC= not calculated

* Hazard exceedance due to thallium, which is not related to the train derailment.

As indicated in Table 3, hazard indices for the child recreator (14), adolescent recreator (7.9) as well as the adult recreators (6.2) visiting Mud Creek exceeded EPA's threshold value of 1. TCE in surface water was the main COC driving the hazards for these recreators. Cancer risk estimates did not exceed EPA's threshold of 1×10^{-6} to 1×10^{-4} for any media evaluated. Exposure to sediments in Mud Creek resulted in a total hazard slightly above unity (1.5), however, this exceedance was due to thallium in sediments which is not a Site-related constituent. Similarly, exposure to sediments in EU2 (Oatka and Spring Creek) resulted in a slight hazard exceedance with hazard estimates equal to 2.6; however, this exceedance was due to presence of non-Site related thallium in sediments. The presence of TCE in surface water of Mud Creek drove the unacceptable hazard estimates for recreators.

In summary, the result of the 2016 HHRA and the 2021 supplemental soil evaluation indicated that TCE in soil, groundwater and surface water of Mud Creek were associated with cancer and/or noncancer risk estimates that exceeded EPA's threshold criteria. The presence of TCE in groundwater was also found at levels that could be of concern for the vapor intrusion pathway.

Ecological Risk Assessment

A Screening Level Ecological Risk Assessment (SLERA) was prepared to determine whether potential adverse ecological effects are occurring or may occur based on constituents of potential ecological concern concentrations in sediment and surface water. Ecological exposure was

[2] Bolded values indicate risk exceedances.

[3] Bolded values indicate risk exceedances.

first evaluated using an exposure evaluation approach that quantified potential risk based on the most conservative exposure scenarios. The results indicated that maximum concentrations of some constituents in surface water and sediment exceeded conservative screening criteria. However, the potential for impacts to populations from exposure to those constituents is low when evaluated using refined benchmarks that indicate the risk of real effects to specific receptors. The findings of the exposure estimate and risk characterization support the following conclusions for the exposure area:

1) The low detected concentration of cyanide in surface water at one location in Mud Creek does not pose unacceptable risks for fish communities because the pathway for exposure is incomplete since Mud Creek upstream of Gorge Pond runs dry portions of the year and, therefore, is unable to support fish communities.
2) Acetone is not related to the train derailment and is not a Site-related constituent. It is unlikely to adsorb to sediment and was found in similar concentrations within and outside the historical plume. The lack of sediment quality criteria and ecotoxicity data suggest that this analyte is unlikely to adversely impact macroinvertebrates. Therefore, the presence of this constituent in sediment samples is not considered Site-related and does not pose a significant risk to benthic invertebrate populations.

A Supplemental Ecological Risk Evaluation was completed to estimate the potential for adverse effects to ecological receptors exposed to contaminated soils on the Site (USEPA, 2021b). Analytical data used in the Supplemental Risk Evaluation included TCE concentrations measured in post-SVE soil boring samples collected in August 2017 from 0.5 to 2.5 ft bgs. The risk was evaluated for surface soils because exposure pathways to terrestrial ecological receptors are only complete in surface soil. Exposure point concentrations (EPC) calculated by EPA were compared to the 2 mg/kg value for protection of ecological receptors established by the NYSDEC. This NYSDEC value assumes that the soil-to-earthworm-to-small mammal exposure pathway is the most sensitive wildlife ingestion pathway. In calculating the 2 mg/kg value, NYSDEC assumed an exposure scenario where short-tailed shrews (*Blarina brevicauda*) consume 100 percent of their diet in earthworms and the TCE bioaccumulation from soil to earthworm tissue is based on general bioaccumulation models for organic compounds based on octanol-water partitioning coefficients. Based on this comparison, USEPA calculated a hazard quotient (HQ) for the Spill Zone of 230 based on an EPC of 460.2 mg/kg. Under current conditions, placement of a stone cover as part of the SVE system prevents the establishment of habitat to support a forage base (*e.g.*, earthworms, vegetation, etc.) for ecological receptors and minimizes incidental soil ingestion. However, if the existing cover is removed, there is a potential for future habitat to be present for ecological receptors.

Summary of Human Health and Ecological Risks

EPA concluded that remaining TCE in Site soil poses an unacceptable noncancer risk to human health and the need to take remedial action remains valid. The inhalation pathway was the exposure pathway of concern. Surface water exposure from Mud Creek, containing TCE, poses an unacceptable noncancer risk to human health, and the need to take remedial action remains valid. Ingestion of and dermal contact with contaminated surface water while swimming were the exposure pathways of concern. Exposure to groundwater beneath the Site via ingestion, inhalation and dermal contact drove unacceptable cancer and noncancer hazard for human health receptors. Additionally, TCE is present in groundwater at concentrations that could be of concern for the VI pathway. A streamlined ecological risk evaluation for the soil in the Spill Zone concluded that there is a potential for adverse impact to ecological receptors from exposure to soil if the existing stone cover is removed.

Based on the results of the human health and ecological risk assessments, a remedial action is necessary to protect human health and the environment from actual or threatened releases of hazardous substances.

It is EPA's judgment that the implementation of preferred alternatives, summarized in this Proposed Plan, is necessary to protect human health and the environment from actual of threatened releases of hazardous substances into the environment.

PRINCIPAL THREAT WASTE

Principal threat waste is defined in the box below. TCE released from the train derailment has diffused into the bedrock matrix and continues to be an ongoing source of groundwater contamination. Bedrock and contaminated groundwater at the Site, however, are not considered source materials and, therefore, are not principal threat wastes. Soil is not considered principal threat waste because it does not act as a significant source of contamination to groundwater.

WHAT IS A "PRINCIPAL THREAT"?

The National Oil and Hazardous Substances Pollution Contingency Plan (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 groundwater 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.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals identified 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 (TBC) guidance, and, if applicable, site-specific risk-based levels.

The RAOs identified in the 1997 NYSDEC ROD were:

- Provide for attainment of Standards, Criteria and Guidance (SCGs) for groundwater quality and surface water quality at the limits of the area of concern, to the extent practicable.
- Prevent, to the extent possible, migration of contaminants in groundwater and reduce the impacts of contaminated groundwater to the environment.
- Reduce, control, or eliminate, to the extent practicable, the soil and bedrock contamination present at the derailment Site.
- Eliminate the potential for human and wildlife exposure to soil containing Site-related contaminants.
- Contain, treat and/or dispose of contaminated soil in a manner consistent with applicable state and federal regulations and guidance.

EPA is amending and supplementing these RAOs with the RAOs detailed below which are organized by media. In developing RAOs for groundwater, EPA expects to return usable groundwater to its beneficial uses (in this case, use as drinking water) wherever practicable, within a timeframe that is reasonable given the characteristics of the site. EPA also acknowledges, however, that groundwater restoration is not always achievable due to limitations in remedial technologies and other site-specific factors. These factors may include technology limitations, contaminant phase contaminant depth, complexity of geological setting, and hydraulic regime.

As discussed above, after evaluating the nature and extent of groundwater contamination and the available remedial alternatives for groundwater, EPA has concluded that the available technologies cannot achieve restoration of the contaminated groundwater to drinking water standards. EPA is recommending a waiver of ARARs due to technical impracticability (TI) for groundwater at the Site. The PRP documented its evaluation of the potential for groundwater restoration in the 2019 AGTI report and identified a zone where ARARs are expected to be exceeded for the foreseeable future. EPA acknowledged that this evaluation satisfied the requirements for a TI waiver.

The proposed TI decision applies only to the chemical-specific groundwater standards being waived in the area in which ARARs or other cleanup standards cannot be reached (hereinafter, TI Zone). For the LVRR Site, the TI Zone includes the portion of the groundwater in the Spill Zone and the plume downgradient to Spring Creek. The horizontal and vertical extent of the TI Zone is illustrated on Figure 4, which shows the TI Zone (items 1 and 2 below) and an area around the TI Zone as follows:

1. Red: depicts an area encompassing the approximately 3.1 million square foot Spill Zone and extending vertically to the upper Camillus Formation (a depth corresponding to approximately 120 ft bgs), resulting in a volume of approximately 213 million cubic feet where groundwater TCE concentrations generally exceed 1,000 µg/L;

2. Yellow: depicts an area encompassing approximately 102 million square feet outside of the Spill Zone area extending vertically to the base of the Camillus Formation (ranging from approximately 120 ft bgs in the western extent of the Study Area to outcrops occasionally near Spring Creek, and Oatka Creek), resulting in a volume of approximately 7,821 million cubic feet where groundwater TCE concentrations generally range from 5 µg/L to 1,000 µg/L. The TI boundary at the distal end of the TCE plume was established to include the entire Spring Creek Fault Zone that extends just east of Spring Creek.

3. Gray (Monitoring Zone): depicts an area that encompasses an approximately 39 million square foot area extending vertically to the base of the Camillus Formation (ranging from approximately 120 ft bgs in the western extent of the Study Area to outcrops occasionally near Spring Creek, and Oatka Creek) resulting in a volume of approximately 2,990 million cubic feet where TCE concentrations in groundwater generally range from non-detect to 5 µg/L. Outside of the TI Zone (gray area), the preliminary remediation goals (discussed below) will be used to verify compliance with the TI waiver.

When restoration of groundwater to beneficial uses is not practicable, EPA selects an alternative remedial strategy that is technically practicable, protective of human health and the environment, and satisfies statutory and regulatory requirements of CERCLA. Consistent with the NCP, alternative remedial strategies for TI sites typically address three site concerns: 1) exposure control; 2) source control; and 3) aqueous plume migration. The RAOs outlined below for groundwater, soil vapor, bedrock, surface water and soil address these concerns.

Groundwater RAOs:

- Prevent current and future human exposure (via ingestion, inhalation and dermal contact) to Site-related contaminants in groundwater that exceed federal or state maximum contaminant levels (MCLs);
- Prevent further migration of Site-related contaminants in groundwater at levels exceeding MCLs beyond the delineated areal extent of the groundwater contamination (TI Zone); and,
- Prevent the migration of Site-related contaminants in groundwater to surface water that would result in exceeding applicable surface water quality standards.

Soil Vapor Intrusion (SVI) RAOs:

- Mitigate potential current and future unacceptable risks from subsurface SVI into indoor air.

Bedrock RAOs:

- Mitigate, to the extent practicable, the Bedrock Vadose Zone (BVZ) as an ongoing source of groundwater contamination;
- Accelerate long-term improvement to the groundwater in a reasonable time frame; and,
- Support further risk reduction for the Site as a whole.

Soil RAOs:

- Prevent human exposure to contaminated Spill Zone soil (*i.e.*, contaminated overburden fill material/debris/soil) via incidental ingestion and inhalation above levels that pose an unacceptable risk for commercial use.

Surface Water RAO:

- Prevent unacceptable risk to human receptors from incidental ingestion and dermal contact exposure to contaminated surface and seep water in the Mud Creek area by reducing contaminant levels to the more stringent federal or state standards.

Preliminary Remediation Goals

Preliminary remediation goals (PRGs) are media- and contaminant-specific numerical or qualitative federal and state standards that can be compared directly to RAOs and will be used for developing use restrictions and other actions to prevent exposure and for assessing the extent of the aqueous plume. To evaluate remedial alternatives and support the RAOs, PRGs for the Site were developed for soil, groundwater and surface water. PRGs are related to RAOs and are based on state and federal standards and will be used for developing the final cleanup levels in the ROD, use restrictions and other actions to prevent exposure. PRGs will not be used for achieving restoration of groundwater within the TI zone to the numerical goals but will be used for assessing the extent of the aqueous plume.

As there are no promulgated chemical-specific ARARs for SVI, PRGs were not specifically developed for vapor intrusion. However, applicable TBC criteria includes EPA Vapor Intrusion Screening Levels (VISLs) and NYSDOH *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York*. The most current EPA VISLs and NYSDOH criteria will be used in the evaluation of the SVI pathway at the Site.

In the 1997 NYSDEC OU1 ROD established the groundwater and surface water PRGs as follows:

Groundwater – 5 µg/L TCE
Surface water – 11 µg/L TCE

For the surface soil, PRGs were as follows:

TCE – 7 mg/kg
1,2-dichloroethene – 3 mg/kg

EPA is proposing to replace the above PRGs with the following:

Table 4: EPA's PRGs

MEDIA	CONTAMINANT OF CONCERN	PRG	UNITS
Groundwater[1]	Trichloroethene (TCE)	5	µg/L
	cis-1,2-dichloroethene	5	µg/L
	trans-1,2-dichloroethene	5	µg/L
	1,1- dichloroethene	5	µg/L
	Vinyl Chloride	2	µg/L
Surface Water[2]	Trichloroethene (TCE)	40	µg/L
Soil[3]	Trichloroethene (TCE)	200	mg/kg

Footnotes:
[1] Lower of the NYSDEC Class GA Drinking Water Standards and NY state and federal Maximum Contaminant Levels (MCL) were selected as PRGs. These PRGs are the ARARs being waived in the TI Zone.
[2] NYSDEC - Part 703: Surface Water Quality Standards for Class C (based on designation of Mud Creek).
[3] 6 NYCRR Part 375, Table 375-6.8(b) Commercial use Soil Cleanup Objective. The protection of groundwater SCO was evaluated in the feasibility study, but was not applied because groundwater restoration is not possible.

As reflected in the PRG table above, the primary groundwater COCs include TCE and its breakdown daughter products: cis- and trans- 1,2 dichloroethene, 1,1,- dichloroethene and vinyl chloride.

The OU2 RI and AGTI Reports conclude that a substantial quantity of TCE, released from the original spill, has diffused into the rock matrix. As such, remediation of the bedrock matrix would be difficult as a result of the formation of the bedrock geology, as well as the size, migration, and location of the TCE mass. Currently, there are no published ARARs, TBCs, or other Guidance specific to the BVZ. Therefore, PRGs have not been identified for the BVZ. The AGTI report concludes that the restoration of groundwater, within the Study Area, to its most beneficial use is not technically practical within a reasonable timeframe. Therefore, BVZ RAOs are based on source reduction and exposure control.

SUMMARY OF REMEDIAL ALTERNATIVES

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

The alternatives for addressing contamination at the Site are organized by media and summarized below. Detailed descriptions of the remedial alternatives for addressing the contamination found at the Site are provided in the 2023 FS Report.

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

Common Elements of the Alternatives

The proposed alternatives described below, with the exception of the 'No Action' alternative, include major common elements which are implementable and do not change significantly in scope from one alternative to another as follows:

1. Common Elements:
   a.) Institutional Controls in the form of governmental controls (see Appendix C of FS Report); proprietary controls (e.g., easements on Spill Zone parcels); and informational devices relating to groundwater, soil vapor, and the Spill Zone (e.g., notices, publications) to limit exposure to contaminated groundwater and soil vapor;

   b. Monitoring, which includes sampling, of groundwater, surface water, soil vapor and indoor air;
      i. A long-term groundwater monitoring program would be implemented to track and to monitor changes in the groundwater contamination to ensure the RAOs are attained.
      ii. The groundwater data results would be used to evaluate any contaminant migration and changes in VOC contaminants over time.

c. Maintenance of existing SSDSs and installation of new systems, as needed, for impacted properties; and
d. Connection of new homes constructed over the groundwater plume to the current municipal water supply system or the provision of a point-of-entry treatment system if connection to the municipal system is not feasible.

Institutional Controls were evaluated as part of EPA's nine criteria analysis as discussed in more detail below.

Bedrock Vadose Zone (BVZ) Remedial Alternatives

BVZ Alternative 1: No Action

The NCP requires that a "No Action" alternative be developed and considered as a baseline for comparing other remedial alternatives. Under this alternative, no additional action would be implemented.

Capital Cost:	$0
O&M Costs:	$0
Present-Worth Cost:	$0

BVZ Alternative 2: Monitoring and ICs

No active remedial actions would be implemented in the BVZ under Alternative 2. An operations and maintenance (O&M) plan would be prepared to protect workers from TCE exposure by outlining methods and procedures for any on-Site work activities. Additionally, ICs (consisting of deed notices and informational devices) and monitoring (groundwater sampling) would be established to prevent the potential use and exposure of impacted materials, as well as to monitor the groundwater quality through sampling over time.

Capital Cost:	$0
O&M Costs:	$0
Common Elements Costs:	$137,250
Present-Worth Cost:	$137,250
Construction time:	Not Applicable

BVZ Alternative 3a (original OU1 bedrock remedy): BVE in a 10-acre portion of the BVZ, Monitoring and ICs

Under this alternative, which was also part of the selected remedy in the OU1 ROD, a BVE system would be installed within the Spill Zone to address the TCE mass that remains within the unsaturated BVZ in the 10-acre area. This would consist of a network of vapor extraction wells, vacuum extraction pumps, and a treatment system to mitigate the extracted vapors. The extent of the proposed area is based on bedrock TCE vapor with the outer most limits containing concentrations of approximately 10,000 $\mu g/m^3$. TCE within the seasonally saturated BVZ would not be addressed by this alternative as it would not be effective.

Capital Cost:	$8.36 million
O&M Costs:	$1.00 million
Common Elements Costs:	$0.14 million
Present-Worth Cost:	$9.50 million
Construction time:	8 months

BVZ Alternative 3b: BVE in a 2-acre portion of the BVZ, Monitoring and ICs

Under this alternative, a BVE system would be installed within the Spill Zone to address the TCE mass that remains within the unsaturated BVZ in a two-acre area. This consists of a network of vapor extraction wells, vacuum extraction pumps, and a treatment system to mitigate the extracted vapors. The extent of the proposed area is based on bedrock TCE vapor data with the outer most limits containing concentrations of approximately 1,000,000 $\mu g/m^3$. TCE within the seasonally saturated BVZ would not be addressed by this alternative as it would not be effective.

Capital Cost:	$2.73 million
O&M Costs:	$0.85 million
Common Elements Costs:	$0.14 million
Present-Worth Cost:	$3.72 million
Construction time:	4 months

Surface Water (SW) Remedial Alternatives

SW Alternative 1: No Action

The NCP requires that a "No Action" alternative be developed and considered as a baseline for comparing other remedial alternatives. This alternative would not reach remedial action objectives in a reasonable time frame.

Capital Cost:	$0
O&M Costs:	$0
Present-Worth Cost:	$0

SW Alternative 2: ICs and Monitoring

No active surface water remedial action would be implemented as part of this alternative. Improvements in

surface water quality would be through natural degradation of TCE by dispersion, dilution, volatilization, biodegradation, and abiotic processes. Monitoring would determine if the surface water quality improved over time.

Capital Cost:	$1.76 million
O&M Costs:	$0
Common Elements Costs:	$0.08 million
Present-Worth Cost:	$1.84 million
Construction time:	Not Applicable

SW Alternative 3: Hydraulic Containment of Contaminated Groundwater with ICs and Monitoring

This alternative would involve the installation and operation of several groundwater extraction wells (and associated treatment and discharge of extracted groundwater) to prevent contaminated groundwater discharges to surface water and active seeps and flows within the Mud Creek area. A Preliminary Design Investigation (PDI) would be undertaken and include collection of seasonal data in the Mud Creek area for flow conditions, groundwater elevations, surface water quality, and identification of fractured rock or karst subsurface flow pathways. Wells and piezometers would be installed, and pump tests would be completed to obtain data on groundwater level fluctuations and flow directions, seep flow rates, changes in COC concentrations, and hydraulic conductivity. Monitoring would determine if the surface water quality improves over time.

Capital Cost:	$5.43 million
O&M Costs:	$5.09 million
Common Elements Costs:	$0.08 million
Present-Worth Cost:	$10.60 million
Construction time:	1 year

SW Alternative 4: Streambed Cover with ICs and Monitoring

This alternative consists of covering the active Mud Creek stream segments and seeps that are impacted by TCE with stones sourced from nearby quarries. The stones would be placed such that the stream would be well below the top of the streambed cover, thereby preventing direct human contact with TCE-impacted media. Monitoring would determine if the surface water quality improves over time.

Capital Cost:	$2.07 million
O&M Costs:	$0.53 million
Common Elements Costs:	$0.08 million
Present-Worth Cost:	$2.69 million
Construction time:	3 months

SW Alternative 5: In situ Treatment of Contaminated Surface Water, Streambed Cover with ICs, and Monitoring

This alternative includes the streambed cover from Alternative 4 and adds the installation of one or more permeable treatment barriers (PTBs) to create treatment zones as an engineered in situ treatment process. The PTBs would also prevent any potential human contact with TCE-impacted surface water. Once a PDI has been completed for the Mud Creek area, the design, the number of treatment zones, their specific location, configuration, and the process or media to be used within the treatment zones will be determined. The PDI would collect seasonal data for flow conditions, groundwater elevations, surface water quality samples, and identification of fractured rock or karst subsurface flow pathways. Additional geochemical sampling and pilot scale installation of one or more of the PTBs in potential treatment zones would be conducted to determine performance and maintenance requirements of the PTBs. Monitoring would determine if the surface water quality improves over time.

Capital Cost:	$ 4.12 million
O&M Costs:	$ 3.10 million
Common Elements Costs:	$ 0.08 million
Present-Worth Cost:	$ 7.31 million
Construction time:	3 months

<u>Soil Remedial Alternatives</u>

Soil Alternative 1: No Action

The NCP requires that a "No Action" alternative be developed and considered as a baseline for comparing other remedial alternatives. Under this alternative, no additional action would be implemented beyond what was accomplished under the OU1 ROD.

Capital Cost:	$0
O&M Costs:	$0
Present-Worth Cost:	$0
Time frame:	Not Applicable

Soil Alternative 2: Solidification/Stabilization (S/S) or Cover System using Commercial Land-Use Based PRG

Under this alternative, the Spill Zone overburden soils would be remediated using ex situ solidification/ stabilization. Overburden materials exceeding the commercial land-use PRG of 200 mg/kg for TCE in soil to depths ranging up to 10.5 ft bgs would be excavated, mixed with Portland cement (or other material) to immobilize the contamination, and returned to the excavation area underlain by a demarcation layer. Post-excavation samples would be completed to ensure all impacted overburden soil exceeding the commercial land use PRG of 200 mg/kg for TCE has been removed. In addition, placement of topsoil and seed to provide for one foot of clean soil cover will extend to any areas of the Spill Zone where surface soil exceeds 2 mg/kg, which is the NYS value for the protection of ecological receptors. Community air monitoring and dust control measures would be performed to ensure that VOCs are not volatilizing into the air.

On-Site ex-situ treatment of TCE-impacted overburden in a temporary treatment unit and placing the solidified material in the excavation area would need to comply with Resource Conservation and Recovery Act (RCRA) corrective action management unit (CAMU) performance standards including requirements for a liner, leachate collection system, cap, and groundwater monitoring.

Capital Cost:	$1.37 million
O&M Costs:	$0.71 million
Common Elements Costs:	$0.12 million
Present-Worth Cost:	$2.20 million
Construction time:	20 months

Soil Alternative 3: Excavation/Disposal using Commercial Land-Use Based PRG

Under this alternative, the Spill Zone overburden material exceeding the commercial land use PRG for TCE of 200 mg/kg would be excavated to depths of up to 10.5 ft bgs. An estimated total of 1,150 cubic yards (yd^3) (1,840 tons) of overburden would be removed and disposed off-Site at an approved disposal facility. Post-excavation samples would be completed to ensure all impacted overburden material exceeding the PRG of 200 mg/kg for TCE has been removed. The area would then be backfilled using clean, imported soil and/or stone underlain by a demarcation layer. In addition, placement of topsoil and seed to provide for one foot of clean soil cover would extend to areas of the Spill Zone where surface soil exceeds the 2 mg/kg value for the protection of ecological receptors. Community air monitoring and dust control measures would be performed to verify volatilization of VOCs into the air is not occurring.

Capital Cost:	$3.02 million
O&M Costs:	$0.06 million
Common Elements Costs:	$0.12 million
Present-Worth Cost:	$3.20 million
Construction time:	6 months

Soil Alternative 4: Low-Temperature Thermal Desorption (LTTD) using Commercial Land-Use Based PRG

Under this alternative, the Spill Zone overburden material exceeding the commercial land use PRG of 200 mg/kg would be remediated ex-situ using LTTD to depths of up to 10.5 ft bgs. An estimated total of 1,150 yd^3 (1,840 tons) of overburden would be removed, treated via LTTD. Post-excavation samples would be completed to ensure all impacted overburden material exceeding the PRG of 200 mg/kg for TCE has been removed. The area would then be backfilled using clean, imported soil and/or stone underlain by a demarcation layer. In addition, placement of topsoil and seed to provide for one foot of clean soil cover would extend to areas of the Spill Zone where surface soil exceeds 2 mg/kg value for the protection of ecological receptors. Community air monitoring and dust control measures will be performed to verify volatilization of VOCs into the air is not occurring.

On-Site treatment of TCE-impacted overburden by ex situ in a temporary treatment unit and placing the treated material in the excavation area would need to comply with the RCRA CAMU performance standards. If LTTD treatment achieves 90% reduction of TCE or reaches 10 times the universal treatment standard (60 mg/kg), the CAMU would not have to comply with the requirements for a liner, leachate collection system, cap, and groundwater monitoring.

Capital Cost:	$1.82 million
O&M Costs:	$0.06 million
Common Elements Costs:	$0.12 million
Present-Worth Cost:	$2.00 million
Construction time:	16 months

EVALUATION OF ALTERNATIVES

In evaluating the remedial alternatives, each alternative is assessed against the nine evaluation criteria set forth in the NCP, namely the following: overall protection of human health and the environment; compliance with ARARs;

long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; cost; and State and community acceptance. Refer to the text box for a more detailed description of these evaluation criteria.

This section of the Proposed Plan evaluates the relative performance of each alternative, including the Common Elements, particularly ICs, against the nine criteria, noting how each compare to the other options under consideration. A detailed analysis of alternatives can be found in EPA's FS Report supporting this decision, dated July 2023.

BEDROCK ALTERNATIVES

Overall Protection of Human Health and the Environment

BVZ Alternative 1 (No Action) would not meet the RAOs and would not be protective of human health and the environment because no action would be taken. BVZ Alternatives 2, 3a and 3b would address risk mitigation through the ICs. Although the active remedial BVZ alternatives (3a and 3b) would provide for a marginal reduction in TCE mass within the BVZ, the beneficial impact with respect to protection of human health would be negligible given that the majority of the TCE mass would be retained within the bedrock matrix micro pore spaces. None of the alternatives presented would have a beneficial impact to groundwater quality as a result of the matrix diffusion mechanisms that occur between the bedrock matrix porewater and the groundwater media, which would be expected to continue for a significant period of time into the future.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

There are no current federal and/or state ARARs that are applicable for the bedrock source material. None of the bedrock alternatives presented would be sufficient to meet the groundwater ARAR of 5 µg/L across the entirety of the TCE-impacted groundwater plume or to reduce risk, in general, with regards to exposure to TCE-impacted groundwater media.

Long-Term Effectiveness and Permanence

BVZ Alternative 1 would not have any long-term effectiveness and permanence because no action would be taken. BVZ Alternative 2, which involves the implementation of comment elements and ICs, would provide for a permanent and effective means of mitigating potential exposure to TCE-impacted bedrock media and to Site groundwater that is impacted by the TCE present within the bedrock media. BVZ Alternatives 3a and 3b would not be expected to provide any benefit with respect to: i) reducing TCE mass to any practical extent within the BVZ; and ii) reducing TCE concentrations (and associated exposure risk) within the TCE-impacted groundwater media, based on an analysis of the Site data collected through various investigations and modeling efforts.

EVALUATION CRITERIA FOR SUPERFUND REMEDIAL ALTERNATIVES

Overall Protectiveness of Human Health and the Environment considers whether and how an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) considers whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the Site, or whether a waiver is justified.

Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.

Reduction of Toxicity, Mobility, or Volume (TMV) of Contaminants through Treatment considers 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.

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.

Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

Cost considers 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.

State/Support Agency Acceptance considers whether the State agrees with EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.

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.

Reduction of Toxicity, Mobility, or Volume Through Treatment

BVZ Alternative 1, No Action, would not address the contamination through treatment, so there would be no reduction in toxicity, mobility, or volume of the contaminants, and the alternative does not include long-term monitoring of groundwater conditions. As a result of the limitations associated with the matrix diffusion processes within bedrock media, the unpredictable nature

associated with the application of BVE in a fractured bedrock media and the generally inconclusive results of the BVE Pilot Study, any implementation of active remediation through BVE (BVZ Alternatives 3a and 3b), would be expected to recover a very small fraction of the TCE mass that lies within the BVZ. Consequently, only a marginal reduction of toxicity, mobility and volume would be expected within the bedrock media when compared to the BVZ Alternatives 1 and 2.

Short-Term Impact and Effectiveness

BVZ Alternative 1 would not have short-term adverse impacts, because no action would be implemented. The activities associated with the BVE system installation phase for BVZ Alternatives 3a and 3b would present a moderate to high degree of risk to on-Site workers, and little to no risk to the community. The elevated risk associated with the installation of the BVE system could be mitigated through the appropriate training of on-Site personnel, and implementation of rigorous safety protocols. Once a BVE system is operational, routine sampling and O&M activities would present a moderate degree of risk to on-Site workers, and little to no risk to the community. In contrast, implementation of either BVZ Alternatives 1 or 2 would not present any increased risk to on-Site workers or the public, in general.

Implementability

BVZ Alternative 1, No Action, would be the easiest of all the alternatives to implement because there would be no remedy to implement. The implementability of the BVZ remedial alternatives (3a and 3b) would be challenging since a large number of extraction wells would be required, uncertainties with regards to their placement, and system operational challenges associated with: i) a highly variable water table and ii) matrix diffusion processes within the bedrock media (both of which would limit that amount of TCE mass that could be recovered by the BVE process). Additionally, the application of BVE would not address the TCE-impacted bedrock that is present below the water table, thus further impacting its implementability and effectiveness. In contrast, there are no technical or administrative implementability issues associated with the BVZ Alternatives 1 and 2.

Cost

BVZ Alternative 1 (No Action) has no cost because no activities would be implemented. Costs associated with the Common Elements alternative (BVZ Alternative 2), which include ICs, are estimated to be approximately $137,250. BVZ Alternatives 3a and 3b have capital worth costs of approximately $8.36 and $2.67 million, and present worth costs for O&M of $1.01 million and $0.85 million, respectively (assuming a three-year system operation time frame). These costs are significant in comparison to the costs associated with the alternative which contains only Common Elements, with little to no benefit achieved through implementation of the active treatment alternatives. The estimated capital cost, O&M, and present worth cost of the various Alternatives are discussed in detail in the 2023 FS Report. For cost estimating and planning purposes, a 30-year time frame was used for O&M.

State Acceptance

NYSDEC is currently evaluating EPA's preferred remedial alternatives as stated in this Proposed Plan.

Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends and all comments are reviewed. Comments received during the public comment period will be addressed in the Responsiveness Summary section of the upcoming ROD.

SURFACE WATER ALTERNATIVES

Overall Protection of Human Health and the Environment

SW Alternative 1 (No Action) would not meet the RAOs and would not be protective of human health and the environment because no action would be taken. The PDI and Common Elements alternative (SW Alternative 2) could provide for some degree of protection of human health through proprietary ICs. Lastly, if the results of the PDI investigations are favorable, SW Alternatives 3, 4, and 5 could potentially be implemented to the extent that they would provide for the protection of human health from TCE-impacted surface water. The Hydraulic Containment (SW Alternative 3) and Streambed Cover (SW Alternative 4) alternatives would provide protection through the containment of the TCE-impacted surface water, whereas the In-situ Treatment with Streambed Cover alternative (SW Alternative 5) would provide protection through both a containment mechanism, and a treatment process. Although Alternative 3 includes a treatment component, the media that it addresses via treatment is groundwater rather than surface water. In reality, SW Alternative 3 would be capturing groundwater prior to daylighting as surface water in Mud Creek and treating for subsequent discharge. As previously discussed, a thorough PDI would need to be conducted in order to obtain specific data, such as seasonal surface water flows, TCE concentrations, and pilot scale data to

assist in the implementation of key design elements for each remedial alternative.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

The No Action alternative would not comply with NYS standards for surface water TCE concentration within a "Class C" stream (*i.e.*, 40 µg/L). SW Alternative 2 would not comply with ARARs. Implementation of Hydraulic Containment (SW Alternative 3) or the Streambed Cover (SW Alternative 4) would not provide for a reduction in TCE concentrations that would meet the PRG. In-Situ Treatment with Streambed Cover (SW Alternative 5) would achieve the PRG for TCE.

Long-Term Effectiveness and Permanence

The long-term effectiveness under the No Action and the ICs and Monitoring alternatives (SW Alternatives 1 and 2) would not be achieved, as these two alternatives do not provide for a method to address surface water TCE concentrations that exceed the PRG. Assuming favorable results are obtained from the PDI, SW Alternatives 3, 4, and 5 could all provide for an effective long-term solution with regards to surface water TCE-impacts in the Mud Creek area. In addition to favorable results from the PDI, the implementation of routine O&M procedures would be another key component with regards to the long-term effectiveness of SW Alternatives 3, 4, and 5.

Reduction of Toxicity, Mobility, or Volume Through Treatment

SW Alternative 1, No Action, would not address the contamination through treatment so there would be no reduction in toxicity, mobility, or volume of the contaminants. The No Action alternative does not include long-term monitoring of the ongoing groundwater conditions. The No Action and the Common Elements alternatives (SW Alternatives 1 and 2) do not provide for any reduction of toxicity, mobility or volume of TCE impacts. Since SW Alternatives 3 and 5 all provide for a method of containment for contaminated groundwater discharging to surface water, the two alternatives would then provide for a reduction in the toxicity, mobility and volume of TCE with regards to the surface water pathway. SW Alternative 5 also provides for an additional mechanism that may result in the reduction of toxicity, mobility and volume of TCE in surface water through a treatment process.

Short-Term Impact and Effectiveness

SW Alternative 1 (No Action) would not have short-term adverse impacts because no action would be implemented. The system installation activities associated with SW Alternatives 3, 4 and 5 would present a moderate to high degree of risk to on-Site workers, and little to no risk to the community. A significant component of this risk is the result of construction activities that would need to be conducted in largely wooded and uneven terrain. The elevated risk associated with the installation of these remedial systems could be mitigated through the appropriate training of on-Site personnel, use of proper construction equipment, and implementation of safety protocols. Routine sampling and O&M activities associated with the proposed remedial systems would present a moderate degree of risk to on-Site workers and little to no risk to the community. In contrast, implementation of either the No Action or the Common Elements alternatives would not present any increased risk to on-Site workers or the public in general.

Implementability

SW Alternative 1 (No Action) would be the easiest of all the alternatives to implement because there would be no remedy to implement. No technical implementability issues are associated the No Action and Common Elements alternatives. SW Alternatives 3, 4 and 5 would all require a PDI to be conducted initially in order to determine the design parameters associated with their implementation. Depending on the results of the PDI, each of these three alternatives would require a significant amount of construction activities to be conducted within a heavily wooded area, as well as the Mud Creek streambed itself. Access roads would need to be constructed for construction equipment and on-Site workers to access the various locations where system infrastructure needs to be installed. SW Alternatives 3 and 5 would require an installation phase that may take half-a-year or more to complete. Additionally, SW Alternative 3 would require a significant footprint to house all the necessary equipment necessary for its implementation. SW Alternatives 3 and 5 would require extensive routine O&M activities associated with their long-term operation. This could include servicing of pumps, motors and treatment equipment, replacement of treatment media, and/or waste disposal. In contrast, the long-term O&M activities associated with SW Alternative 4 would be simple and straightforward, and significantly easier to manage over the long-term.

Cost

The estimated capital cost, O&M, and present worth cost of the various alternatives are discussed in detail in the 2023 FS Report. For cost estimating and planning purposes, a 30-year time frame was used for O&M. The cost estimates are based on the available information. SW Alternative 1 (No Action) has no cost because no activities would be implemented. Costs associated with the ICs and Monitoring alternative (SW Alternative 2) are estimated to be approximately $81,750. Capital costs associated with implementation of the proposed PDI are $2.12 million. Capital costs for Hydraulic Control & Common Elements (SW Alternatives 3), Streambed Cover & Common Elements (SW Alternative 4), and In-situ Treatment, Streambed Cover & Common Elements (SW Alternative 5) are estimated to be approximately $5.43 million, $2.07 million and $4.12 million, respectively. Note that these costs also include the implementation of the proposed PDI. Present worth costs for O&M for these three alternatives are estimated to be approximately $5.09 million, $534,000 and $3.10 million, respectively (assuming a 30-year O&M period). Present worth costs are calculated based on a 7% discount rate for each year of system O&M. The corresponding total costs for these three alternatives are estimated to be approximately $10.6 million, $2.69 million and $7.31 million, respectively. The costs for SW Alternatives 3 and 5 are significant in comparison to the other alternatives presented, as they will incur more upfront capital expenditures and higher O&M costs over the course of their operation.

State Acceptance

NYSDEC is currently evaluating EPA's preferred alternatives, as stated in this Proposed Plan.

Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends and all comments are reviewed. Comments received during the public comment period will be addressed in the Responsiveness Summary section of the upcoming ROD.

Soil Remedial Alternatives

Overall Protection of Human Health and the Environment

Soil Alternative 1 (No Action) would not meet the RAOs and would not be protective of human health and the environment because no action would be taken. Except for the No Action Alternative, all alternatives are protective of human health and the environment. Soil Alternatives 3 and 4 reduce TCE concentrations on-Site through physical removal. Although Soil Alternative 2 does not reduce TCE concentrations, solidification would mitigate wind/surface water erosion and incidental ingestion/inhalation and placement within a lined/capped CAMU would make these alternatives equally as protective.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

EPA has identified NYSDEC's soil cleanup objectives (SCOs) (6 NYCRR § 375-6.5) as an ARAR, a "to-be considered," or other guidance to address contaminated soil at the Site. Refer to soil PRG in the table above. The No Action Alternative does not achieve the soil PRGs. Since all alternatives involve removal of soil and any treatment options would be expected to meet the soil PRGs for the soil placed back on the ground, post-excavation soil samples would verify attainment of the PRGs. Imported soil for backfill under Soil Alternative 3 would be tested to verify conformance with the allowable constituent levels for imported fill soil. Since Soil Alternative 2 (solidification) would not achieve any reduction in soil TCE concentrations, the CAMU would need to comply with the requirements for a liner, leachate collection, cap, and groundwater monitoring.

Long-Term Effectiveness and Permanence

The No Action Alternative provides no long-term effectiveness toward achieving the RAOs. All alternatives prevent direct contact with residual impacts. Soil Alternative 3 provides the greatest long-term effectiveness and permanence since the TCE-impacted soil media is removed from the Site. If proven effective through pilot testing, Soil Alternative 4 (LTTD) will permanently reduce TCE concentrations on-Site.

Reduction of Toxicity, Mobility, or Volume Through Treatment

Soil Alternative 1, (No Action), would not address the contamination through treatment, so there would be no reduction in toxicity, mobility, or volume of the contaminants, and the alternative does not include long-term monitoring of groundwater conditions. Soil Alternative 2 (solidification) would reduce the mobility but not the toxicity or volume of TCE impacted soil media. Soil Alternative 3 (off-Site disposal) would reduce the toxicity, mobility, and volume on-Site; however, the off-Site reduction in toxicity and/or volume depends on

the form of treatment/disposal at the Treatment, Storage and Disposal Facility (TSDF). Soil Alternative 4 (LTTD) would reduce the volume of TCE in the soil media but the overall reduction in volume and toxicity depends on the form of emissions control employed.

Short-Term Impact and Effectiveness

Soil Alternative 1 would not have short-term adverse impacts because no action would be implemented. All other soil alternatives would result in noise, dust, and vapor impacts; however, these are considered minimal and controllable through proper construction techniques. Evaluation of additional emissions controls for crushing that might be required under Soil Alternative 2 (solidification) would be considered during pilot-testing. Except for Soil Alternative 2, the work would be sequenced to minimize the time the excavation will remain open and safety measures would be in place. Construction of a CAMU for Soil Alternative 2 would require an open excavation for a significant period to install the liner and leachate collection system. Soil Alternative 4 would require significant fuel for the LTTD reactor and, since natural gas is not available near the Site, propane or heating oil tanks would need to be kept on-Site resulting in short-term risk to both human health and the environment.

Implementability

Soil Alternative 1 (No Action) would be the easiest of all the alternatives to implement because there would be no remedy to implement. Soil Alternative 2 (solidification) would have significant technical and administrative implementability issues surrounding construction of a CAMU in the Spill Zone. Since ex-situ solidification and stabilization of the soil media does not result in a TCE concentration reduction, the CAMU would have to comply with the requirements for a liner, leachate collection system, cap, and groundwater monitoring. Administrative issues include require agency approval of the CAMU design. The impacted soil media would need to be excavated and stockpiled or placed in roll off containers pending CAMU construction. The impacted material would need to be covered to prevent erosion. Design and construction of a CAMU would extend the time for these remedial alternatives by approximately 12 months. Other implementability issues include determining the type and amount of binding agent that will effectively solidify the impacted soil media and securing the appropriate equipment. The footprint of the CAMU would need to be larger than the excavation area to manage the grade change due to volume increases through the addition of the solidification agent.
Soil Alternative 3 (off-Site disposal) would require traffic coordination for off-Site transport to the TSDF, securing a disposal contract with out-of-State TSDF, and locating a borrow source for backfill material. Soil Alternative 4 requires a pilot test to verify effectiveness, securing specialized equipment for LTTD, and emissions control. Soil Alternative 4 is estimated to take up to 18 months to implement.

Cost

A comparative summary of the cost estimates for each alternative is presented in Table 5.

State Acceptance

NYSDEC is currently evaluating EPA's preferred alternatives as stated in this Proposed Plan.

Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends and all comments are reviewed. Comments received during the public comment period will be addressed in a responsiveness summary section of the upcoming ROD.

PREFERRED ALTERNATIVES

Climate resiliency was evaluated in reviewing the alternatives. Potential Site impacts from climate change have been assessed and EPA's preferred alternative would be not at risk as a result of the expected effects of climate change in the region and near the Site.

After a thorough review of the proposed remedial alternatives, EPA recommends the following preferred remedy for the various media:

1. Groundwater: For the approximately four-mile TCE plume, EPA proposes a combination of monitoring and ICs while invoking a TI waiver for chemical-specific groundwater ARARs in the TI Zone because groundwater cannot be restored in a reasonable timeframe. Outside of the TI Zone, the ARARs will remain as the final cleanup goal. Long-term monitoring and groundwater use restrictions would be required.
2. Bedrock Vadose Zone – BVZ Alternative 2: ICs and Groundwater Monitoring. The BVZ and the groundwater in the Spill Zone is included in the extent of the TI zone (Figure 4).
3. Soil – Alternative 3: Excavation and off-Site disposal.

4. Surface Water – Alternative 5: In-situ treatment of contaminated surface water with streambed cover, ICs, and monitoring.
5. Common Elements:
   a. Institutional Controls in the form of governmental controls (see Appendix C of FS Report); proprietary controls (e.g., easements on Spill Zone parcels); and informational devices relating to groundwater, soil vapor, and the Spill Zone (e.g., notices, publications) to limit exposure to contaminated groundwater and soil vapor;
   b. Monitoring, which includes sampling, of groundwater, surface water, soil vapor and indoor air as follows:
      i. A long-term groundwater monitoring program would be implemented to track and to monitor changes in the groundwater contamination to ensure the RAOs are attained.
      ii. The groundwater data results would be used to evaluate any contaminant migration and changes in VOC contaminants over time.
   c. Maintenance of existing SSDSs and installation of new systems, as needed, for impacted properties; and
   d. Connection of new homes constructed over the groundwater plume to the current municipal water supply system or the provision of a point-of-entry treatment system if connection to the municipal system is not feasible.

With this comprehensive remedy for OU1 and OU2, this Proposed Plan also proposes the following changes to the OU1 ROD:

1. Eliminating the BVE source control measure;
2. Eliminating ex-situ SVE;
3. Updating the surface water standard for TCE from the original cleanup goal of 11 µg/L to the current NYSDEC standard of 40 µg/L;
4. Addressing soil contamination beneath Gulf Road by implementing ICs to restrict access and to require proper soil management if the roadbed is disturbed in the future; and
5. Updating the RAOs as discussed above.

A Site Management Plan (SMP) would also be developed for long-term O&M to provide for:

a) reviews of the effectiveness of the engineering and institutional controls;
b) proper management of the Site remedy post-construction;
c) long-term groundwater monitoring and health and safety requirements;
d) maintenance of existing vapor mitigation systems;
e) inspection of the plume area for new home construction and associated installation of new vapor mitigation systems; and
f) new connections to the public waterline or the provision of a point-of-entry treatment system if connection to the municipal system is not feasible.

Because this preferred alternative would result in contaminants remaining on-Site above levels that allow for unlimited use and unrestricted exposure, CERCLA requires that the Site remedy be reviewed at least once every five years. Also, provisions would be made for periodic reviews and certifications of the institutional and engineering controls. If justified by these reviews, additional remedial action may be implemented at the Site.

Green remediation techniques may be implemented as part of the preferred alternative to minimized environmental impacts consistent with EPA Region 2's Clean and Green Policy[4] and NYSDEC's Green Remediation Program Policy-DER-31.[5]

The total, estimated, present worth cost for the proposed remedy is $14,082,504 (see Table 5). Further details of the overall cost are presented in the FS Report.

Basis for the Remedy Preference

The preferred alternative for groundwater involves a TI waiver of chemical-specific ARARs based on the following factors: (1) the limited options available to successfully treat contamination in fractured bedrock with extensive evidence of matrix diffusion into the rock over a wide area; (2) the expected limited ability of the groundwater contamination to expand beyond its current extent; and, (3) the limited potential for treatment or containment of contamination remaining in the Spill Zone to result in a measurable improvement in groundwater quality anywhere in the aquifer within a reasonable time period. It also includes monitoring and institutional controls, mentioned as common elements.

[4] https://www.epa.gov/greenercleanups/epa-region-2-clean-and-green-policy

[5] http://www.dec.ny.gov/docs/remediation_hudson_pdf/der31.pdf.

The preferred alternative for Bedrock Vadose Zone – BVZ Alternative 2: ICs and Groundwater Monitoring was selected over BVZ Alternatives 3a and 3b. As demonstrated in the FS, the source reduction RAOs cannot be met because of matrix diffusion, complexity of the fracture network, and the groundwater elevation fluctuations in the BVZ. The active remedial BVZ alternatives (3a and 3b) would not achieve any appreciable reduction of TCE mass in the long term due to the matrix diffusion mechanisms that occur between the bedrock matrix porewater and the groundwater media, which would be expected to continue for a significant period of time into the future. This is also the basis for EPA proposing a TI waiver as to restoration of groundwater. The implementation of long-term groundwater monitoring and ICs would provide for an effective means of mitigating potential exposure to TCE-impacted bedrock media, and to Site groundwater that is impacted by the TCE that is present within the bedrock media.

The preferred Soil alternative (Soil Alternative 3 - excavation and off-Site disposal) was selected over other alternatives because it is expected to achieve the greatest degree of long-term effectiveness and permanence by removing impacted soils. Excavation Soil Alternative 3 is technically feasible, is a proven technology and more reliable than the soil treatment presented in Soil Alternatives 4 and 5. It is expected that this alternative could be substantially implemented within five to six months at a cost comparable to the other alternatives and provide for long-term reliability of the remedy.

The preferred Surface Water - SW Alternative 5: in-situ treatment of contaminated surface water with streambed cover, ICs and monitoring, was selected over other alternatives because it is expected to achieve substantial and long-term risk reduction through treatment of contaminants, and the use of engineering and institutional controls. The preferred SW Alternative reduces the risk within a reasonable time frame, at a cost comparable to other alternatives, and provides for long-term reliability of the remedy. A PDI would be undertaken and include collection of seasonal data in the Mud Creek area for flow conditions, groundwater elevations, surface water quality, and identification of fractured rock or karst subsurface flow pathways.

Based upon the information currently available, EPA believes that the preferred alternatives meet the threshold criteria and provide the best balance of trade-offs among the other alternatives with respect to the balancing criteria.

As discussed above, EPA is proposing an ARAR waiver for the federal and state drinking water and groundwater standards at the Site because of the technical impracticability of achieving ARARs in the TI Zone.

EPA expects the preferred remedy to satisfy the following statutory requirements of Section 121(b) of CERCLA: (1) the proposed remedy is protective of human health and the environment; (2) it complies with ARARs for all media except for where ARARs are waived; (3) it is cost effective; (4) it utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (5) it satisfies the preference for treatment.

FOR FURTHER INFORMATION

The Administrative Record file, which contains copies of the Proposed Plan and technical supporting documentation, is available at the following information repositories:

USEPA – Region II
Superfund Records Center
290 Broadway, 18th Floor
New York, New York 10007-1866
(212) 637-4325
Hours: Monday – Friday: 9:00 am to 4:30 pm

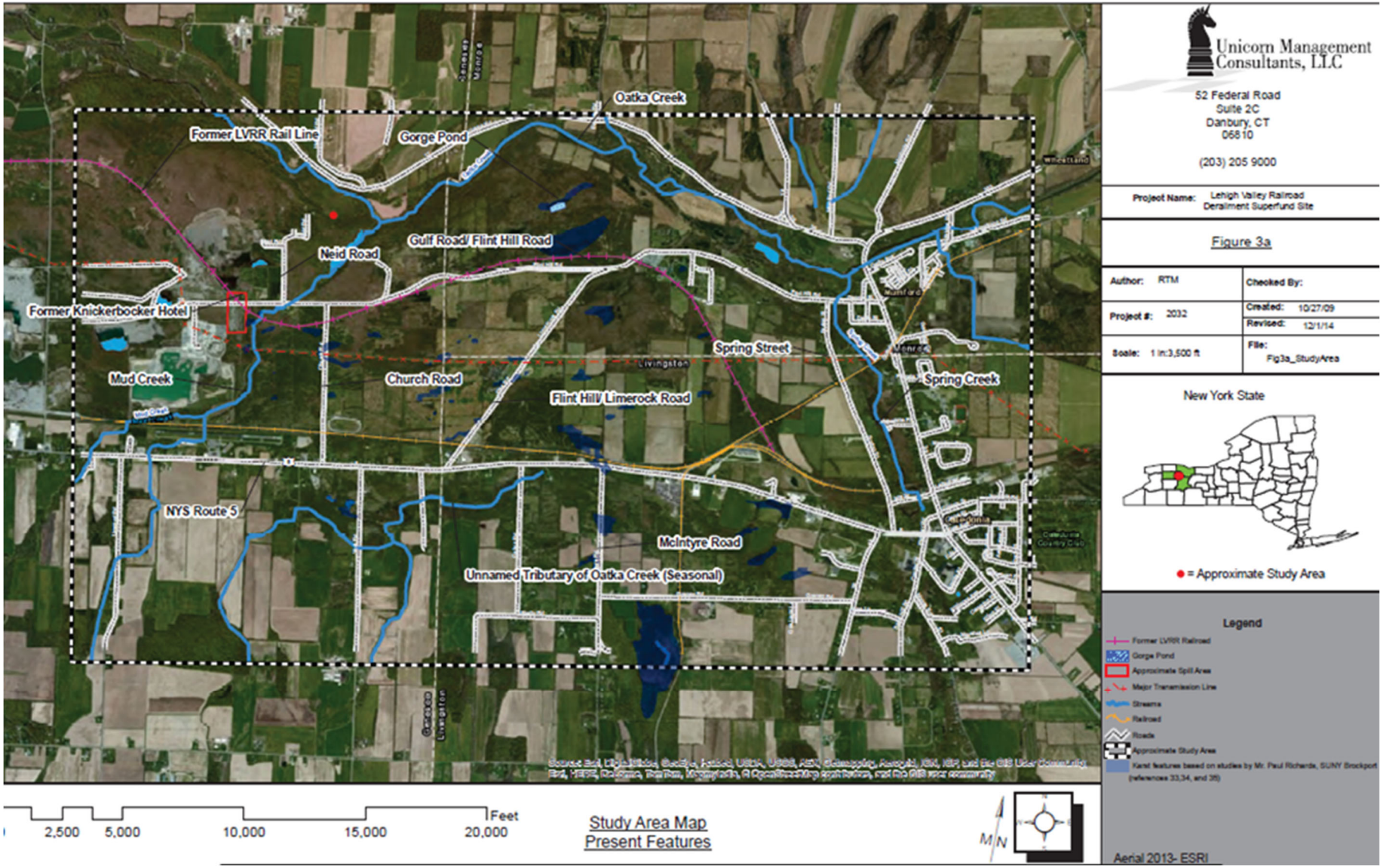
In addition, the Administrative Record file is available on-line on the Site Profile Page:
https://www.epa.gov/superfund/lehigh-valley-rr

For general information or questions about EPA's Superfund program, please contact the EPA Regional Public Liaison: George Zachos, zachos.george@epa.gov or (732) 321-6621 or toll free at (888) 283-7626.

Table 5: Costs for the Proposed Remedy

Media	Description	Capital Cost	O&M Cost	Institutional Controls Costs	Present-Worth Cost
Groundwater	TI waiver (includes monitoring)	$0	$2,253,200	$524,000	$2,778,000
Soil Vapor Intrusion	Indoor air	$0	$659,704	$0	$659,704
Bedrock Vadose Zone	Alternative BVZ - 2: ICs and Groundwater Monitoring	$0	$0	$137,250	$137,250
Soil	Alternative 3 - excavation and off-Site disposal	$3,017,897	$62,000	$121,750	$3,202,000
Surface Water	Alternative SW-5: In-situ treatment of contaminated surface water with streambed cover, ICs and monitoring	$4,121,550	$3,102,250	$81,750	$7,305,550
				Total	**$14,082,504**

Note: The soil alternative includes one foot of clean soil cover in areas of the Spill Zone where surface soil exceeds 2 mg/kg, which is the SCO value for the protection of ecological receptors.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Gulf Road/ Flint Hill Road
Neid Road
Former Knickerbocker Hotel
Spring Street
Mud Creek
Church Road
Flint Hill/ Limerock Road
Spring Creek
NYS Route 5
McIntyre Road
Unnamed Tributary of Oatka Creek (Seasonal)
Livingston
Monroe
Feet
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5,000
10,000
15,000
20,000
Study Area Map
Present Features
N
Unicorn Management Consultants, LLC
52 Federal Road
Suite 2C
Danbury, CT
06810
(203) 205 9000
Project Name: Lehigh Valley Railroad Derailment Superfund Site
Figure 3a
Author: RTM
Checked By:
Project #: 2032
Created: 10/27/09
Revised: 12/1/14
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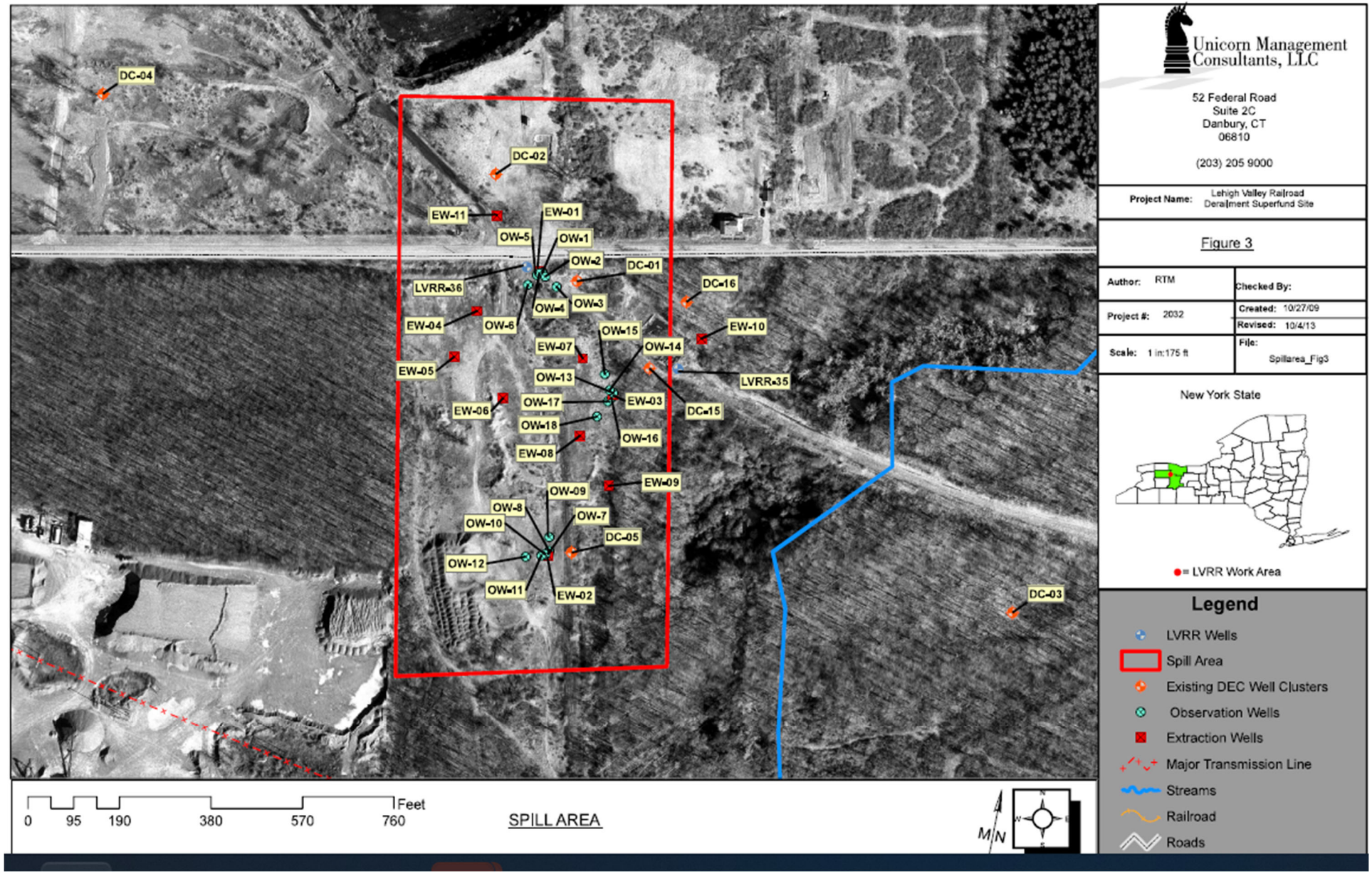
= Approximate Study Area
Legend
Former LVRR Railroad
Gorge Pond
Approximate Spill Area
Major Transmission Line
Streams
Railroad
Roads
Approximate Study Area
Karst features based on studies by Mr. Paul Richards, SUNY Brockport (references 33,34, and 35)
Aerial 2013- ESRI

Figure 1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OW-15
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EW-07
OW-14
EW-05
OW-13
LVRR-35
EW-06
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EW-03
DC-15
OW-18
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OW-12
OW-11
EW-02
DC-03
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SPILL AREA
M/N
Unicorn Management Consultants, LLC
52 Federal Road
Suite 2C
Danbury, CT
06810
(203) 205 9000
Project Name: Lehigh Valley Railroad Derailment Superfund Site
Figure 3
Author: RTM
Checked By:
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Created: 10/27/09
Revised: 10/4/13
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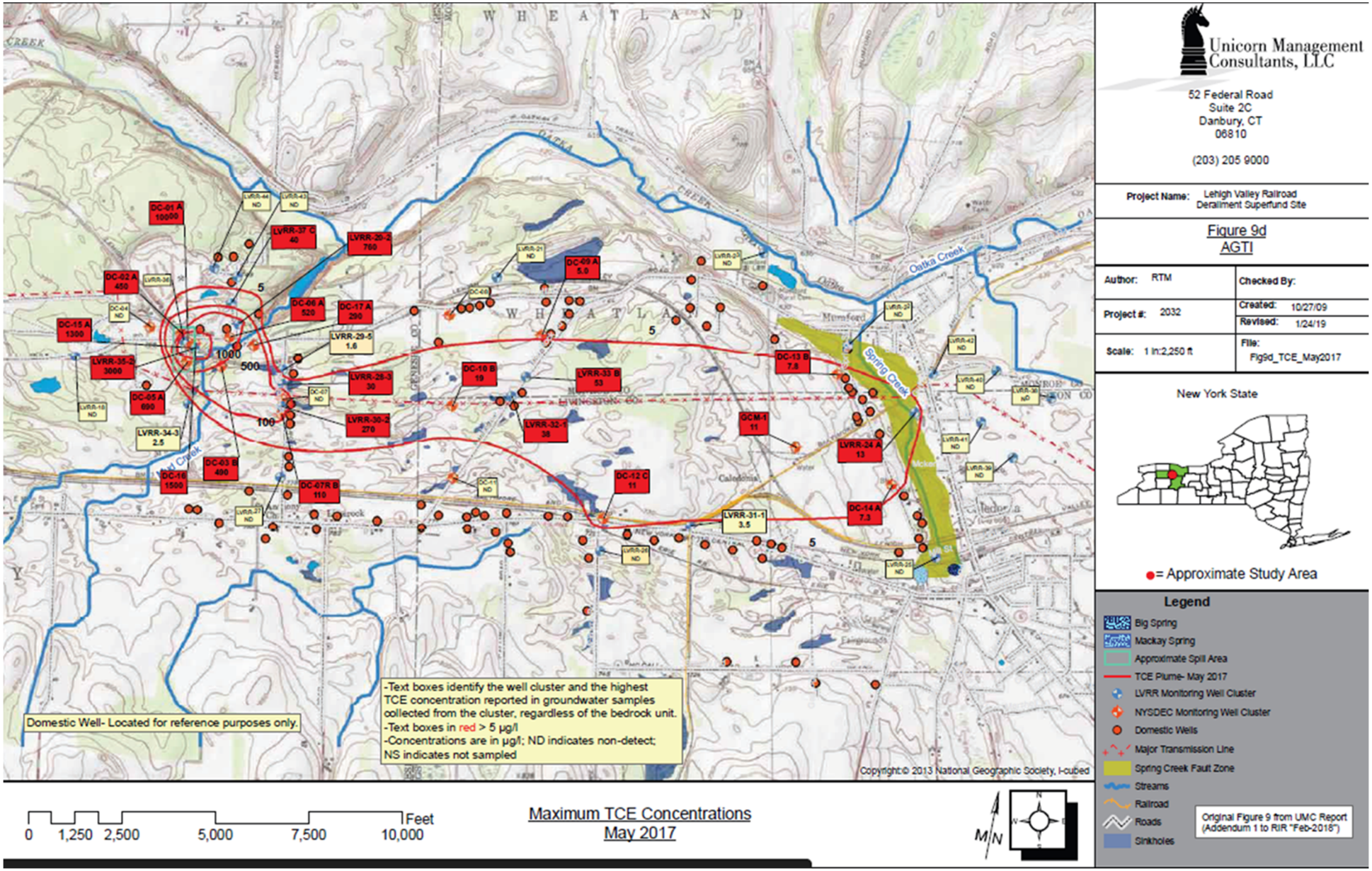
New York State
= LVRR Work Area
Legend
LVRR Wells
Spill Area
Existing DEC Well Clusters
Observation Wells
Extraction Wells
Major Transmission Line
Streams
Railroad
Roads

Figure 2


Unicorn Management Consultants, LLC
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Danbury, CT
06810
(203) 205 9000
Project Name: Lehigh Valley Railroad Derailment Superfund Site
Figure 9d
AGTI
Author: RTM
Checked By:
Project #: 2032
Created: 10/27/09
Revised: 1/24/19
Scale: 1 in:2,250 ft
File: Fig9d_TCE_May2017
New York State
= Approximate Study Area
Legend
Big Spring
Mackay Spring
Approximate Spill Area
TCE Plume- May 2017
LVRR Monitoring Well Cluster
NYSDEC Monitoring Well Cluster
Domestic Wells
Major Transmission Line
Spring Creek Fault Zone
Streams
Railroad
Roads
Sinkholes
Original Figure 9 from UMC Report (Addendum 1 to RIR "Feb-2018")
-Text boxes identify the well cluster and the highest TCE concentration reported in groundwater samples collected from the cluster, regardless of the bedrock unit.
-Text boxes in red > 5 µg/l
-Concentrations are in µg/l; ND indicates non-detect; NS indicates not sampled
Domestic Well- Located for reference purposes only.
Copyright © 2013 National Geographic Society, i-cubed
0 1,250 2,500 5,000 7,500 10,000 Feet
Maximum TCE Concentrations
May 2017
M/N
Oatka Creek
Spring Creek
WHEATLAND

Figure 3

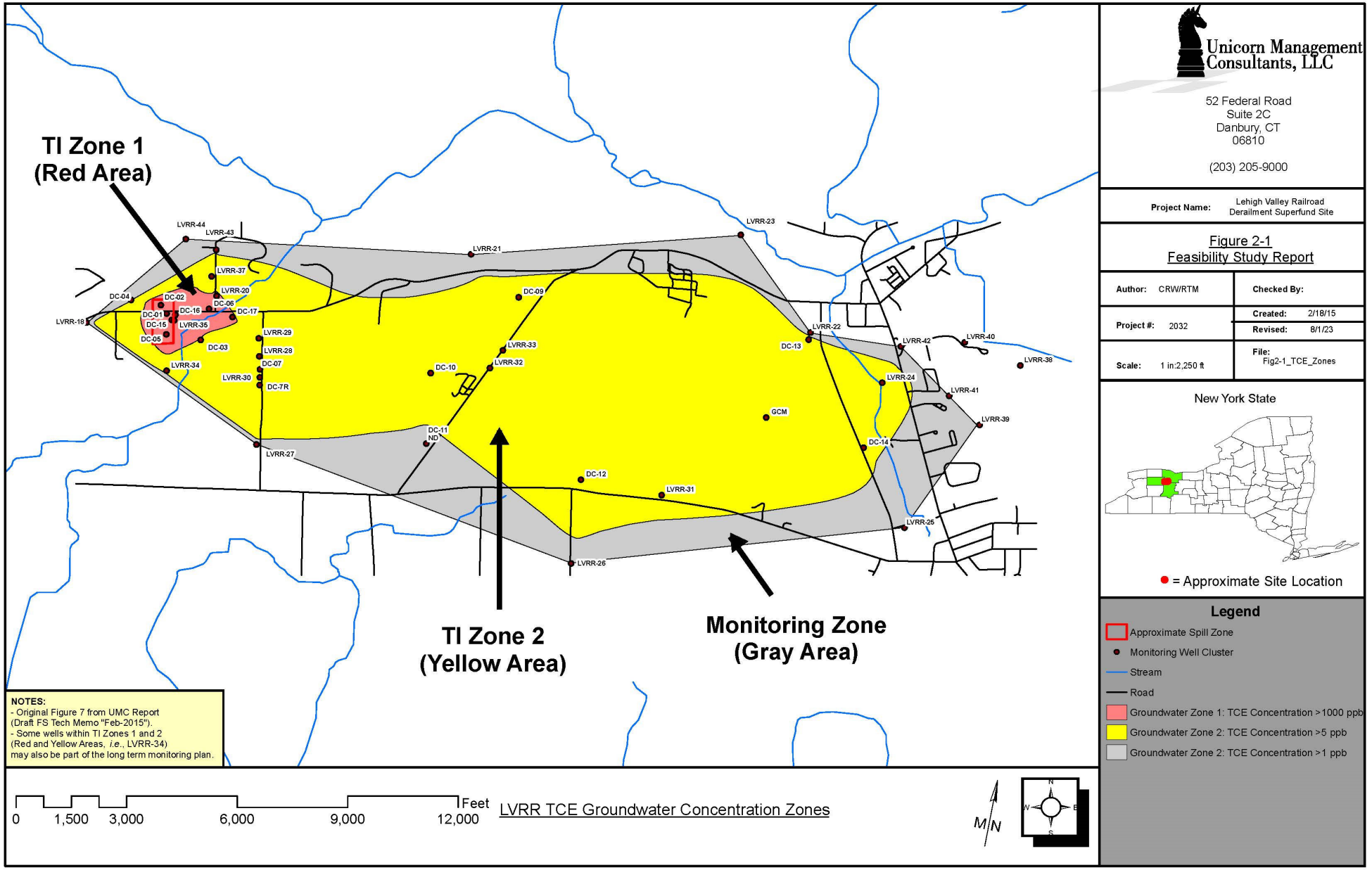
TI Zone 1
(Red Area)
TI Zone 2
(Yellow Area)
Monitoring Zone
(Gray Area)
NOTES:
- Original Figure 7 from UMC Report
(Draft FS Tech Memo "Feb-2015").
- Some wells within TI Zones 1 and 2
(Red and Yellow Areas, i.e., LVRR-34)
may also be part of the long term monitoring plan.
0 1,500 3,000 6,000 9,000 12,000 Feet
LVRR TCE Groundwater Concentration Zones
Unicorn Management Consultants, LLC
52 Federal Road
Suite 2C
Danbury, CT
06810
(203) 205-9000
Project Name: Lehigh Valley Railroad Derailment Superfund Site
Figure 2-1
Feasibility Study Report
Author: CRW/RTM
Checked By:
Project #: 2032
Created: 2/18/15
Revised: 8/1/23
Scale: 1 in:2,250 ft
File: Fig2-1_TCE_Zones
New York State
= Approximate Site Location
Legend
Approximate Spill Zone
Monitoring Well Cluster
Stream
Road
Groundwater Zone 1: TCE Concentration >1000 ppb
Groundwater Zone 2: TCE Concentration >5 ppb
Groundwater Zone 2: TCE Concentration >1 ppb

Figure 4

ATTACHMENT B

PUBLIC NOTICE

United States Environmental Protection Agency

EPA Invites Public Comment on Proposed Cleanup Plan Addressing Groundwater, Bedrock, Soil, Soil Vapor and Surface Water at the Lehigh Valley Railroad Derailment Superfund Site in LeRoy, New York

The U.S. Environmental Protection Agency (EPA) has issued a proposed final cleanup plan for the Lehigh Valley Railroad Derailment Superfund site in LeRoy, New York.

A 30-day public comment period on EPA's proposed cleanup plan begins on August 18, 2023, and ends on September 18, 2023. EPA's proposed preferred alternative calls for excavating and disposing contaminated soil off-site, monitoring and maintaining the current vapor mitigation systems and installing new systems when required, plus connecting newly constructed homes over the groundwater plume to the municipal water supply system. Contaminated surface water will be addressed through in-situ (in place) treatment with a streambed cover. The contamination in the groundwater and bedrock zone above the water table will continue to be monitored. EPA also calls for utilizing institutional controls in the form of governmental controls, proprietary controls (*e.g.*, easements) and informational devices and monitoring as components of the cleanup plan.

EPA will hold an in-person public meeting at 6:00 p.m. on August 29, 2023, at the Caledonia Mumford High School, 99 North Street, Caledonia, New York, for public input to the proposed cleanup plan.

The proposed cleanup plan is available at: https://www.epa.gov/superfund/lehigh-valley-rr

You may also find the plan at the site's two local repositories; Caledonia Public Library, 3108 Main Street, Caledonia, NY and the Woodward Memorial Library, Wolcott Street, LeRoy, NY; or at the EPA Records Center, 290 Broadway, 18th floor, New York, New York.

Written comments regarding EPA's preferred cleanup plan must be submitted by September 19, 2023, to Maria Jon, Remedial Project Manager, EPA Region 2, 290 Broadway, 19th floor, New York, New York 10007-1866, or preferably via email: jon.maria@epa.gov.

You may contact Michael Basile, EPA Community Involvement Coordinator at basile.michael@epa.gov with any questions.

ATTACHMENT C

PUBLIC MEETING TRANSCRIPT

LEHIGH VALLEY RAILROAD DERAILMENT SUPERFUND SITE
PUBLIC MEETING
Tuesday, August 29, 2023 - 6:00 p.m.
Caledonia-Mumford High School, Caledonia, New York

(Beginning of Audio Recording.)

MR. BASILE: Can I have your attention, please? I think we're going to start this 6:00 meeting at 6:04. No, I'm very punctual. I'm sorry, but my feeling is we invited you to a 6:00 meeting, and we're going to start on time, and there's no need to waste in waiting.

My name is Mike Basile. On behalf of the United States Environmental Protection Agency, let me welcome you to the Lehigh Valley Railroad Derailment Superfund Site meeting here in Caledonia.

I work out of the field office up in Buffalo, handle 38 community relations sites like this one, and have been involved with the Lehigh Valley for almost two and a half decades.

We're going to have -- pretty simple. You can see the agenda that you picked up at the sign-in table. We're going to have about three speakers. I'm going to just kind of facilitate the beginning and the end with questions and answers. We are having this preceding tonight videotaped so that I ask you to please let our speakers make their

presentations, and then they will -- we'll do questions and answers.

I will be coming into the audience to ask you to raise your hand. When you're identified and I bring the microphone to you, I'll ask you to spell and state your name and spell and state the street and your mailing address just for the record. Okay. Because it's important that we have that information.

We have a variety of different speakers from EPA. From Region 2, Region 2 we cover New York, New Jersey, the Virgin Islands, and Puerto Rico. And this evening we have a bunch of speakers that are members of the team that I serve on from our 290 Broadway headquarters in downtown New York.

One of the representatives will not be on the agenda, but I'd like to introduce him and just recognize him. Damian Duda, our Superfund remedial section branch chief. He's down front here. He'll probably be available to answer some questions later on.

From the New York State Department of Environmental Conservation, who are partners with us, Jeff Dyber. Jeff.

From the New York State Department of Health, Chris Budd and Chris Nicastro. And from Livingston County, Mark Rove. Mark, where are you? Mark's over here. And is Star O'Neil here from Monroe County? Star is not here. Okay.

We are here tonight to listen to a presentation as we roll out the proposed plan for the Lehigh Valley Railroad Derailment Site. We are in a -- are currently in a 30-day public comment period that ends on September the 18th. If this evening you don't have any questions, but you think of something while you're driving home over the holiday weekend, just keep the agenda, and you have the information there on how you can send your comments in to us that have to be postmarked no later than September the 18th. Okay?

At this time, I'd like to go into the agenda and call upon let's see, where's the clicker? Right here. The mouse. Okay. There we go. There we go. Okay, I'm going to call upon the remedial project manager was going to give you an overview for the site, and that is Maria Jon. Maria?

MS. WIEDER: I'll do the history.

MR. BASILE: Oh, you're going to do the history. Okay. Marla Wieder, the site attorney, is going to do the history first. Okay.

MS. WIEDER: Thank you, Mike. So you've all seen the agenda. We're going to talk a little bit about the site history, talk a little bit about the remedial investigations, the risk assessment results, the remedial action objectives that we chose for the site, the remedial alternatives that we have debated and discussed in terms of the feasibility study, the preferred remedy, which will be -- is embodied in the proposed plan. And then we'll have a little time for some questions and answers.

So a lot of you, I'm sure, are familiar with the site already, so I'm not going to go into a lot of detail. But the site is located in Genesee, Monroe, and Livingston counties. And as you know, this was the site of the 1970s train derailment.

So over 50 years ago, the Lehigh Valley Railroad, two cars ruptured, spilled over with

with TCE. It was about 30,000 gallons. And TCE is also called Trichloroethane. And this is the primary contaminant of concern at the site. It's a volatile, organic compound and it's quite common on a lot of our sites.

So the area where it spilled, this is called the spill zone so as not to confuse anybody, and it's about a ten-acre site. So when we talk more about the alternatives, Maria will be referencing what we plan on doing in that area.

So unfortunately, the TCE was flushed with water and it seeped into the ground and formed the four-mile plume that we have here today. Early in the '90s, New York State had undertaken some sampling, and they had found a number of homes exceeded the drinking water standards in the area. EPA came in with the removal program and installed groundwater filters to protect people from the TCE and the groundwater.

Then DEC went into a process of study, so they went into their remedial investigation and feasibility study. Eventually in 19 -- unbelievable -- 1997, they released their

record of decision for the site, which is their decision document. And this was released under state law. So this wasn't under the federal superfund program, and this was to address the TCE that was in the soil, the bedrock, as well as provide clean drinking water for people.

So in about 1998 was when DEC requested that EPA come on board and take over responsibility for the site. EPA included the site on the national priorities list, which enables us to use superfund money to do the work. So that freed up a lot of funding for us to be able to undertake the work on installing the water line with our partners at DEC.

So in 1999, we formally concurred on DEC's water line portion of the remedy. Later, a few years later, we concurred on the source control part of their remedy and that was the soil and the bedrock components. But we also decided that we needed to go a little further, and we felt a further remedial investigation and feasibility study would be necessary to look at the rest of the

groundwater plume in the area.

So by 2003, the water line was constructed, and that's currently providing about 70 affected residents with clean water. Now, this is just a little chart to show you about the Superfund remedy process. So we took it over. We took responsibility over from DEC, and most of our time has been spent here in the remedial investigation, risk assessment, and feasibility study squares, which we'll talk about.

So in order to get the work implemented and to get our remedial investigation and feasibility study underway, EPA negotiated with the potentially responsible party, who is the Lehigh Valley Railroad Company, to perform the work.

And during the RI/FS process, the railroad investigated the nature and extent of the contamination at the site, and that includes the groundwater, soil, bedrock, surface water, and also the vapors that were coming into homes that were located over the plume.

EPA then worked with Lehigh Valley

Railroad, and we issued them what we call a friendly order for them to initiate the work on the soil. So we were all in agreement on trying a certain technology called soil vapor extraction in the source area, which we tried for about two years with some moderate success, but we knew it wasn't going to meet the final cleanup standards. So we stopped that process in 2017.

So while all this was going on, Lehigh Valley also initiated a pretty extensive vapor intrusion study in the area. And afterwards, after all the dust settled on all the sampling. About 12 homes do have vapor mitigation systems, and that's really to protect the residents in those homes from inhaling any of the TCE vapor.

We did finally get to the point where the remedial investigation under EPA's jurisdiction was finalized at the end of 2014. And after that, there was a lot of discussion on is there any way that we can really restore groundwater here, and what are we going to do with the TCE contamination in the bedrock?

We have a very complicated site, hydro-

geologically speaking. So these were extensive and difficult and a lot of dialog with all of the stakeholders involved in this.

By June of 2019, the railroad did submit a draft feasibility study, and that was to evaluate the different remedial alternatives for the site. A final FS was just approved this summer, and so this is where we're then going to talk about our remedial project manager, Maria Jon, is going to come up and talk about what we found during the remedial investigation and then go into the feasibility study, the alternatives we looked at, and then what we feel is the appropriate remedy for the site. And so, Maria.

MS. JON: Thank you, Marla. Hi. So based on the results of the remedial investigation, TCE was detected in groundwater, soil vapor, soil in the spill zone, in the bedrock, and in section of Mud Creek surface water.

This figure illustrates the study area, which includes the ten-acre portion of the spill zone. And the plume of groundwater

contamination emanating from the spill area to -- from the spill area, which is this this section here, emanating contamination and moving eastward down to Spring Creek.

So the remedial investigation conclusions. The area we found an area impacted by TCE in the groundwater. We also found evidence of TCE contamination within the primary pore spaces of the bedrock. This is referred to as the matrix diffusion.

The TCE mass is in the bed - is in the rock pore spaces and in microfractures throughout the footprint of the plume. We also found TCE vapors from the contaminated groundwater that had affected homes above the plume.

Furthermore, TCE was detected in surface water in Mud Creek, located -- which is located hydraulically downgradient from the spill zone, including the waterfall and downstream of the waterfall at up to 440 micrograms per liter, which exceeds the New York State DEC class C surface water quality standard of 40 micrograms per liter.

We also found soil contamination in the

spill zone area a concentrations of up to 460 micrograms per kilogram exceeding the New York State DEC soil cleanup objectives. Contamination remains in the unsaturated soil in the spill zone in the bedrock in nearby surface water and the groundwater.

Site clean-ups may be divided into phases or operable units to prioritize and accelerate the selection of a remedy. For the Lehigh Valley site, EPA designated two operable units.

Operable Unit 1 includes alternate water supply for homes impacted by the groundwater contamination. This component of OU1 was -- has been completed. The OU1 plan also includes soil treatment within the spill zone, which also has been completed, and the bedrock source area treatment, which has not been implemented.

Operable Unit 2 includes the groundwater, the four-mile plume contaminated with TCE, soil vapor intrusion into homes, soil which are remaining in the spill zone after treatment which has not successfully removed most of the TCE in the soil, as well

as contaminated groundwater discharging to surface water.

Baseline risk assessment. Ula is going to talk about the risk assessment.

MS. KINAHAN: All right. So a baseline risk assessment is the analysis of the potential adverse human health and ecological effects of releases of hazardous substances from a site if no actions to mitigate such releases are taken under both current and future land and groundwater uses.

A baseline risk assessment is conducted during the remedial investigation phase of the site, and it consists of a human health risk assessment and an ecological screening level ecological risk assessment. It provides the basis for taking an action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action.

This slide summarizes the conclusions of the baseline risk assessment per media. On top is the human health risk assessment conclusions, and on the bottom is the screening level ecological risk assessment conclusions. All media at the site, including

groundwater, soil, sediment, and surface water, were evaluated for both human health and ecological risk. Both cancer and non-cancer effects were evaluated. And this slide only presents the risks that exceeded EPA's benchmark values.

So for the human health risk assessment, exposure to TCE contaminated groundwater via potable uses resulted in unacceptable cancer risk and non-cancer hazard. Exposure to TCE and soil poses an unacceptable non-cancer hazard. Further exposure via swimming in Mud Creek poses an unacceptable non-cancer hazard.

Furthermore, the vapor intrusion pathway was evaluated in the risk assessment, and it was concluded that the potential for subsurface vapor intrusion into indoor air exists.

The screening level ecological risk assessment conclusions were that there is potential for risk to ecological receptors if the stone cover that is part of the soil vapor extraction system is removed. So currently there is a soil vapor extraction system that

is still in place, and it provides a barrier to the contamination below the cap. And next I will give it back to Maria for the remedial action objectives.

MS. JON: Thank you. Remedial action objectives, RAOs, by media. RAOs are remedial action objectives that are the specific goals identified during the base risk assessment to protect human health and the environment. The RAOs for groundwater is -- well, in this case, in this particular case for the site, EPA recognizes that it may not be possible to restore groundwater to its designated beneficial -- beneficial use in some cases.

In situations where from an engineering perspective, it is not possible to restore all or part of the groundwater plume, EPA may waive the applicable or relevant and appropriate requirements, ARARs, and establish alternative protective remedial strategies.

The RAOs from the groundwater are prevent current and human exposure via ingestion, inhalation, and dermal contact to site related contaminants in groundwater that exceeds the federal MCLs and the state

groundwater standards.

Prevent -- prevent further migration of site-related contaminants in groundwater levels exceeding the maximum contaminant levels beyond the delineated area extent of the groundwater and contamination of the groundwater contamination, and to prevent the the migration of site-related contaminants in groundwater to surface water that would result in exceeding applicable surface water quality standards.

For soil vapor intrusion to mitigate potential current and future unacceptable risks from subsurface soil vapor intrusion into indoor air.

Remedial action objectives for the bedrock vadose zone is to mitigate, to the extent practicable, the bedrock vadose zone as an ongoing source of groundwater contamination, accelerate long-term improvement to the groundwater in a reasonable time frame, and to support further risk reduction for the site as a whole.

For soil to prevent human exposure to contaminated spill zone soil via incidental

ingestion and inhalation above levels that pose an unacceptable risk for commercial commercial use.

RAOs for surface waters is to prevent unacceptable risk to human receptors from incidental ingestion and dermal contact exposure to contaminated surface and seep water in Mud Creek area by reducing contaminant levels to the most stringent federal and state standards.

Based on these RAOs, EPA developed cleanup levels for various media, which are referred to as preliminary remediation goals or PRGs.

Clean-up options that were evaluated in the -- in the FS for each environmental media. And we also develop common elements for each of the alternatives except for the no-action alternative.

Common elements include institutional controls, monitoring of the groundwater, surface water, soil vapor and indoor air, maintenance of existing soil vapor, intrusion mitigation systems, and installation of new systems as needed for impacted properties, and

connection of new homes constructed over the groundwater plume to the municipal water supply system, or the provision of a point of entry treatment system if connection to the municipal system is not feasible.

Alternative for groundwater and soil. For groundwater, EPA has determined that restoration of groundwater to beneficial uses is technically impracticable. Therefore, EPA proposes a technical impracticability waiver for the federal and state drinking water and groundwater standards.

EPA remedial strategy, which however, will address exposure control, source control, and aqueous plume migration control.

For soil vapor, the existing sub-slab depressurization systems will be inspected, maintained, and new system will be installed on new homes as needed.

The cost for the institutional controls, for the groundwater, as well as for the soil vapor monitoring and maintenance are presented on this table, and the costs are estimated for a 30-year operational and maintenance period.

Alternatives for bedrock vadose zone. The NCP requires that a no-action alternative be developed and considered as a baseline for comparing other remedial alternatives. For the no-action alternative, contamination will remain in place and there is no cost associated with the no-action alternative.

So for the bedrock vadose Zone, alternatives -- four alternatives were evaluated in the feasibility study. Number one, no action. Number two, monitoring and institutional controls with the groundwater TI waiver. The third alternative for vapor bedrock vadose zone is vapor extraction in a ten-acre portion of the bedrock vapor zone with institutional controls and monitoring, which is -- this is the remedial, the cleanup that -- that was established in the New York State DEC OU1 record of decision.

Alternative 3B, which is vapor extraction in a two-acre portion of the vapor vadose zone with institutional controls and monitoring. The column on the right-hand side are the costs associated for each of these remedial alternatives presented in the FS for

the bedrock vadose zone.

For these media, EPA prefers alternative number two, which is monitoring and institutional controls. The preferred alternative is highlighted here in green. Thank you.

Alternative for soil. The FS evaluate four alternatives to address the contaminated soil. One, the no-action. Number two, ex situation solidification/stabilization. Number three, excavation and offsite disposal. Number four, ex situation ow temperature thermal desorption treatment.

So for the soil remedies, EPA preferred alternative is number three, excavation and offsite disposal. And the costs associated for each of these alternatives are presented on the right-hand side right here. These are the total costs for each of the remedial alternatives for the soil remedies.

Alternative for surface water. The FS evaluated five alternatives to address contamination in surface water. No action. Number two, institutional controls and monitoring. Number three, hydraulic

containment of groundwater to prevent discharges to surface water with institutional controls and monitoring. Number four, stream cover with institutional controls and monitoring. And number five, in situ treatment of contaminated groundwater prior to discharge to surface water with a stream bed cover, institutional controls and monitoring.

EPA's preferred alternative is Alternative five, in situ treatment of contaminated groundwater prior to discharge to Surface water with stream bed cover, institutional controls and monitoring with the estimated cost of $7.3 million.

EPA is also proposing to amend the OU1 record of decision by eliminating the bedrock surface area treatment -- source area treatment excuse me, eliminating the soil treatment in the spill zone, updating the TCE surface water standard from the original cleanup goal of 11 micrograms per liter to the current New York State standard of 40 micrograms per liter.

Also addressing the soil contamination beneath Gulf Road by implementing

institutional controls to restrict access and to require proper soil management management if the road bed is disturbed in the future.

We are also proposing to update the remedial action objectives by media to recognize the proposed waiver for the federal and state drinking water and groundwater standards at the site because the technical impracticability of achieving the standards.

EPA uses nine criteria for the analysis of alternatives. They are overall protection of human health; compliance with applicable or relevant and appropriate requirements, ARARs; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume of contaminant through treatment; short term effectiveness; implementability; cost; state acceptance of the remedy; and the community acceptance of the remedy or the proposed remedy.

So this slide presents a summary of EPA's preferred remedy. For the groundwater, the four-mile plume, a combination of monitoring and institutional controls while invoking a technical impracticability waiver

for specific chemicals in -- for the groundwater standards in the TI zone.

For bedrock groundwater monitoring and institutional controls. For soil excavation and offsite disposal. For surface water in-situ treatment of contaminated surface water with a stream bed cover, institutional controls, and monitoring .

Plus the common elements, which are institutional controls, long term monitoring of groundwater, surface water, soil vapor, and indoor air maintenance of the existing sub-slab, depressurization systems, and installation of new systems are as needed. And connection to the water -- to the municipal water supply for new construction over the groundwater plume or installation of a point of entry treatment systems.

All areas that will be impacted by the remedy will be restored to the extent that is applicable or feasible.

In summary, this slide presents the components of the EPA, the EPA preferred remedy and the associated costs for each media, and the total estimated cost is for the

entire -- for all the preferred remedies for each environmental media is approximately $14 million.

EPA's preferred alternative. EPA believes the preferred alternative most effectively meets the nine criteria evaluation -- the nine evaluation criteria.

Reduces risk to human health and the environment; complies with applicable, relevant and appropriate requirements for all media except for where ARARs are waived; minimizes impact of remedial activities on the community; uses permanent solutions; satisfy the preference for treatment; and is cost effective.

So we are current here in the proposed plan stage of the superfund remedial process. And this concludes my presentation. So any questions, please?

MR. BASILE: Thank you, Maria, Marla, and Ula. We'll now go into the question and answer period. If you have a question, please raise your hand. And again, I remind you, I'll come forth with a portable microphone. Just ask you to state your name and address

and spell it for the record. Are there any questions?

MR. MOWRY: My name is William Mowry. I live at 9290 York Road in Leroy. M-O-W-R-Y. And my personal opinion, this has been going on since 1970. I don't know of anybody that has been deathly struck and ill with anything from this spill.

We have a well that is in this aquifer that is affected by this. We've had the water tested, and there's no sign of TCE in the water. And I think this is an absolute waste of money, taxpayers' money. And I just can't believe that people would go to this extent for something that's been there for 55 years or 53 years now and has had no effects on the people.

And I'd hate to think of how many million dollars they've already spent trying to remedy this, and apparently have gotten nowhere because they're going back to doing this.

So I think it's just creating work for some people. And -- and I don't understand one other part of this. When you're going to

remove the soil from the contaminated zone and take it off site, aren't you just moving it to another site? If it's contaminated, it's going to stay contaminated and pose risk to wherever you're moving this.

MR. BASILE: Thank you, sir.

MS. WIEDER: Maybe the team should kind of come up here and your your questions and comments were good. Just trying to make sure we cover all of them. You had a few mixed in there.

First of all, I'm glad that you don't have any exposure scenarios going on where you live. That, first of all, is really important. And what I think was really important for this site was when we came on and when DEC came on and DOH came on, you know, our first -- the first thing that we have to do is look around for exposure and figure out how we can mitigate that.

And so, you know, first it was providing bottled water to people who were affected, and then it was doing a lot of sampling. And then it was also about working with our partners at the state to not only get

the money and get the plans and get the water line implemented so the homes that were affected by the contamination could be hooked up and they wouldn't be exposed anymore.

And then there was also a pretty extensive study done for the vapor issue. So some people who were living above the plume -- and now it's like about four acres and about how -- I'm sorry, about four miles and about a mile and a half wide. So it's a pretty good sized plume.

So we had to make sure that those people weren't breathing in the TCE that vaporized and unfortunately was in their homes. So that's why we do have a series of these mitigation systems that operate in their homes. And I don't know if you either of you want to address a little bit more about the the risk issues.

MS. KINAHAN: I think you covered it really well. When we first come in, and that includes EPA and the state, the first thing we do is make sure that there is no exposure. So that's why those point of entry systems were put on. People were connected to the public

water supply, People were put on bottled water initially. So that is always the first thing or EPA or DEC do. So I think you spoke about that and that was a good point.

For the excavation, once the excavation and offsite disposal to facility that is properly permitted and they have the proper lining, all the things that you need to store that waste. So it is taking it from here and moving it somewhere else. But it's a safer place where it won't be leaking into the ground or, you know, exposure to overlying buildings.

MS. WIEDER: Right. Right.

MS. JON: So let me -- let me add to a little more about the contaminated soil.

MR. MOWRY: (Inaudible).

MS. JON: Well, the contaminated soil that will be excavated will be transported to a treatment and disposal facility that have a -- they have the authority to manage and treat the soil before they place the treated soil in the landfill.

There are there are commercial facilities out there that can manage the type

of soil that can treat it and can properly dispose of those -- of the treated soil on their own facility.

And that's why we are proposing for the soil to do X -- to excavate and properly dispose of them to a permitted disposal facility.

MR. MOWRY: (Inaudible).

MS. JON: Well, for VOCs, there are different ways of treating it. They could they could use low -- low temperature thermal treatment unit to reduce the concentrations of TCE, or they could also mix it with Portland cement to solidify the soil and the -- and the TCE and then dispose of it properly.

It -- all those options that are out there to dispose and treat the -- the soil will be evaluated once the -- the -- the company, the PRPs, are -- prepares a design for the -- for the remedy. That's one of the stages of the -- the superfund process.

We select the proposed remedy. So right now we're here on the proposed plan. After we issue a final plan, a final cleanup plan, the responsible party will then prepare

a design document for the remedy. Then they will prepare -- and the design document, they will specify what they are going -- there -- how they're going to comply with the remedy, how are they going to build a treatment system, how and what -- what is going to include in the design, what levels they are required to meet, what cleanup standards they are required to meet.

Then once the design is approved, then they put together what they call a remedial action plan, which is -- which indicates how they're going to implement the design of the remedy.

Once it's completed. Then they go out in the field and start construction of the remedy. And once the construction is completed, then we go into the monitoring maintenance stage of the remedy.

MR. BASILE: Thank you, Maria. Any other questions? Another question. Any questions?

MALE VOICE: (Inaudible).

MS. WIEDER: Yeah, that's -- that's an excellent point.

MALE VOICE: Maybe you can make clear who's paying for the remedy. Just to address that gentleman's question.

MS. WIEDER: Well, hopefully the responsible party, Lehigh Valley Railroad Company, will be paying for the remedy. But that's something after we actually release the record of decision, we'll be going back to them and continuing our dialogue, and hopefully that's where we'll end up.

And -- and, sir, to your point, as well, I mean, I think what I'm hearing you saying, too, is that -- and -- and I think what's reflected in our decision making and our dialogue on all this is it's really a balancing test.

I mean, it's clear that, you know, we're not going to be able to get 100 percent of the contamination. And so we have to go back and examine the different remedial alternatives for each of the impacted media and see how can we do our best and and it's all a balancing test with the nine criteria that Maria had listed here to see which of these we can put together to really make a --

a remedy that's going to be effective in reaching the remedial goals.

MR. BASILE: Are there any other questions from the audience? Are there any other questions? Wait, wait, wait, wait. Coming, coming, coming. No, they can't hear you, sir. Sorry. You think they can hear you, but they can't hear you. Okay.

MR. MOWRY: I have a big mouth.

MR. BASILE: Last question.

MR. MOWRY: You understand that it took you 30 years to take care of the drinking water by putting a water line in. That was the most imminent danger to -- to the public. And it was 29 years before public water was offered to these houses.

MS. WIEDER: Well, a -- on the water line issue, remember, there was the spill in 1970. There was some immediate efforts that went into trying to figure out how do we deal with it. And at that time, it was, you know, digging ditches, flushing the contamination.

And unfortunately, as we know now, that flushes it into being a groundwater plume. So at the time, there was a lot of -- a lot of

sampling done. People were provided bottled water for a while by EPA. Then people were put on filters for a while.

And it wasn't until the state went back in the early '90s and did some sampling that they did find those homes that unfortunately by that time, you know, you were seeing levels higher than the recommended drinking water standards.

And at that point is when the state started in earnest their study of how do we get a handle on this? And then we went through the process of eventually getting to the water line. And remember, the water line was very expensive. I believe it was -- cost us over $8 million.

So it was very important that when the state came to EPA to see if the site would possibly list on our national priorities list, and if it would, that would give us the option of making the superfund money available to fund this.

And one of the tenets of our program is, you know, it's about cleaning up the site first and then going after a responsible party

for cost recovery second.

So it was our priority to, you know, get the site listed, get the money available, get the design going. Unfortunately, it doesn't happen overnight. Everybody's like, well, you throw in a water line. It's a little more complicated than that. But everybody was moving as fast as they could to get to design and construction.

So, you know, that's kind of the long and the short of it. But, you know, I understand what you're saying, but that was the process to get us to the 2003 water line.

MR. BASILE: Any other questions? Are there any other questions from anyone in the audience?

MS. WIEDER: I think he has some more. Oh.

MR. MOWRY: (Inaudible) file bankruptcy (inaudible).

MS. WIEDER: Well, that's a good point. They filed bankruptcy many years ago.

MR. MOWRY: It'll all come back -- it'll all come back onto the taxpayers. And the superfund money isn't money that falls out

of the sky.

MS. WIEDER: It is not. That's true.

MR. MOWRY: So I happen to own a business, and I pay substantial taxes. So I like my tax money spent properly. And I don't consider this, 53 years later, the proper use of $14 million when they've -- they aren't going to get it. They understand they aren't going to get any money back because the company is bankrupt.

MS. WIEDER: Well -- well, here's -- here's the thing. And I can tell you this because I'm the attorney on the site. Lehigh Valley Railroad, There has been two different bankruptcies. I believe it was in -- you know, I can't remember the dates exactly, but there was the Rail Reorganization Act and then there was also a bankruptcy by Lehigh Valley Railroad.

And EPA, you know, based upon federal law, you know, we can pursue claims against the responsible party even through bankruptcy in certain cases. And this was the case here.

So that's why we are at the table with Lehigh Valley Railroad. That's why they've

been involved in the site and under two different orders with us. And hopefully they will cooperate going forward and work with us to implement it.

And there's also a cost recovery component, too, because, you know, for EPA, you know, the main thing is to prevent exposure to people and to clean up the site. And our second priority is to get the money back. Exactly. The taxpayer money back from the people who are responsible for the contamination.

And that's what we've done here. We've moved forward with our money when we needed to, when we needed to get things going with the water line. But we do have a tab going, let's say, with Lehigh Valley Railroad, and they have been doing a lot of this work for the last since EPA's been involved with it and the EPA has been involved, you know, as essentially lead agency for the last 25 years.

They've been working with us. They have done a lot of work and study. And we're hopeful going forward that we're going to reach an agreement with them for them to

implement the work on their dime and then to reimburse EPA for its oversight costs so that the taxpayers, like yourself and everybody here, including me, are not paying for this.

MR. BASILE: Any other questions? Are there any other questions? If there aren't any other questions, I, on behalf of EPA and the state, would like to thank you for attending.

And again, a reminder that we do have two repositories set up in your community -- the Woodward Memorial Library and the Caledonia Public Library. And once again, September 18th is the deadline for comments. So if you think of something after you leave here, please feel free to use the agenda to email your comments to EPA by September 18th.

And I thank you for your interest in coming this evening. Hope you have a wonderful holiday weekend, and enjoy the rest of your summer. Thank you very much. We'll be here for a while to answer any questions. Thank you.

(End of Audio Recording.)

CERTIFICATE

I, Wendy Sawyer, do hereby certify that I was authorized to and transcribed the foregoing recorded proceedings, and that the transcript is a true record, to the best of my ability.

DATED this 14th day of September, 2023.

WENDY SAWYER, CDLT

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ATTACHMENT D

WRITTEN COMMENTS

Unicorn Management Consultants, LLC

Memorandum

Date: **9-12-2023**

To: **M. Hill, Esq.**

From: **F. Trejo and A. Leonard**

RE: **Timely submittal of comments, during the public comment period that ends on September 18, 2023, for the Superfund Proposed Plan for the Lehigh Valley Railroad Derailment Superfund Site, located in LeRoy, New York**

Unicorn Management Consultants, LLC (UMC), on behalf of the Lehigh Valley Railroad Company (LVRR), has carefully reviewed and considered the United Stated Environmental Protection Agency's (USEPA) Superfund Proposed Plan for the Lehigh Valley Railroad Derailment Superfund Site, located in LeRoy, New York (Proposed Plan). In general, UMC is in agreement with the USEPA Proposed Plan; however, UMC respectfully requests the USEPA to consider the following questions and comments related to the General Proposed Plan and Preferred Surface Water Remedy.

1. The cost to implement the USEPA's Preferred Remedy ($14,082,504) is unreasonable when considering the incomplete risk pathways to human health and the environment after the installation of the waterline, vapor intrusion mitigation systems, proposed institutional controls (ICs) and monitoring.

2. The Preferred Surface Water Remedy ($7,305,550) proposes the implementation of in-situ treatment of contaminated surface water with streambed cover, ICs, and monitoring. The Site remedial investigations, conceptual Site model, and feasibility study identify the technical impracticability challenges with in-situ treatment of surface water with or without a streambed cover. These challenges include but are not limited to:

    a. It is unlikely that the in-situ treatment can be effectively dispersed or emplaced within the fractured bedrock media underneath Mud Creek which acts as a continuing source of TCE to the groundwater and surface water within the Study Area and Mud Creek Area of Interest. To implement a surface water in-situ technology would require extensive knowledge of the fracture networks and connectivity of the seep areas which has been determined to be technically impractical when evaluating remedial options for other media. Even with extensive fracture network knowledge, successful implementation of in-situ technologies may not be possible or at best may require trial-and-error installations that may inadvertently cause new contaminated seeps. Regardless, the in-situ technology will not address the TCE source (bedrock microfractures and pore spaces) to surface water.

    b. Fouling of in-situ treatment points, associated fractures, and seeps may occur and can result in the inadvertent daylighting of contaminated groundwater at previously uncontaminated seep locations following a path

of least resistance. Also, the treatments for fouling typically use acidic solutions to dissolve precipitates. The applications of these fouling treatments may negatively alter surface water characteristics.

c. It will be challenging to achieve remediation goals if the location, orientation, and hydraulic conductivity of the fractures and other subsurface flow paths that may be contributing to the flows and seeps are technically impracticable to identify. Also, it will be challenging to achieve remediation goals if the water flow is too high/turbulent to allow for appropriate contact time with media.

d. The routine maintenance and repair of the in-situ technology beneath or within proximity to the streambed cover could prove challenging especially during precipitation and/or flooding events that occur in the vicinity and upgradient/upstream of the Mud Creek Area of Interest.

e. The preferred surface water remedy would include the clearing of vegetation and trees, construction of access roads, installation of in-situ treatment infrastructure and other support structures within and in the vicinity of the streambed, excavation of the streambed associated with the in-situ treatment, establishment of power source and backup power source, etc.

f. TCE data from surface water samples that have been collected at various locations along Mud Creek show a 50% decrease in TCE concentrations after only flowing 200 feet along the creek bed (Mudcreek-03 to Mudcreek-02). These data and observations suggest that the surface water flowing along the streambed of Mud Creek is subjected to natural degradation processes that likely include aeration, volatilization, and/or dilution. Turbulent flow along the streambed has been observed due to the presence of rocks in the streambed that create obstacles to the natural flow of surface water which promotes volatilization and likely accounts for the significant reduction of TCE in downstream surface water samples from the Mud Creek Falls to below 40 µg/L (remedial goal) at the southern inlet to Mud Creek Pond. The streambed cover alone could help to enhance the natural process by creating more obstacles for surface water flow while minimizing changes to the chemistry of Mud Creek and maintaining a low carbon footprint over time.

g. A pre-remedial design investigation will not change the fact that it is technically impractical to obtain extensive knowledge of the fracture networks and connectivity of the seep areas with current technology or to anticipate precipitation events within the areas contributing to the fluxes of allogenic water into the Mud Creek area of interest (approximately 484 million gallons per month).

UMC respectfully requests the USEPA to review the above comments and consider the Surface Water Alternative 4, Streambed cover with ICs and monitoring, as the preferred USEPA surface water remedy.

From: Basile, Michael
To: Duda, Damian; Wieder, Marla; Jon, Maria
Subject: Fwd: Lehigh Valley Railroad Derailment Superfund Site
Date: Tuesday, August 29, 2023 5:08:34 PM

FYI

Thanks Mike

Begin forwarded message:

> **From:** "Swierkos, John (The Dolomite Group)" <jswierkosjr@dolomitegroup.com>
> **Date:** August 29, 2023 at 3:10:24 PM EDT
> **To:** "Basile, Michael" <Basile.Michael@epa.gov>
> **Cc:** "Haley, Thomas P (DEC) (thomas.haley@dec.ny.gov)" <thomas.haley@dec.ny.gov>, jeffrey slade <jslade@continentalplacer.com>
> **Subject: Lehigh Valley Railroad Derailment Superfund Site**
>
> Good afternoon Mr. Basile,
>
> I just found out about the public meeting and I'm unable to attend. I wanted to bring it to your attention that Dolomite Products Company Inc. was never allowed the opportunity to connect to the water line the DEC installed in 2003. We are the second closest to the spill site and yet have no potable water. Question would be why did the connection not happen? I'm still reviewing the proposal plan, I may forward other comments if any. Thank you for your attention to this detail.
>
> Regards,
>
> John Swierkos Jr. PG
> Geologist & Environmental Coordinator
>
> The Dolomite Group
> A CRH Company
> 800 Parker Hill Drive, Suite 400
> Rochester, NY 14625
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>
> www.dolomitegroup.com

From: FOIA Exemption 6
To: Jon, Maria
Subject: Gulf road/TCE clean up
Date: Tuesday, August 29, 2023 12:56:35 PM

Good afternoon -
I grew up a FOIA Exemption 6 and I am familiar with the spill, and migration of TCE over the years (And played in the creek etc, but that was prior to any known high concentrations 70's and 80's). I was just reading the announcement about the town meeting and the importance of proper soil management. My mother is still on FOIA Exemption 6 FOIA Exemptio nd recently noticed that dirt next to the spill is being disturbed. She is concerned that the person who lives across from the site is moving dirt to his property. Are you or someone from your team able to investigate, or is this part of the EPA/NYS DEC plans? We could like our names to be kept private in case of an investigation of a neighbor. I am unfortunately unable to go to the town meeting tonight, but I did start perusing the larger document online.

Thank you for your time.

Sincerely,

FOIA Exemption 6

Sent from my iPhone