



GEORGE E. WAHLEN  
DEPARTMENT OF VETERANS AFFAIRS MEDICAL  
CENTER  
VA Salt Lake City Health Care System  
500 Foothill Drive  
Salt Lake City, UT 84148

## ACTION MEMORANDUM

**DATE:** 20 October 2016  
**SUBJECT:** Action Memorandum for Residence 0040-H within Accelerated Operable Unit 1: East Side Springs 700 South 1600 East PCE Plume, Salt Lake City, Utah  
**FROM:** D. Lynne Welsh, CERCLA Program Manager  
Department of Veterans Affairs *SM*  
**TO:** Vera Moritz, Remedial Project Manager  
U.S. Environmental Protection Agency, Region 8  
Tom Daniels, Project Manager  
Utah Department of Environmental Quality  
**Site ID #** UTD981548985

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### 1. Purpose

The purpose of this Action Memorandum (AM) is to request regulatory consultation and document the decision to initiate a time-critical removal action for the Residence 0040-H within Accelerated Operable Unit 1 (AOU-1) East Side Springs (ESS) area of the 700 South 1600 East Tetrachloroethene (PCE) Plume Site, Salt Lake City, Utah. This time-critical removal action involves the installation of a vapor intrusion mitigation system to mitigate the PCE vapors entering Residence 0040-H from the PCE-impacted springs and shallow groundwater at the property. This removal action involves no nationally-significant or precedent-setting issues. Conditions existing at the Site present a threat to the public health (inhabitants of the residence) and meet the criteria for initiating a removal action under 40 CFR 300.415(b)(2) and the approved Site decision matrix indicating when indoor air (IA) concentrations exceed action levels that warrant mitigation (First Environment, Inc. [FE] 2015, Appendix F).

### 2. Site Conditions and Background

|                                    |                                    |
|------------------------------------|------------------------------------|
| Superfund Site Name:               | 700 South 1600 East PCE Plume Site |
| Accelerated Operable Unit:         | AOU-1                              |
| Specific Residence Identification: | 0040-H                             |
| CERCLIS Number:                    | UTD981548985                       |
| Site Location:                     | Salt Lake City, Utah               |
| Potentially Responsible Party:     | Department of Veterans Affairs     |
| NPL Status:                        | Final                              |
| Removal Start Date:                | 7 November 2016                    |

The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) identification number for the 700 South 1600 East PCE Plume Site and National Priorities List (NPL) status pertains to the groundwater plume site and is not specific to Residence 0040-H addressed in this AM.

## 2.1 Site Description

### 2.1.1 Removal Site Evaluation

The George E. Wahlen Department of Veterans Affairs Medical Center (VAMC) was constructed beginning in the late 1940s on property that was formerly part of Fort Douglas (U.S. Army) military reservation. A dry cleaning facility was operational on the VAMC property from approximately 1976 through 1984. A single dry cleaning machine was installed and operated on a part-time basis. The system was a “closed loop” system, meaning the system contained a distillation process for the recovery of PCE at the end of each cycle. The condensate from the distillation process was emptied into a vitrified clay drain line attached to the sanitary sewer. This method of disposal was common practice in the 1980s (U.S. Environmental Protection Agency [EPA] 2012).

The drain line has been identified by EPA as a potential source for the PCE plume. During routine cleaning of the sanitary sewer line near VAMC Building 7 in the early 1980s, employees of the Salt Lake City Department of Public Utilities (SLCDPU) documented discolored water and odors of dry cleaning solvent (EPA 2012).

In 1990, during routine monitoring of the Mt. Olivet Cemetery irrigation well conducted by SLCDPU, PCE was identified in groundwater at the irrigation well. The irrigation well is located hydraulically down gradient from the VAMC property. The concentration of PCE in groundwater from the Mt. Olivet Cemetery irrigation well was 32 micrograms per liter at that time.

EPA and Utah Department of Environmental Quality (UDEQ) concluded that PCE originating from the VAMC is the likely source of PCE contamination in groundwater and has designated the plume the 700 South 1600 East PCE Plume. The Department of Veterans Affairs (VA) has been named as a potentially responsible party (PRP). Based on the results of their investigation, EPA and UDEQ determined that the contaminated groundwater plume has likely extended as far west as 1100 East. Taking historically detected PCE concentrations into account, UDEQ has suggested an elliptical groundwater plume that is oriented in a northeast-southwest direction with an origin immediately to the west of the VAMC. The contaminated groundwater daylights as seeps and springs in the ESS area and terminates west of the ESS area as shown on Figure 1 (UDEQ 2012). The conceptual site model is being refined as part of the ongoing remedial investigation (RI).

In 2013, VA began the RI process for the 700 South 1600 East PCE Plume. Because the ESS area had the highest potential for exposure to PCE due to vapor intrusion from shallow groundwater, the investigation of this area was accelerated and groundwater containing PCE within 50 feet (ft) of the ground surface within the ESS area was designated AOU-1. The RI field work was split into two field seasons. Season one, completed in 2015, included sampling of 36 inhabited structures including 30 private residences, four schools, a church, and an elderly care facility within AOU-1 for indoor air, outdoor air, and near-slab soil gas to evaluate if PCE was entering the residences through the subsurface to indoor air vapor intrusion (VI) pathway. The VI screening protocol, consisting of on-site analyses of IA using a portable HAPSITE<sup>®</sup> gas chromatograph/mass spectrometer (GC/MS). These analyses were performed under normal, ambient building conditions and also while pressurizing and depressurizing the indoor air relative to air and soil gas exterior to the structure. The on-site field analysis was followed by TO-15 laboratory analysis as warranted per the screening protocol. Risk-based IA screening levels (SLs) and removal action levels (RALs) were developed (FE 2015). IA samples were analyzed for PCE and PCE degradation products including trichloroethene (TCE), cis-1,2-dichloroethene and vinyl chloride. The air samples were also analyzed for 1,4-dioxane at the request of EPA.

Residential indoor air SLs developed in the Screening Action Memo (SAM) correspond to the lower of either the target carcinogenic risk level of 1 in 1 million ( $1 \times 10^{-6}$ ) excess lifetime cancer risk or a target non-cancer hazard quotient (HQ) of 1. Tier 1 RALs correspond to the lower of a target carcinogenic risk level of 1 in 100,000 ( $1 \times 10^{-5}$ ) excess lifetime cancer risk or a target non-cancer HQ of 1. Tier 2 RALs correspond to the lower of either the target carcinogenic risk level of 1 in 10,000 ( $1 \times 10^{-4}$ ) excess lifetime cancer risk or a target non-cancer HQ of 3. For PCE and TCE, the non-carcinogenic end point represented the lower value and was therefore identified as the Tier 1 RAL.

The second field season of the AOU-1 RI included seep, spring, surface water, groundwater, and soil sampling as well as additional soil gas and IA sampling. The IA sampling was initiated in December 2015 and occurred from December 2015 to May 2016. The VI screening protocol was also used during this phase of the AOU-1 RI, and was performed at 16 residences and one school within AOU-1, including 0040-H (Figure 1). Based on HAPSITE® results, 9 of those 17 locations were identified for IA sample collection and analysis using SUMMA® canisters and TO-15 laboratory analysis (Table 1). Within three residences including 0040-H, PCE was detected above the SL based on TO-15 laboratory results. Two of the residences exhibited concentrations above the IA SL of 11 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ), but below the IA Tier 1 RAL of  $41 \mu\text{g}/\text{m}^3$ . Since these two residences did not exceed the IA Tier 1 RAL, they are not addressed as part of this AM; however, cracks observed in the foundations and basements of these homes are being sealed by VA. Of the three residences, 0040-H exhibited the highest PCE concentrations, exceeding the RAL for PCE in both the kitchen and basement samples with reported concentrations of  $59 \mu\text{g}/\text{m}^3$  and  $74 \mu\text{g}/\text{m}^3$ , respectively. A duplicate basement sample was collected that had a concentration of  $78 \mu\text{g}/\text{m}^3$ . J-qualified values signify estimated data values based on data validation and are still usable to achieve project objectives. The residential IA Tier 1 RAL is  $41 \mu\text{g}/\text{m}^3$ . Based on the off-site laboratory IA TO-15 results, residence 0040-H is being considered in this action memorandum for a time-critical removal action.

### 2.1.2 Physical Location

Residence 0040-H is located within a PCE plume that is thought to be the western extent of the 700 South 1600 East PCE Plume. The Plume is located within the Salt Lake City Alluvial basin near the Wasatch Mountain front. The Salt Lake City Alluvial basin is bounded to east by the Wasatch Fault and a seismically independent segment of the Wasatch fault called East Bench Segment Fault. A drop in surface elevation due the Wasatch fault scarp has resulted the development of seeps and springs from groundwater daylighting between 800 South and Michigan Avenue (approximately 1300 South) and between 1000 East and 1300 East. This area is within the ESS area. The focus area for vapor intrusion (VI) lies within the ESS (Figure 1). Residence 0040-H is located in the central portion of the ESS area, south of 900 South and east of 1200 East (Figure 1).

The Salt Lake City Alluvial basin-fill deposits consist of unconsolidated to semi-consolidated Tertiary-age deposits overlain by unconsolidated Quaternary deposits. Groundwater in the area can be separated into four zones: localized, unconfined perched aquifers; a deep unconfined aquifer lying between the deep artesian aquifer and the mountains; a shallow aquifer over laying the artesian aquifer; and the deep artesian aquifer. The discontinuous perched aquifers transition laterally into the shallow unconfined aquifer moving west away from the mountain front. The shallow unconfined groundwater and springs within the ESS area are impacted by PCE that may be associated with the western portion of the 700 South 1600 PCE Plume and has resulted in intrusion of PCE vapors into buildings. There are two surface water bodies in the area: Red Butte Creek and Mount Olivet Reservoir.

Current land use near residence 0040-H includes single family residential properties with several schools, churches, and small businesses located along the major streets. The few commercial operations near the

residence include an auto repair shop/gasoline station (Craig's Conoco), convenience store (7-Eleven)/, and coffee shop located near the intersections of 800 South and 900 South with 1300 East.

Residences in this area were developed beginning in the 1910s with most of the houses completed by the 1940s. Homes in this area range from small brick bungalows and wood frame cottages to large multi-story homes. Some homes are built into the steep hillsides of the fault scarp. Many of the homes, both large and small, have partially to wholly below-ground basements that are finished as living spaces. The homes are closely spaced, with typical lot sizes of 0.10 to 0.15 acres.

Prior to development, the land was open fields and farm land. AOU-1 is likely to remain under similar use conditions for the foreseeable future due to the well-established, stable neighborhoods, public and private schools, and the public parklands. A review of Salt Lake City Property Tax maps indicates that current land use within the vicinity of residence 0040-H is approximately 75 percent residential, five percent commercial, 10 percent public or private schools, and the remainder is publically owned rights of way or parkland.

### 2.1.3 Site Characteristics

The 0040-H location is a privately owned residence and is situated within a westward sloping residential lot of the ESS area with visible seeps and springs located in the eastern and northern portions of the lot. The eastern portion of the lowest level of the house is below grade, and the western portion of the lowest level is partially below grade, with a partially below grade living space in the northwest corner of the lowest level and a walkout garage at grade in the southwest corner of the lowest level. The resident reported that a clay pipe traverses from east to west within the foundation to convey spring water and groundwater from the wetter eastern portion of the lot to the western portion of the lot with discharge to a small pond.

Residence 0040-H was identified by VA as having the potential of being adversely affected by the PCE plume (Figure 1) through the subsurface to indoor air VI pathway. Seeps, springs, and groundwater in this area have detections of PCE and TCE which are most likely associated with the 700 South 1600 East PCE Plume.

Indoor air sampling was conducted in March 2016 within residence 0040-H. Time-weighted TO-15 indoor air samples were taken in the basement and kitchen of the residence. Each sample was analyzed for preliminary COPCs, including those listed above. Of the compounds analyzed, only PCE and TCE exceeded the Tier I RALs of 41 and 2.1  $\mu\text{g}/\text{m}^3$ , respectively. The indoor air concentrations of PCE and TCE in the basement were 74J  $\mu\text{g}/\text{m}^3$  and 5.2  $\mu\text{g}/\text{m}^3$ , respectively. A duplicate sample was also taken in the basement, with indoor air concentrations of PCE and TCE of 78J  $\mu\text{g}/\text{m}^3$  and 5.4J  $\mu\text{g}/\text{m}^3$ , respectively. Laboratory results for the indoor air concentrations in the kitchen for PCE and TCE were 59J and 4.3  $\mu\text{g}/\text{m}^3$ , respectively. Analytical results for the indoor air sampling are summarized in Table 1. Evaluation of multiple lines of evidence suggests that vapor intrusion from shallow groundwater is a cause of the PCE and TCE detected in the indoor air at residence 0040-H.

The implementation of this AM is the only removal action conducted within AOU-1 to date. The work for the removal action is expected to begin in the first quarter of fiscal year 2017.

### 2.1.4 Release or Threatened Release into the Environment of a Hazardous Substance

The contaminants of concern at the site include chlorinated solvents, which are commonly associated with dry-cleaning facilities and processes. The Site contains elevated levels of PCE and TCE as discussed in Section 2.1.1 of this AM.

Indoor air sampling conducted in March 2016 at residence 0040-H showed PCE and TCE exceeded the Tier I RALs of 41 and 2.1  $\mu\text{g}/\text{m}^3$ , respectively. The indoor air concentrations of PCE and TCE in the basement at 0040-H were 74J  $\mu\text{g}/\text{m}^3$  and 5.2  $\mu\text{g}/\text{m}^3$ , respectively. A duplicate sample was also taken in the basement, with indoor air concentrations of PCE and TCE of 78J  $\mu\text{g}/\text{m}^3$  and 5.4J  $\mu\text{g}/\text{m}^3$ , respectively. Laboratory results for the indoor air concentrations in the kitchen for PCE and TCE were 59J and 4.3  $\mu\text{g}/\text{m}^3$ , respectively (Table 1).

A shallow groundwater plume containing PCE and TCE is the most likely source of elevated indoor air concentrations. PCE and TCE are volatile and evaporate producing vapors capable of rising through the soil and infiltrating into the above environment, which in this case includes residence 0040-H. In general, indoor residential vapor pressure is lower than vapor pressures found in soils, which encourages vapor intrusion into buildings overlying the plume. This physical process is the basis for sub-slab depressurization as a remedial action option. The rate of intrusion into a home can be influenced by seasonal heating and cooling of a home.

### 2.1.5 NPL Status

The 700 South 1600 East PCE Plume is an NPL site. In May 2013, EPA placed the site on the Superfund program's NPL. EPA has concluded that the PCE plume originated from the VAMC, and VA has been named a PRP for the PCE plume that may be contributing to the VI at residence 0040-H. Residence 0040-H is an occupied structure located near the center of the impacted area. However, the residence itself has not been listed as an NPL site (Figure 1).

Currently, no activities are being conducted at the 700 South 1600 East PCE Plume Site, with the exception of those associated with this AM removal action. A RI of the PCE plume is currently being conducted, as discussed in Section 2.2.2 of this AM.

### 2.1.6 Maps, Picture, Other Geographic Representations

A site map presenting the inferred PCE plume originating from the VAMC, AOU-1 extent, and location of residence 0040-H is provided as Figure 1.

## 2.2 Other Actions to Date

### 2.2.1 Previous Actions

As a conservative measure, VA has installed portable air filtration systems in some residences within the ESS area with detections of PCE. However, no residences have had exceedances of the RAL other than 0040-H. Previous sampling activities conducted by SLCDPU, EPA, UDEQ, and VA have been discussed in Section 1. No additional actions or sampling have been performed that are specific to residence 0040-H.

### 2.2.2 Current Actions

Current actions, including sampling and other responses conducted by EPA, UDEQ, and VA have been previously discussed in Section 2.1. No additional actions, other than tasks to support this removal action and associated sampling, are currently being performed at residence 0040-H. A RI of the PCE plume, with initial focus on AOU-1, is currently underway. Response action for the PCE plume began in 2013 with the RI.

## 2.3 Federal Facility Agreement: Local, State, and Federal Authorities' Role

### 2.3.1 Local, State, and Federal Actions to Date

- In the 1980s, the SLCDPU documented discolored water and odors of dry cleaner solvent while cleaning the sanitary sewer line near the VAMC.
- The plume was first identified in 1990 when the SLCDPU detected PCE in the Mt. Olivet Cemetery irrigation well during routine monitoring.
- In May of 1995, E & E conducted a site investigation for EPA in order to delineate the plume and locate the source.
- EPA conducted additional investigations in 1996 and 1998.
- In 1997 the SLCDPU detected PCE in a Salt Lake City Drinking Water Well No. 18 (SLC-18) and concentrations increased through 2001. The well was suspected to be near the downgradient edge of the PCE plume.
- The U.S. Geological Survey (USGS) continued monitoring well SLC-18. The well was taken off line by the SLCDPU in 2004.
- In October 2004, UDEQ and the EPA Site Assessment Program sampled the Mt. Olivet Cemetery irrigation well, well SLC-18, and monitoring wells that were installed at the site.
- In 2005, UDEQ and EPA returned to the site with the intention of developing a hazardous ranking system package to determine if the site was eligible for the NPL. These efforts were suspended until 2008 so that the City could pursue other options to address the contamination. Currently, the NPL status is final and evaluation of human exposure and health risks is ongoing.
- From 2010 to 2011 various investigations by Salt Lake City and UDEQ included a hydrological assessment which identified impacted springs and surface water as well as provided a pump test for aquifer properties.
- Based on the 2011 investigation, EPA and UDEQ attributed the source of the PCE plume to the VAMC and named VA as a PRP.
- In 2013, VA and EPA began drafting a Federal Facility Agreement (FFA) for the PCE plume site.
- VA began a RI at the site in 2013, focusing on that area where groundwater with PCE occurred within 50 ft of the ground surface, designated as AOU-1, which may contribute to VI of chlorinated solvents.
- In 2015, Season 1 field work for the RI was initiated by VA and included indoor air, outdoor air, and near-slab soil gas samples at 36 inhabited buildings. EPA and UDEQ provided oversight during the RI activities.
- In 2016, VA continued fieldwork which included collection of samples from groundwater, surface water, seeps, springs, and soil in the ESS area, as well as indoor air, outdoor air, and near-

slab soil gas samples at 14 residences. Residence 0040-H exhibited PCE concentrations above the RALs for the site leading to this AM for a time-critical removal action. EPA and UDEQ continue to provide consultation and oversight.

## 2.3.2 Potential for Continued Response

Potential actions for continued response at the PCE plume include:

- The execution of this time-critical removal action by VA at residence 0040-H as proposed in this AM.
- Continued remedial investigation and feasibility study (RI/FS) activities by VA with oversight support by EPA and UDEQ, and information and consulting support from Salt Lake City, Utah Department of Health, United States Geological Survey (USGS), University of Utah, and the U.S. Agency for Toxic Substances and Disease Registry (ATSDR).
- Potential additional interim removal actions to address VI if detected in other residences in concentrations exceeding the RALs.
- Possible remedial actions to mitigate the PCE plume based on the selected preferred remedial alternative to be documented in the Record of Decision.

This AM covers the known residence within AOU-1 where remedial action is warranted. Based on the most recent indoor air sampling event in March 2016, residence 0040-H is the only known location where concentrations exceed the IA RAL for PCE and or TCE indicating a need for this removal action. If future removal actions are required, they will be addressed as an addendum to the AM.

## 3. Threats to Public Health or Welfare or the Environment and Statutory and Regulatory Authorities

This section presents the 8 criteria to be evaluated for determination of initiating a removal action under 40 CFR 300.415(b)(2) of the National Contingency Plan (EPA 1992).

- *(i) Actual or potential exposure to nearby human populations, animals, or the food chain from contaminants*

Vapor intrusion sampling was conducted at residence 0040-H in March 2016 and indoor-air concentrations of PCE and TCE exceeded Tier 1 RALs (Table 1). While no symptoms have been reported by the residents of 0040-H, inhalation of PCE can cause irritation to the nose, throat, and respiratory system. Symptoms of PCE exposure include nausea, flushed face and neck, dizziness, incoordination, headaches, and drowsiness. PCE exposure targets the eyes, skin, respiratory system, liver, kidneys, and central nervous system. PCE is also considered a potential carcinogen since studies have found liver tumors in lab tests performed on animals (Center for Disease Control [CDC], National Institute for Occupational Safety and Health [NIOSH] 2016a).

TCE, a degradation product of PCE detected in the home, may also be a potential risk. Inhalation of TCE can cause irritation to the respiratory system. Symptoms of TCE exposure include eye irritation, skin irritation, headache, blurry vision, weakness and exhaustion, dizziness, tremors, drowsiness, nausea, vomiting, and dermatitis. More severe symptoms include cardiac arrhythmias, paresthesia, and liver injury. TCE exposure targets

the eyes, skin, respiratory system, heart, liver, kidney, and central nervous system and has the potential to affect the developing fetus (CDC, NIOSH 2016b, EPA 2016). TCE is also considered a potential carcinogen since studies have found liver and kidney cancer in tests performed on lab animals, and EPA has determined it to be a mutagen (CDC, NIOSH 2016b). Table 3 summarizes the site management decision matrix including what potential actions should be taken in the event indoor air sampling results exceed the action levels.

- (ii) *Actual or potential contamination of drinking water supplies or sensitive ecosystems*  
Shallow groundwater (e.g., less than 10 ft below ground surface) and springs are contaminated with PCE below and adjacent to the 0040-H residence and are suspected to be providing a source of PCE in the home's indoor air.
- (iii) *Hazardous substances or pollutants or contaminants in drums, barrels, tanks, or when in bulk storage containers, that may pose a threat of release*  
None.
- (iv) *High levels of contaminant in soil largely at or near the surface that may migrate*  
Soil contamination has not been evaluated at residence 0040-H, and remedial action activities are not expected to produce soil contamination.
- (v) *Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released*  
Air pressure in the home may change seasonally while the house is heated or cooled. When the air pressure in the home decreases it may increase the rate at which chlorinated solvent vapors intrude into the home.
- (vi) *Threat of fire or explosion*  
Neither vapor poses a significant fire hazard. PCE does not have a lower or upper explosive limit (CDC NIOSH 2016a). TCE does not pose a risk under ordinary conditions within a home with a lower explosive limit of 8% at 77°F and an upper explosive limit of 10.5% at 77°F. Neither contaminant has a recorded flash point.
- (vii) *Availability of other appropriate federal or state response mechanisms to respond to the release.*  
Although not associated specifically with residence 0040-H, the ATSDR will be preparing a public health risk evaluation for AOU-1 following completion of the RI.
- (viii) *Other situations or factors that may pose threats to public health or welfare of the United States or environment*  
None.

#### 4. Endangerment Determination

This release of a hazardous substance impacting indoor air at residence 0040-H may present and imminent and substantial endangerment to public health, or welfare, or the environment. Specifically, the current and ongoing migration of PCE and TCE vapor into residence 0040-H presents a substantial endangerment to the inhabitants. The concentrations of PCE and TCE detected in indoor air samples collected from both the kitchen and the basement of residence 0040-H exceed both the SL and Tier 1 RALs established in the in the approved Vapor Intrusion Screening Level and Removal Action Levels for 700 South 1600 East PCE Plume (also known as the SAM) as discussed in Section 2.1.1 of this AM (FE



2015). The summary of the SLs and RALs from the SAM are provided in Table 2. A risk management decision matrix was established in the SAM and is summarized in Table 3. The results of IA sampling at 0040-H, and the SLs and RALs, are summarized in Table 1.

The concentrations of PCE collected in both the basement and kitchen were 1.4 and 1.8 times the Tier 1 RAL, respectively, and the concentrations of TCE in the basement and kitchen were 2.0 and 2.5 times the Tier 1 RAL, respectively, which equate to a HQ greater than 1.

Based on the EPA-approved Site Management Decision Matrix (Table 3), further evaluation, mitigation and monitoring are required for residence 0040-H because the PCE and TCE indoor air sample concentrations exceed the residential indoor air Tier 1 RALs. The agreed upon possible actions for the site management decision include: additional data collection, long-term mitigation, periodic monitoring, data evaluation, and maintenance of the mitigation system.

## 5. Exemption from Statutory Limits

Although the mitigation of PCE in IA at residence 0040-H will continue until it can be demonstrated that mitigation is no longer required, it is expected that the mitigation system will be installed within 12 months of the approval of this AM and within the two million dollar statutory budget limit. Therefore, no request for exemption from the statutory limits are being sought at this time.

## 6. Proposed Actions and Estimated Costs

This section describes the removal action and estimated costs.

### 6.1 Proposed Actions

#### 6.1.1 Proposed Action Description

The proposed action for this AM is to reduce concentrations of PCE and TCE in indoor air at residence 0040-H via the installation a vapor intrusion mitigation system (VIMS). The selected VIMS to be installed will comprise two (2) AirPura W600 whole house filter units with VOC filter packages. Each VOC filter package includes a 26-pound carbon filter, a HEPA barrier filter, and a pre-filter. The AirPura units will be installed in the plenum closet ducted to the furnace suction. The units will have hourly meters for inspection purposes and be hard wired with local disconnects for maintenance. The adjustment knobs for the units will be removed to discourage tampering. The VIMS to be installed is capable of reducing indoor-air concentrations of PCE and TCE to below the RALs. The selected VIMS (including both AirPura Units) is expected to sorb 2508019.20 µg/day or 0.0055 pounds per day of PCE. The system will require filter changes and maintenance every 18 months. The total PCE sorbed over the 18-month period is expected to be 7.8 pounds.

A Removal Action Work Plan detailing the proposed mitigation system will be prepared by VA prior to installation. In addition, air sampling prior to and following the installation of the VIMS will be conducted to help evaluate the effectiveness of the system and to assess whether further mitigation activities are needed. The proposed sampling program will be presented in the Removal Action Work Plan.

### Verification Sampling and Post-Removal Site Controls Monitoring

VA will provide post-removal site controls (PRSCs) at residence 0040-H. PRSCs for residence 0040-H will include, but are not limited to, the following: maintenance of an access agreement; post system installation sampling to be performed 15 and 30 days after system installation and start-up; system inspections, operations and maintenance (O&M); and additional IA monitoring following post-installation sampling. The Removal Action Work Plan will detail the frequency of monitoring samples and will include preparation of an O&M Plan presenting the frequency and details of required system inspections and maintenance. The monitoring and O&M will include periodic evaluation of site conditions to ascertain whether such changes could reduce the effectiveness of the system. Additional monitoring is to occur for a minimum of three (3) years after system installation and start-up for costing purposes, and will be maintained as long as the mitigation system is needed. The additional monitoring will include one year of seasonal sampling (one sampling event in each of the four seasons) for the first year after installation reducing to semiannually for the subsequent two (2) years, and may eventually be reduced to annual sampling.

This sampling program may change depending upon site conditions and efficacy of the system in mitigating VI. Samples will be collected and analyzed in accordance with the *Quality Assurance Project Plan (QAPP) Update Revision 1, 700 South 1600 East PCE Plume AOU-1: East Side Springs, Salt Lake City, Utah* (EA 2016) and pertinent QAPP addenda or amendments specific to the VIMS monitoring. Each sampling event will include one sample collected from each level of the house and one duplicate sample. The duplicate sample will be collected from one level of the home, which will be determined prior to each sampling event based on the concentrations detected during the previous sampling event.

The inspections for the selected VIMS, two AirPura W600 whole house filter units with the VOC filter package, will coincide with the sampling schedule described above. Each system inspection will include a visual inspection to ensure the system is working and has not been tampered with, screening of the system discharge using a photo ion detector (PID), flow rate reading using an anemometer, purification system filter changes and disposal, VOC filter package changes every 18 months.

Additional PRSCs may be presented in the Removal Action Work Plan, a future document such as a QAPP amendment, or a minor field modification.

### Impact to Vulnerable or Sensitive Populations, Habitats, or Natural Resources

The installation will not impact any surrounding populations, habitats, or natural resources.

### Uncertainties Affecting System Implementation

Uncertainties affecting the implementation of the proposed action include: continued access by the resident; timely award of the removal action contract; approval of the AM; and determining an effective VIMS design in consideration of the unique heating and cooling system at residence 0040-H and high groundwater table.

Implementation of proposed actions will occur pending the finalization of this AM and Removal Action Work Plan.

### Need for Institutional Controls

No institutional controls are needed for this removal action.

### Waste Disposal

No solid or liquid waste material, other than equipment packaging and construction materials are expected to be generated during the installation of the filtration system and filter changes. Filter changes for the system maintenance will generate filter media waste including the VOC filtration packages and the purification system filters which will need to be disposed. Disposal of the filters will be part of the system O&M. It has been determined through consultation with UDEQ that the PCE and TCE do not require handling as a listed hazardous waste. Therefore, filter material will be analyzed to determine if it exhibits hazardous characteristics prior to disposal. The disposal of the used filters will be based on the generated waste analytical results following the appropriate guidelines.

### Cross Media Relations

There are no major cross-media relationships or potential adverse impacts associated with the intermediate steps of installing the VIMS in the residence. Access into the residence will be required and will be coordinated through VA public relations personnel.

The residence in which the VIMS will be installed was built in the 1920's, therefore lead and asbestos may be present. Vermin, molds, and dust may also be present in the residence.

No impact to traffic or other local community activities is anticipated.

## **6.1.2 Contribution to Remedial Performance**

Long-term remedial action for the shallow PCE groundwater plume throughout the entire AOU-1 impact area is expected to take place in the future. The details and methods of the long-term remedial actions to occur within AOU-1 will be determined based on the results of the RI/FS which is underway, but has not been completed.

### Alternative Methods

Options to mitigate the infiltration of PCE vapor into residence 0040-H have been identified. The alternative option is a VIMS comprised of a sub-slab depressurization system. Sub-slab depressurization works by reducing air pressure in the soil below the foundation of the structure so that it is lower than the vapor pressure in the structure. Although this method is common and generally effective, it does not work well in areas of shallow groundwater tables and areas where surface water drainage may be an issue. Shallow groundwater and poor surface water drainage can saturate the venting system and cause it to malfunction. Sub-slab vapor recovery would be a viable option if drainage at the residence is considered and addressed so it will not impact the system installed. These methods are being assessed in consideration of the groundwater table and the unique ventilation configuration within the residence.

Installing a sub-slab depressurization system at residence would consist of activities which would have a larger impact to residence including impact to the structure itself and longer installation/construction times. The sub-slab depressurization system would need to be installed with an access point in the utility room with routing through the garage and crawl space to the fan installation on the south side of the house. An aesthetics package would also need to be installed on the south side of the house to minimize visual and noise impact to residence. A sump for dewatering would also be needed to address the issue of shallow groundwater flooding the system.

### Threats to be Addressed Prior to Long Term Clean Up

PCE and TCE concentrations in IA that are attributable to VI from the PCE plume and that exceed the RALs established for AOU-1 (Table 2) must be mitigated when receptors (i.e., residents) can be exposed. IA mitigation can take place while further actions are taken to complete the PCE plume RI/FS.

### Ensure Threat is Adequately Abated

The VIMS to be installed, monitored and maintained at residence 0040-H must reduce indoor air PCE and TCE concentrations below the Tier 1 RALs of  $41\mu\text{g}/\text{m}^3$  and  $2.1\mu\text{g}/\text{m}^3$ , respectively, and remain in place and functioning until the concentrations in shallow groundwater no longer contribute to vapor intrusion above RALs.

### Consistency of Proposed Removal Action with Long Term Remedial Goals

The installation of the VIMS at residence 0040-H will contribute to the efficiency of the long-term remedial action within AOU-1. Because the remediation of the PCE plume will likely take decades, VIMS will likely be a component of the final remedy to address the VI exposure pathway. The VIMS will mitigate the effects of the infiltrating vapors while efforts are made toward long-term remedial action of the shallow groundwater PCE plume. The long-term reduction in PCE vapor intrusion can be achieved if the source of the vapor is mitigated i.e., the shallow groundwater plume is treated via long-term remedial action activities.

The VIMS will need to be maintained and operational until it can be demonstrated that VI from the PCE plume no longer presents a risk at residence 0040-H or the shallow groundwater plume and PCE source have been remediated via the long-term remedial actions within AOU-1 as a whole.

#### **6.1.3 Engineering Evaluation/Cost Analysis**

The engineering evaluation and cost analysis section applies to non-time critical removal actions only. The removal action at 0040-H is considered time critical and therefore this section is not applicable.

#### **6.1.4 Applicable or Relevant and Appropriate Requirements**

Removal actions conducted under the Comprehensive Environmental Response, Compensation & Liability Act (CERCLA) are required, to the extent practicable considering the exigencies of the situation, to attain ARARs. In determining whether compliance with an ARAR is practicable, VA may consider appropriate factors, including the urgency of the situation and the scope of the removal action to be conducted. An initial list of ARARs for the VIMS removal action have been identified and are included in Appendix A, Table A-1.

#### **6.1.5 Project Schedule**

A specific project schedule is forthcoming. The VIMS installation and subsequent monitoring and maintenance schedule are dependent on the electrical inspection, HVAC duct work, subsequent VIMS system installation, and the finalization of this AM. The installation of the VIMS is expected to begin during the first quarter of fiscal year 2017. The following represents the anticipated timing for the pre- and post- installation sampling for residence 0040-H.

Prior to VIMS Installation:

- Indoor air sampling at residence 0040-H

Post VIMS Installation:

- Development of a system specific O&M Plan.
- Development of a Remedial Action Work Plan.
- Indoor air sampling and system inspection at residence 0040-H fifteen (15) days after system start up.
- Indoor air sampling and system inspection at residence 0040-H thirty (30) days after system start up.
- Seasonal (one sampling event per season) indoor air sampling and system inspection at residence 0040-H for the first year after system installation.
- VOC filter change eighteen (18) months after system start up.
- Semiannual (two sampling events per year) indoor air sampling at residence 0040-H for two years following the first year of system installation.
- VOC filter change thirty-six (36) months after system start up.

## 6.2 Estimated Costs

The three (3) year total cost estimation for the installation, monitoring, and operation and maintenance is \$ 148,007.93 ± 20% contingency costs. This cost estimation includes the installation of the VIMS, pre- and post-system installation sampling, operation and maintenance, and all reporting.

### VA SLC Vapor Intrusion Mitigation

| <u>Item</u>                                    | <u>Total</u>        |
|------------------------------------------------|---------------------|
| Work Plan                                      | \$25,213.30         |
| Pre & Post Install Air Sampling                | \$15,054.77         |
| Installation of VIMS                           | \$24,155.38         |
| Operation and Maintenance                      | \$53,706.51         |
| Pollution Report                               | \$17,877.97         |
| Unforeseen Labor and Travel Costs              | \$12,000.00         |
| <b>Sub-Total</b>                               | <b>\$148,007.93</b> |
| Contingency (20% rounded to nearest thousand.) | \$30,000.00         |
| <b>Total</b>                                   | <b>\$178,007.93</b> |

## 7. Expected Change in the Situation Should Action Be Delayed

A delay in action or no action at residence 0040-H would result in the continued exposure of the residents to concentrations of PCE and TCE vapors above the RAL.

## 8. Outstanding Policy Issues

The proposed removal action for residence 0040-H is not expected to be of national significance or a precedence-setting issue. Removal actions at the site do not involve the following:

- Impact to other sovereign nations, including Indian Tribes
- Use or storage of any pesticide products
- Any form of dioxin as a principal contaminant of concern
- Releases of consumer products in consumer use
- Asbestos as a principal contaminant of concern
- *Bacillus anthracis* (anthrax) from natural sources such as contaminated soils, animals, or animal products
- Substances which may be subject to statutory exclusions under CERCLA including those covered under the following regulations:
  - o CERCLA§101(14) – certain petroleum products including crude oil, natural gas, synthetic gas usable for fuel
  - o CERCLA§101(22) – emissions from engine exhaust of motor vehicles, radioactive material from a nuclear incident, releases caused by regularly applied fertilizer
  - o CERCLA§104(a)(3) – releases from naturally occurring substances, products that are part of a structure resulting in exposure within the structure, and releases in public and private drinking water supply due to system deterioration.

Based on the nature of the contamination and the removal action activities, there are no outstanding policy issues for the installation of the VIMS at residence 0040-H.

## 9. Enforcement

VA is performing this removal action voluntarily in support of AOU-1 under their delegated authority to do so, as part of the larger remedial response for the 700 South 1600 East PCE Plume. No enforcement actions have been initiated against VA with regard to VI at residence 0040-H.

## 10. Recommendation

This decision document represents the selected removal action for residence 0040-H within AOU-1 of the ESS area of 700 South 1600 East PCE Plume in Salt Lake City, Utah, developed in accordance with CERCLA as amended, and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for the site as well as recently gathered yet unpublished groundwater, spring, and IA sample results from the RI of AOU-1.

Conditions at residence 0040-H, located in the ESS area over the presumed western extent of the 700 South 1600 East PCE Plume meet the NCP section 300.415(b) criteria for a removal. The removal action is approved as noted below. The total project ceiling is anticipated to be \$178,007.93. This removal action is fully funded by VA.

## References

- Center for Disease Control and Prevention (CDC), National Institute for Occupational Safety and Health (NIOSH). 2016a. NIOSH Pocket Guide to Chemical Hazards, Tetrachloroethylene. <http://www.cdc.gov/niosh/npg/npgd0599.html>. April.
- CDC, NIOSH. 2016b. NIOSH Pocket Guide to Chemical Hazards, Trichloroethylene. <https://www.cdc.gov/niosh/npg/npgd0629.html>. April.
- EA Engineering, Science, and Technology, Inc., PBC. 2016. Quality Assurance Project Plan Update Revision 1, 700 South 1600 East PCE Plume AOU-1: East Side Springs, Salt Lake City, Utah. February.
- (U.S) Environmental Protection Agency (EPA). 2012. Hazard Ranking System Documentation Record for 700 South 1600 East PCE Plume. EPA ID No. UTD981548985. Accessed at <http://www.epa.gov/superfund/sites/docrec/pdoc1874.pdf>.
- EPA. 1992. Title 40, Chapter 1, Subchapter J, Part 300.415 - National Oil and Hazardous Substance Pollution Contingency Plan, Guidance on Accelerating CERCLA Environmental Restoration at Federal Facilities, Hazardous Substance Response 40 CFR Part 300.415(b)(2).
- EPA. 2016. Trichloroethylene Fact Sheet. <http://www.epa.gov/assessing-and-managing-chemicals-under-tsca/fact-sheet-trichloroethylene-tce>. Accessed 10/13/16.
- First Environment, Inc. 2015. Final Remedial Investigation Work Plan AOU-1: East Side Springs 700 South 1600 East PCE Plume, Salt Lake City, Utah. July.
- Utah Department of Environmental Quality Division of Environmental Response and Remediation (UDEQ-DERR). 2012. Site Investigation Analytical Results - East Side Springs, Salt Lake County, Utah; prepared by Craig Barnitz.



## Tables

- 1 Summary of Time-Weighted TO-15 Sampling Results Compared to Screening Levels and Removal Action Levels
- 2 Summary of Screening Levels and Removal Action Levels
- 3 Site Management Decision Matrix

## Figures

- 1 Site Map

## Appendices

- A Applicable or Relevant and Appropriate Requirements

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TABLE 1

Summary of Time-Weighted TO-15 Sampling Results Compared to Screening Levels and Removal Action Levels

Action Memorandum for Residence 0040-H within Accelerated Operable Unit 1: East Side Springs 700 South 1600 East PCE Plume, Salt Lake City, Utah

| CASRN  | Chemical                         | Residential<br>Indoor Air SL<br>( $\mu\text{g}/\text{m}^3$ ) | Residential<br>Indoor Air Tier<br>1 RAL<br>( $\mu\text{g}/\text{m}^3$ ) | Residential<br>Indoor Air Tier<br>2 RAL<br>( $\mu\text{g}/\text{m}^3$ ) | A-0040H-<br>031216-IA-<br>BAS    | A-0040H-<br>031216-IA-<br>BAS-D               | A-0040H-<br>031216-IA-KIT |
|--------|----------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------|-----------------------------------------------|---------------------------|
|        |                                  |                                                              |                                                                         |                                                                         | Northwest<br>Basement<br>Bedroom | Northwest<br>Basement<br>Bedroom<br>Duplicate | Main Level<br>Kitchen     |
| 75354  | 1,1-Dichloroethene               | 210                                                          | 210                                                                     | 630                                                                     | 0.59 U                           | 0.59 U                                        | 0.59 U                    |
| 123911 | 1,4-Dioxane                      | 0.56                                                         | 5.6                                                                     | 56                                                                      | 0.18 U                           | 0.18 U                                        | 0.18 U                    |
| 156592 | cis-1,2-Dichloroethene           | NSL                                                          | NSL                                                                     | NSL                                                                     | 0.55                             | 0.58                                          | 0.39                      |
| 127184 | Tetrachloroethene                | 11                                                           | 41                                                                      | 120                                                                     | 74 J                             | 78 J                                          | 59 J                      |
| 79016  | Trichloroethene                  | 0.48                                                         | 2.1                                                                     | 6.3                                                                     | 5.2                              | 5.4 J                                         | 4.3                       |
| 75014  | Vinyl chloride<br>(chloroethene) | 0.17                                                         | 1.7                                                                     | 17                                                                      | 0.13 U                           | 0.13 U                                        | 0.13 U                    |

## NOTES:

CASRN = Chemical Abstracts Services Reference Number.

J = Data validation qualifier signifying estimated concentration.

 $\mu\text{g}/\text{m}^3$  = Micrograms per cubic meter.

NSL = No Screening Level

RAL = Removal action level.

SL = Screening level.

U = Analyte not detected at or above the method detection limit qualifier.

Shaded values represent exceedances of the Tier 1 RAL.

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TABLE 2  
Summary of Screening Levels and Removal Action Levels  
Action Memorandum for Residence 0040-H within Accelerated Operable Unit 1: East Side Springs 700 South 1600 East PCE Plume, Salt Lake City, Utah

| CASRN  | Chemical                         | Residential<br>Indoor Air<br>SL<br><br>(µg/m³) | Residential<br>Indoor Air<br>Tier 1 RAL<br><br>(µg/m³) | Residential<br>Indoor Air<br>Tier 2 RAL<br><br>(µg/m³) | Residential<br>Soil Gas SL<br><br>(µg/m³) | Residential<br>Groundwater<br>SL<br><br>(µg/L) | Commercial/<br>Industrial<br>Indoor Air<br>SL<br><br>(µg/m³) | Commercial/<br>Industrial<br>Indoor Air<br>Tier 1 RAL<br><br>(µg/m³) | Commercial/<br>Industrial<br>Indoor Air<br>Tier 2 RAL<br><br>(µg/m³) | Commercial/<br>Industrial<br>Soil Gas SL<br><br>(µg/m³) | Commercial/<br>Industrial<br>Groundwater<br>SL<br><br>(µg/L) |
|--------|----------------------------------|------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|-------------------------------------------|------------------------------------------------|--------------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------|---------------------------------------------------------|--------------------------------------------------------------|
| 75354  | 1,1-Dichloroethene               | 210                                            | 210                                                    | 630                                                    | 7,000                                     | 200                                            | 880                                                          | 880                                                                  | 2,640                                                                | 29,000                                                  | 830                                                          |
| 123911 | 1,4-Dioxane                      | 0.56                                           | 5.6                                                    | 56                                                     | 19                                        | 2,900                                          | 2.5                                                          | 130                                                                  | 390                                                                  | 83                                                      | 13,000                                                       |
| 156592 | cis-1,2-Dichloroethene           | NSL                                            | NSL                                                    | NSL                                                    | NSL                                       | NSL                                            | NSL                                                          | NSL                                                                  | NSL                                                                  | NSL                                                     | NSL                                                          |
| 127184 | Tetrachloroethene                | 11                                             | 41                                                     | 120                                                    | 370                                       | 15                                             | 47                                                           | 180                                                                  | 540                                                                  | 1,600                                                   | 65                                                           |
| 79016  | Trichloroethene                  | 0.48                                           | 2.1                                                    | 6.3                                                    | 16                                        | 1.2                                            | 3                                                            | 8.8                                                                  | 26                                                                   | 100                                                     | 7.5                                                          |
| 75014  | Vinyl chloride<br>(chloroethene) | 0.17                                           | 1.7                                                    | 17                                                     | 5.7                                       | 0.15                                           | 2.8                                                          | 440                                                                  | 1,320                                                                | 93                                                      | 2.5                                                          |

NOTES:  
µg/L = Micrograms per liter.  
µg/m³ = Micrograms per cubic meter.  
NSL = No screening level  
RAL = Removal action level.  
SL = Screening level.

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TABLE 3

## Site Management Decision Matrix

*Action Memorandum for Residence 0040-H within Accelerated Operable Unit 1: East Side Springs**700 South 1600 East PCE Plume, Salt Lake City, Utah*

| Indoor Air SL/RAL Comparison Result   | Site Management Decision                   | Possible Actions                                  |
|---------------------------------------|--------------------------------------------|---------------------------------------------------|
| Indoor Air <= SL                      | No further evaluation or actions           | None                                              |
| SL < Indoor air <= Tier 1 RAL         | Monitoring and Further Evaluation          | Additional Data Collection                        |
|                                       |                                            | Periodic Monitoring                               |
|                                       |                                            | Additional Data Evaluation                        |
| Tier 1 RAL < Indoor Air <= Tier 2 RAL | Further Evaluation, Mitigation, Monitoring | Additional Data Collection                        |
|                                       |                                            | Long-term Mitigation                              |
|                                       |                                            | Periodic Monitoring                               |
|                                       |                                            | Additional Data Evaluation                        |
| Indoor Air >= Tier 2 RAL              | Response Action Needed                     | Additional Data Collection                        |
|                                       |                                            | Short-term Mitigation (e.g., portable filtration) |
|                                       |                                            | Long-term Mitigation                              |
|                                       |                                            | Periodic Monitoring                               |
|                                       |                                            | Additional Data Evaluation                        |

## NOTES:

RAL = Removal action level.

SL = Screening level.

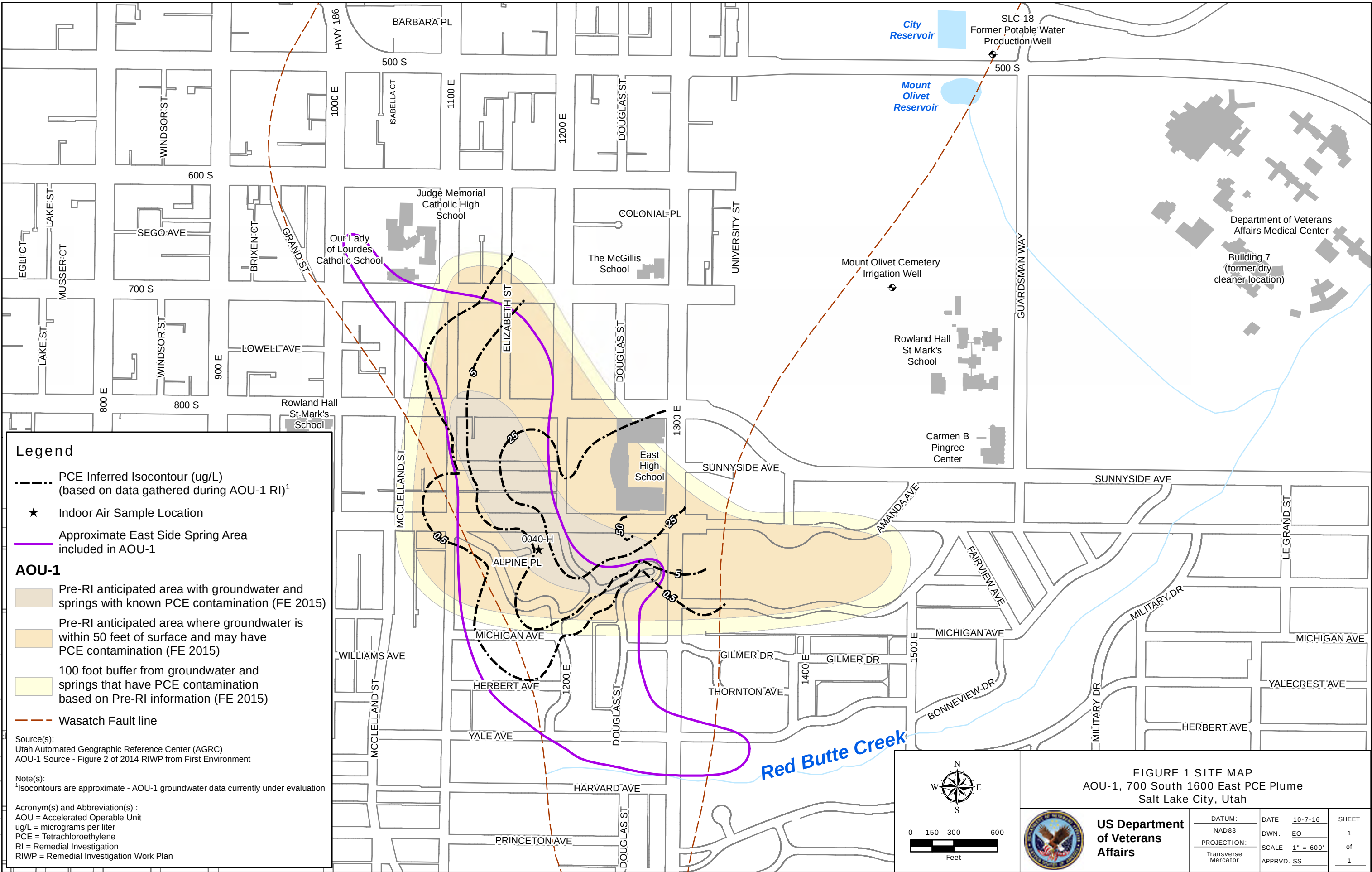
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Figure

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Appendix A  
Applicable or Relevant  
and Appropriate Requirements

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TABLE A-1

Applicable or Relevant and Appropriate Requirements

*Accelerated Operable Unit 1 – East Side Springs, 700 South 1600 East Street PCE Plume, Salt Lake City, Utah*

| Type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Authority                      | Regulated Item            | Requirement                                                                                                                                        | Status                                                                                                                                                                                                                                                                                 | Synopsis of Requirement                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hazardous Waste Rules:</b> Indoor air treatment, in which a treatment system (using a heating, ventilation, and air conditioning modification or separate air filtration system) within the building removes indoor air contaminants via a treatment medium such as granular activated carbon (GAC). If an indoor air treatment system using GAC is used at a residence as part of the AOU1 remedy, the federal and state hazardous waste characterization and management rules listed below would be applicable. Actions to apply with the substantive requirements of these rules would include: waste characterization, containerization, secondary containment, labeling, storage, tracking, inspections, security, training, emergency response, recordkeeping, and contingency planning. It is expected that any wastes generated would be disposed of within 90 days, and so would only be subject to hazardous waste generator requirements. |                                |                           |                                                                                                                                                    |                                                                                                                                                                                                                                                                                        |                                                                                                                                    |
| Action-specific                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Federal Regulatory Requirement | Solid and Hazardous Waste | 40 Code of Federal Regulations (CFR) Part 261 – Identification and Listing of Hazardous Waste (adopted by Utah Administrative Code [UAC] R315-261) | Applicable<br><br>If indoor air treatment with a treatment medium such as GAC is used, spent GAC or other treatment media would need to be evaluated for hazardous waste characteristics.                                                                                              | Defines those solid wastes that are subject to regulation as hazardous wastes and applicability of land disposal restrictions.     |
| Action-specific                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Federal Regulatory Requirement | Hazardous Waste           | 40 CFR Part 262 – Standards Applicable to Generators of Hazardous Waste (adopted by UAC R315-262)                                                  | Applicable<br><br>If indoor air treatment with a treatment medium such as GAC is used, spent GAC or other treatment media would need to be evaluated for hazardous waste characteristics and would need to be managed as hazardous waste if it fails a hazardous waste characteristic. | Specifies standards for management of hazardous waste by hazardous waste generators, including management in tanks and containers. |
| Action-specific                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Federal Regulatory Requirement | Hazardous Waste           | 40 CFR Part 264 Subpart I – Use and Management of Containers (adopted by UAC R315-264-170, -171, -172, and -173)                                   | Applicable<br><br>Applies to the storage of hazardous waste generated during remedial activities. If indoor air treatment with a treatment medium such as GAC is used, spent GAC or other treatment media may need to be managed as hazardous waste and stored in containers.          | Requirements for storage of hazardous waste in containers.                                                                         |

TABLE A-1

Applicable or Relevant and Appropriate Requirements

*Accelerated Operable Unit 1 – East Side Springs, 700 South 1600 East Street PCE Plume, Salt Lake City, Utah*

| Type            | Authority                      | Regulated Item  | Requirement                                                                                            | Status                                                                                                                                                                                                                                            | Synopsis of Requirement                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------|--------------------------------|-----------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Action-specific | Federal Regulatory Requirement | Asbestos        | 29 CFR Section 1926 subsection 1101 – Requirements for working with asbestos (adopted by UAC R307-801) | Applicable<br><br>Applies when work with asbestos and /or when disturbing asbestos containing material. If asbestos is encountered during the installation of the VIMS, then appropriate personal protective equipment will need to be used.      | Requirements for working with asbestos or work that may disturb asbestos.                                                                                                                                                                                                                                                                                                                                  |
| Action-specific | Federal Regulatory Requirement | Lead            | 40 CFR Section 745 subsection 61 – Requirements for working with lead (adopted by UAC R307-840)        | Applicable<br><br>Applies when working with lead and lead based products including lead based paint. If lead based paint is encountered during the installation of the VIMS, then appropriate personal protective equipment will need to be used. | Requirements for working with and around lead and lead based products.                                                                                                                                                                                                                                                                                                                                     |
| Action-specific | State Regulatory Requirement   | Hazardous Waste | Hazardous Waste Definitions – UAC R315-1                                                               | Applicable                                                                                                                                                                                                                                        | Provides definitions applicable to Utah's hazardous waste rules.                                                                                                                                                                                                                                                                                                                                           |
| Action-specific | State Regulatory Requirement   | Hazardous Waste | General Requirements, Identification, and Listing of Hazardous Waste – UAC R315-2                      | Applicable<br><br>If indoor air treatment with a treatment medium such as GAC is used, spent GAC or other treatment media would need to be evaluated for hazardous waste characteristics.                                                         | Defines those solid wastes that are subject to regulation as hazardous wastes. Includes definitions of characteristic and listed hazardous wastes. Toxicity-characteristic hazardous wastes are above Toxicity Characteristics Leaching Procedure limits discussed in 40 CFR 261.24. Toxicity-characteristic hazardous waste includes chlorinated compounds such as trichloroethene and tetrachloroethene. |

TABLE A-1

Applicable or Relevant and Appropriate Requirements

*Accelerated Operable Unit 1 – East Side Springs, 700 South 1600 East Street PCE Plume, Salt Lake City, Utah*

| Type            | Authority                    | Regulated Item                             | Requirement                                                                     | Status                                                                                                                                                                                                                                                                                                                                      | Synopsis of Requirement                                                                                                    |
|-----------------|------------------------------|--------------------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Action-specific | State Regulatory Requirement | Hazardous Waste                            | Hazardous Waste Generator Requirements – UAC R315-262, which adopts 40 CFR 262  | Applicable<br><br>If indoor air treatment with a treatment medium such as GAC is used, spent GAC or other treatment media would need to be evaluated for hazardous waste characteristics and would need to be managed as hazardous waste if it fails a hazardous waste characteristic.                                                      | Establishes standards for generators of hazardous waste.                                                                   |
| Action-specific | State Regulatory Requirement | Hazardous Waste                            | Hazardous Waste Emergency Controls – UAC R315-263                               | Applicable, if hazardous waste is generated                                                                                                                                                                                                                                                                                                 | Outlines requirements for emergency control of hazardous waste spills, including immediate action, cleanup, and reporting. |
| Action-specific | State Regulatory Requirement | Hazardous Waste                            | Risk Based Closure Standards and Site Management Requirements – UAC R315-101    | Applicable<br><br>Establishes requirements to support risk-based cleanup and closure standards at sites for which remediation or removal of hazardous constituents to background levels will not be achieved. The procedures in this rule also provide for continued management of sites for which minimal risk-based standards are not met | Applicable where hazardous constituents in exceedance of background concentrations are left in place.                      |
| Action-specific | State Regulatory Requirement | Corrective Action Cleanup Standards Policy | Corrective Action Cleanup Standards Policy, UST and CERCLA Sites – UAC R311-211 | Applicable<br><br>General criteria to be considered in establishing cleanup standards including compliance with maximum contaminant levels (MCLs) in Safe Drinking Water Act and Clean Air Act.                                                                                                                                             | Requires action be taken to be protective.                                                                                 |

TABLE A-1

Applicable or Relevant and Appropriate Requirements

*Accelerated Operable Unit 1 – East Side Springs, 700 South 1600 East Street PCE Plume, Salt Lake City, Utah*

| Type            | Authority                    | Regulated Item | Requirement                                           | Status                                                                                                                                                             | Synopsis of Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------|------------------------------|----------------|-------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Action-specific | State Regulatory Requirement | Air Quality    | Air Quality Permit: New and Modified Sources R307-401 | Applicable<br><br>Establishes the application and permitting requirements for new installations and modifications to existing systems throughout the State of Utah | R307-401-8 (Approval Order) requires compliance with National Primary and Secondary Air Quality Standards and is applicable (including the requirement that the degree of pollution control for emissions is at least best available control technology) unless the installation qualifies for an exemption under the rule [e.g., R307-401-9 (Small Source Exemption), R307-401-15 (Air Strippers and Soil Venting Projects, and R307-401-16 (De minimis Emissions from Soil Aeration Projects)]. R307-401-4(1) also requires that any control apparatus installed on an installation shall be adequately and properly maintained. |
| Action-specific | State Regulatory Requirement | Air Quality    | General Requirements UAC R307-101-2                   | Applicable to remedial actions that may cause air emissions                                                                                                        | R307-101-2 Defines prohibited levels of air pollution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Action-specific | State Regulatory Requirement | Air Quality    | General Requirements UAC R307-102-1                   | Applicable to remedial actions that may cause air emissions                                                                                                        | Prohibits the emissions of air contaminants in sufficient quantities to cause air pollution as defined in UAC R307-101-2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Action-specific | State Regulatory Requirement | Air Quality    | General Requirements: Breakdowns UAC R307-107-2       | Applicable to emissions control equipment                                                                                                                          | If emissions control equipment suffers and unavoidable breakdown, operators will ensure that emission limitations and visible emissions limitations are exceeded for only as short of a period of time as reasonable                                                                                                                                                                                                                                                                                                                                                                                                               |

TABLE A-1

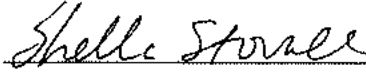
Applicable or Relevant and Appropriate Requirements

*Accelerated Operable Unit 1 – East Side Springs, 700 South 1600 East Street PCE Plume, Salt Lake City, Utah*

| Type            | Authority                    | Regulated Item | Requirement                                                              | Status                                                              | Synopsis of Requirement                                                                                                                                                                                          |
|-----------------|------------------------------|----------------|--------------------------------------------------------------------------|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Action-specific | State Regulatory Requirement | Air Quality    | Ozone Nonattainment and Maintenance Areas: General Requirements R307-325 | Applicable because Salt Lake County is a maintenance area for Ozone | Prohibits handling of volatile organic compounds (VOCs) in a manner that would result in greater evaporation of VOCs than would have occurred if reasonable available control technology (RACT) had been applied |

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## Authorizing Signature



SHELLA STOVALL, MNA, RN, NE-BC  
Acting Director  
VA Salt Lake City Health Care System

10/27/16

Date

| Comment and Response Worksheet |                |         |      |      |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                           |       |
|--------------------------------|----------------|---------|------|------|-------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-------|
|                                |                |         |      |      |       | East<br>Side Springs 700 South 1600 East PCE Plume, Salt Lake City, Utah                                                                                                                                                                                                                                                                                                                                                                                                 |               | Contract/TO Number: VA259-16-F-3951                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Regulator Concurrence     |       |
|                                |                |         |      |      |       | Draft for Regulatory Review                                                                                                                                                                                                                                                                                                                                                                                                                                              |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                           | Date: |
| Item                           | Commenter      | Section | Page | Para | Line  | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Response Code | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Concurrence with Response |       |
| 1                              | EPA - D Naftz  |         |      |      |       | Is it customary for Federal Facility sites to use their consultant's (rather than their own) letterhead in an Action Memo? I do not feel strongly about this, but wanted to flag it as a potential issue.<br>A Madigan - I agree it should be on VA letterhead                                                                                                                                                                                                           | C             | Letterhead changed to VA.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                           |       |
| 2                              | EPA - V Moritz | 2.1.1   | 2    | 4    | 8-9   | East Side Springs (ESS) not shown on Fig. 1 - need to add label                                                                                                                                                                                                                                                                                                                                                                                                          | C             | Label for East Side Springs added to Figure 1.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                           |       |
| 3                              | EPA - V Moritz | 2.1.1   | 3    | 2    | 7     | <p>"Within three residences..."</p> <p>Text following only addresses 0040-H, should add disposition of the other 2 homes</p>                                                                                                                                                                                                                                                                                                                                             | CC            | <p>The final paragraph of section 2.1.1 was revised to discuss the other two residences in general terms, as the focus of this document is the action to be conducted at residence 0040-H. The text now reads as follows:</p> <p><i>The second field season of the AOU-1 RI included seep, spring, surface water, groundwater, and soil sampling as well as additional soil gas and IA sampling. The IA sampling was initiated in December 2015 and occurred from December 2015 to May 2016. The IA screening protocol was also used during this phase of the AOU-1 RI, and was performed at 16 residences and one school within AOU-1, including 0040-H (Figure 1). Based on HAPSITE® results, 9 of those 17 locations were identified for IA sample collection and analysis using SUMMA® canisters and off-site TO-15 laboratory analysis (Table 1). Within three residences including 0040-H, PCE was detected above the SL based on TO-15 laboratory results. Two of the residences exhibited concentrations above the IA SL of 11 micrograms per cubic meter (µg/m3), but below the IA Tier 1 RAL of 41µg/m3. Since these two residences did not exceed the IA Tier 1 RAL, they are not addressed as part of this AM; however, cracks observed in the foundations and basements of these homes are being sealed by VA. Of the three residences, 0040-H exhibited the highest PCE concentrations, exceeding the RAL for PCE in both the kitchen and basement samples with reported concentrations of 59J µg/m3 and 74J µg/m3, respectively. A duplicate basement sample was collected that had a concentration of 78J µg/m3 . J-qualified values signify estimated data values based on data validation and are still usable to achieve project objectives. The residential IA Tier 1 RAL is 41 µg/m3. Based on the off-site laboratory IA TO-15 results, residence 0040-H is being considered in this action memorandum for a time-critical removal action.</i></p> |                           |       |
| 4                              | EPA - V Moritz | 2.1.1   | 3    | 2    | 10-11 | <p>"...a duplicate basement sample was collected that had a concentration of 79 µg/m3)."</p> <p>On Table 1 this duplicate is shown as 78J, which is a qualified value. The text here should either be corrected, deleted, or better explained - is the VA using a qualified result?</p>                                                                                                                                                                                  | C             | The value was corrected in the text to 78J µg/m <sup>3</sup> , and clarification was added regarding the J-qualifier flag.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                           |       |
| 5                              | EPA - V Moritz | 2.1.3   | 4    | 2    | 3     | The verb "is" needs to be corrected.                                                                                                                                                                                                                                                                                                                                                                                                                                     | C             | Text revised as requested.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                           |       |
| 6                              | EPA - V Moritz | 2.1.3   | 4    | 3    | 6     | <p>78 µg/m<sup>3</sup></p> <p>Clarify the duplicate result of 78 ug/m<sup>3</sup> had a J qualifier.</p>                                                                                                                                                                                                                                                                                                                                                                 | C             | Text revised to include J qualifiers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                           |       |
| 7                              | EPA - D Naftz  | 2.1.3   | 4    | 3    | 9-11  | <p>"Evaluation of multiple lines of evidence suggests that vapor intrusion from shallow groundwater is a cause of the PCE and TCE detected in the indoor air at residence 0040-H."</p> <p>Indicate whether this is the first removal action the Site (which appears to be the case).</p> <p>See Superfund Removal Guidance for Preparing Action Memoranda, U.S. EPA 11 (2009) [hereinafter Action Memo Guidance].</p>                                                    | C             | Text revised to indicate that the implementation of the AM will be the first removal action conducted at 0040-H.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                           |       |
| 8                              | EPA - D Naftz  | 2.1.4   | 4    |      |       | Recommend adding a section on "Release or Threatened Release Into the Environment of a Hazardous Substance" as specified in the Action Memo Guidance (at p. 11-12). Although some of the information included in this section in the guidance has already been discussed elsewhere in the Action Memo, please re-state or add cross-references to this information in a discrete section here.                                                                           | C             | "Release or Threatened Release Into the Environment of a Hazardous Substance" added as Section 2.1.4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                           |       |
| 9                              | EPA - D Naftz  | 2.1.4   | 4    | 1    | 4-5   | <p>"However, the residence itself has not been listed as an NPL site (Figure 1)."</p> <p>Indicate whether or not remedial activities are in progress or when remedial action is expected (can cross-reference to Section 2.2 here as well). Action Memo Guidance, at 12.</p> <p>The language "However, the residence itself has not been listed as an NPL site" Releases of hazardous substances are what get listed. The site is the areal extent of contamination.</p> | C             | <p>The following paragraph has been added to the section (now Section 2.1.5):</p> <p><i>Currently, no activities are being conducted at the 700 South 1600 East PCE Plume Site, with the exception of those associated with this AM removal action. A RI of the PCE plume is currently being conducted, as discussed in Section 2.2.2 of this AM.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                           |       |
| 10                             | EPA - V Moritz | 2.2.2   | 5    | 1    | 4     | "response" action began in 2013, not "remedial"                                                                                                                                                                                                                                                                                                                                                                                                                          | C             | "Remedial" changed to "Response" as requested.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                           |       |



| Item                                                      | Commenter      | Section        | Page | Para                  | Line | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                  | Response Code | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Concurrence with Response |
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| 11                                                        | EPA - V Moritz | 2.3.1          | 5    | 7th bullet            |      | "federal facilities enforcement program"<br>The EPA program conducting this action was the 'Site Assessment Program.'                                                                                                                                                                                                                                                                                                                    | C             | Text revised as requested.                                                                                                                                                                                                                                                                                                                                                                                                                                               |                           |
| 12                                                        | EPA - V Moritz | 2.3.1          | 6    | last bullet           |      | Suggest deleting the 2nd "2016"                                                                                                                                                                                                                                                                                                                                                                                                          | C             | Text revised as requested.                                                                                                                                                                                                                                                                                                                                                                                                                                               |                           |
| 13                                                        | EPA - D Naftz  | 3              | 6    |                       |      | Recommend re-configuring this section to the format suggested on p. 14 of the Action Memo Guidance. Identify each applicable factor from section 300.415(b)(2) of the NCP and discuss how it is implicated in the removal action at the Site.<br><br>Based on the information in the draft Action Memo, it appears that factors (i), (iv), (vii), (viii), and potentially (v) could be discussed in this section.                        | C             | Section has been revised to include the eight factors and discuss which are applicable to the removal action, in accordance with the AM guidance.                                                                                                                                                                                                                                                                                                                        |                           |
| 14                                                        | EPA - V Moritz | 3              | 6    | 1                     | 2    | Indicate the basis for this statement - add reference.                                                                                                                                                                                                                                                                                                                                                                                   | CC            | Text was revised to indicate that the shallow groundwater is the suspected source of the PCE in the home. This statement has not been made in a prior document.                                                                                                                                                                                                                                                                                                          |                           |
| 15                                                        | EPA - V Moritz | 6.1.1          | 9    | 1                     | 1-2  | "...one sample collected from each level of the house and one duplicate sample."<br>Indicate where duplicate sample will be collected                                                                                                                                                                                                                                                                                                    | C             | Text revised to indicate that a duplicate sample will be collected from a level in the home, which will be determined based on concentrations detected at the previous event. Duplicate samples are most useful as a QC when there is a detection that can be verified. A QC sample collected from an area of "non-detect" does not provide a measureable repeatable result.                                                                                             |                           |
| 16                                                        | EPA - D Naftz  | 6.1.3          | 11   |                       |      | See comments at Table A-1, infra.                                                                                                                                                                                                                                                                                                                                                                                                        | C             | Addressed with comments 18 and 19 for Table A-1.                                                                                                                                                                                                                                                                                                                                                                                                                         |                           |
| 17                                                        | EPA - D Naftz  | Figure 1       |      |                       |      | Recommend identifying the location of the dry cleaner facility on the map.                                                                                                                                                                                                                                                                                                                                                               | C             | Label added to Figure 1 as requested.                                                                                                                                                                                                                                                                                                                                                                                                                                    |                           |
| 18                                                        | EPA - D Naftz  | Table A-1      | A-1  | Hazardous Waste Rules | 3    | As specified at p. 9 of the Action Memo, "asbestos and lead may be present." Therefore, federal and state asbestos and lead abatement regulations are potentially applicable (if asbestos and/or lead are encountered during VIMS installation). It is recommended that the ARARs table be updated accordingly. See e.g., 29 C.F.R. § 1926.1101 et seq. and UAC R307-801 (asbestos); 40 C.F.R. § 745.61 et seq. and UAC R307-840 (lead). | C             | Table revised to include asbestos and lead ARARs.                                                                                                                                                                                                                                                                                                                                                                                                                        |                           |
| 19                                                        | EPA - D Naftz  | Table A-1      | A-2  |                       | 4    | Consider adding the "Corrective Action Cleanup Standards Policy - UST and CERCLA Sites" as an action-specific applicable state regulatory requirement. See UAC R311-211.                                                                                                                                                                                                                                                                 | C             | "Corrective Action Cleanup Standards Policy - UST and CERCLA Sites" added to Table A-1 as an action-specific applicable state regulatory requirement.                                                                                                                                                                                                                                                                                                                    |                           |
| <b>Comments from V Moritz email dated 5 October 2016:</b> |                |                |      |                       |      |                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                           |
| 20                                                        | EPA - V Moritz | General        |      |                       |      | This draft Action Memorandum was submitted on letterhead from EA Engineering Science. It should be submitted on VA stationery indicating that VA is the party undertaking the action.                                                                                                                                                                                                                                                    | C             | See response to Comment 1.                                                                                                                                                                                                                                                                                                                                                                                                                                               |                           |
| 21                                                        | EPA - V Moritz | 1              |      |                       |      | In section I, "Purpose," we recommend keeping the statement from the template that "this removal action involves no nationally-significant or precedent-setting issues." There are 8 categories of such issues and PCE vapor intrusion isn't one of them.                                                                                                                                                                                | C             | Statement added as requested.                                                                                                                                                                                                                                                                                                                                                                                                                                            |                           |
| 22                                                        | EPA - V Moritz | 2.3.2          |      |                       |      | In section 2.3.2, "Potential for Continued Response," revise the last paragraph to reflect that "This Action Memorandum covers the known residence within AOU-1 where removal action is warranted. If similar, future removal actions are required, they will be addressed as an amendment to the AM." This section should also include a brief description and/or justification that this is the only home that needs to be addressed.  | C             | Text revised as requested. Paragraph now reads as follows:<br><br><i>This AM covers the known residence within AOU-1 where remedial action is warranted. Based on the most recent indoor air sampling event in March 2016, residence 0040-H is the only known location where concentrations exceed the IA RAL for PCE and or TCE indicating a need for this removal action. If future removal actions are required, they will be addressed as an addendum to the AM.</i> |                           |
| 23                                                        | EPA - V Moritz | 3              |      |                       |      | Section 3 – this section needs to include identifying the criteria necessary for initiating a removal action under 40 CFR 300.415(b)(2) of the NCP. We suggest using the removal action guidance (pp 14-17) to identify which criteria apply to this situation and use the narrative to support the selected criteria.                                                                                                                   | C             | See response to Comment 13.                                                                                                                                                                                                                                                                                                                                                                                                                                              |                           |
| 24                                                        | EPA - V Moritz |                |      |                       |      | After Section 6.1.2, add back in the "Engineering Evaluation/Cost Analysis (EE/CA)" section from the template.                                                                                                                                                                                                                                                                                                                           | CC            | This section was added as requested. However, per the EPA AM Guidance (pg 20), this section is only applicable to non-time critical removal actions. This AM pertains to a time-critical removal action.                                                                                                                                                                                                                                                                 |                           |
| 25                                                        | EPA - V Moritz | 6.1.4          |      |                       |      | Section 6.1.4 and section 2 -- Please provide an estimated start date for the work in. Time critical removal actions are to be initiated within 6 months of signing the AM. Identifying the date by year and quarter is sufficient(for example: "fiscal year 2017 – first quarter").                                                                                                                                                     | C             | Sections 2.1.3 and 6.1.5 (previously 6.1.4) have been revised to indicate that work is scheduled to begin in the first quarter of fiscal year 2017.                                                                                                                                                                                                                                                                                                                      |                           |
| 26                                                        | EPA - V Moritz | Signature Page |      |                       |      | Please remove the signature page for 'regulatory signatures' (p. 14). The Regulatory Agencies will signify concurrence by issuing a concurrence letter.                                                                                                                                                                                                                                                                                  | C             | Signature page removed as requested.                                                                                                                                                                                                                                                                                                                                                                                                                                     |                           |

| Item | Commenter      | Section | Page | Para | Line | Comment                                                                                                                                                     | Response Code | Response                                                                                                                                                                                                                                                                 | Concurrence with Response |
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| 27   | EPA - V Moritz | Figure  |      |      |      | Please include a figure or maps showing the vapor intrusion data for AOU-1; this should include validated data as well as field data included in decisions. | NC            | Validation of the 2015 VI data for AOU-1 is in process and not finalized. This AM pertains specifically to residence 0040-H and final data has been provided in the AM. All of the VI data will be presented in the RI report after it has been validated and evaluated. |                           |

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|-------------------------------------------------------------------------------------------------------------------|
| Comment Classifications                                                                                           |
| Comment Response Codes:                                                                                           |
| (C) Concur with requested edits.                                                                                  |
| (CC) Concur, but with clarification/explanation.                                                                  |
| (N) Non-concur. Author did not concur with the comment. Clarification is presented in the response detail column. |