FIRST FIVE-YEAR REVIEW REPORT
FOR
MCGAFFEY AND MAIN GROUND WATER PLUME SUPERFUND SITE
CHAVES COUNTY, NEW MEXICO

September 28, 2017

Prepared by

U.S. Environmental Protection Agency
Region 6
Dallas, Texas

FIRST FIVE-YEAR REVIEW REPORT
MCGAFFEY AND MAIN GROUND WATER PLUME SUPERFUND SITE
EPA ID: NMD0000605386
CHAVES COUNTY, NEW MEXICO

This report documents the U.S. Environmental Protection Agency's (EPA) performance, determinations and approval of the McGaffey and Main Ground Water Plume Superfund Site (Site) First Five-Year Review Report (FYR) under Section 121(c) of the Comprehensive Environmental Response, Compensation and Liability Act, *United States Code,* Title 42, Section 9621(c), as provided in the attached First Five-Year Review Report.

Summary of the First Five-Year Review Report

Tetrachloroethene (PCE) has been detected at levels over 10,000 micrograms per liter (µg/L) in several ground water monitoring wells on the 1100 block of Main Street where three former dry cleaners operated. Soil vapor concentrations exceeding 11,000,000 micrograms per cubic meter (µg/m3) have also been detected, and a PCE plume in ground water extends over two miles to the southeast of the 1100 block of Main Street. From 2008 to 2015, the leading edge of the plume has expanded about 2200 feet to the southeast. A combined vapor intrusion mitigation system (VIMS) and enhanced soil vapor extraction (ESVE) system was installed in the source area in 2012 and 2013 and continues to operate (EPA, 2015a).

Chemicals of Concern (COCs) present within the alluvial aquifer (source area ground water (SAGW) and ground water plume (GWP) areas) are at concentrations that exceeded the maximum contaminant levels (MCLs) established in the Safe Drinking Water Act. The alluvial aquifer is not used as a drinking water source for the City of Roswell due to the availability of municipal water in the artesian aquifer. COC concentrations would prevent the use of the alluvial aquifer as a potential future drinking water source. COCs have migrated to downgradient areas (within the GWP) where the alluvial ground water is used as a water supply for domestic and irrigation uses. GWP with PCE concentrations greater than the MCL has migrated approximately 1.75 miles southeast of the source area (Figures 1, 5 and 6). A ground water management plan will be developed to protect private well users from potentially impacted water. Information that may need to be defined to determine if a specific well is impacted includes identification of subsurface environments and well construction information that may impact the flow of ground water. There are a significant number of private wells in the vicinity of the GWP (or, at the leading edge of the GWP) and it is unknown if they are screened in the contaminated aquifer. For these reasons, this FYR recommends that well owners and well users in the hotspot area be notified that well water should not be used as drinking water. The notification should be made as soon as possible. The notification should include information about the acceptable uses of well water.

EPA headquarters staff (the Optimization Team) completed a study of ongoing and future remedy construction and operations (EPA, 2015a). The optimization team recommended prioritizing remedial activities as follows:

1. Improve understanding of risks associated with current and future PCE exposure to contaminated ground water and mitigate exposure to Site contaminants where current exposure risks found to be unacceptable;
2. Address source area contamination with a higher priority on source area ground water than source area soil; and
3. Evaluate the need for further characterization and remediation of the ground water plume hotspot" or plume core.

The report also stated "With respect to addressing the unacceptable risks (if any) related to the ground water plume core or "hotspot", the optimization team recommends mitigating exposures to Site contaminants through the implementation of point-of-use treatment systems until a final remedy is selected or protective cleanup levels are reached."

Concerns identified during this FYR include:

- COC concentrations greater than the MCL are known to exist in the GWP.
- Water in the GWP area and drawn from a number of private wells may be used as drinking water by residents.
- The expansion and migration of the GWP.
- Unknown impact from nearby irrigation wells.
- Changes in site conditions that identified additional contamination that could require further design consideration prevented operation of the enhanced reductive dechlorination (ERD).

Actions Needed

The following activities must be taken for each remedial component to be **protective in the long term**:

- *Source Area Soil, Soil Vapor and Indoor Air Component:* 1) continue monitoring indoor air during vapor intrusion mitigation system (VIMS) shutdown and soil vapor extraction (SVE) operations to sustain protectiveness; and 2) implement the ICs specified by the ROD to safeguard long-term protectiveness until soil vapor remediation goals (RGs) are achieved. It is expected that these actions will be completed by the next five-year review.

- *Source Area Ground Water Component*: 1) complete the remedial design; 2) construct the remedy described in the ROD; and 3) operate the remedy for ground water extraction and treatment. It is expected that these actions will take approximately 18 to 24 months to complete.

- *Ground Water Plume Area Component*: 1) As soon as possible, conduct a month-long sampling event for private well residents to submit their well water for testing in the hot spot and ground water plume area (see Figure 1). (During this event we will implement a ground water plume management plan that will ensure that the well owners and users will not be drinking potentially impacted water in the hot spot and ground water plume area (see Figure 1). This will include: 1) a public information campaign to notify well owners and users that well water could potentially be impacted and to notify residents what the safe uses of untested well water may be.) 2) Resample existing monitoring wells, and survey and evaluate the construction details and uses of existing private wells beginning in January 2018. 3) Conduct representative vapor intrusion to indoor air and soil gas sampling in areas where ground water exceeds the screening levels used in the calculation for COCs by summer 2018.

Determination

I have determined that the remedy for the McGaffey and Main Ground Water Plume Superfund Site is **Protectiveness Deferred.** A protectiveness determination for the remedy at the Site cannot be made at this time until further information is obtained. Further information will be obtained by taking the following actions: 1) As soon as possible, conduct a month-long sampling event for private well residents to submit their well water for testing in the hot spot and ground water plume area (see Figures 1, 4, and 5). (During this event we will implement a ground water plume management plan that will ensure that the well owners and users will not be drinking potentially impacted water in the hot spot and ground water plume area (see Figure 1). This will include a public information campaign to notify well owners and users that well water could potentially be impacted and to notify residents what the safe uses of untested well water may be.) 2) Resample existing monitoring wells, and survey and evaluate the construction details and uses of existing private wells beginning in January 2018. 3) Conduct representative vapor intrusion to indoor air and soil gas sampling in areas where ground water exceeds the screening levels used in the calculation for COCs by summer 2018.

Pam Phillips acting for   9/28/17

Carl E. Edlund, P.E.   Date
Director, Superfund Division
U.S. Environmental Protection Agency Region 6

CONCURRENCES

FIRST FIVE-YEAR REVIEW REPORT
MCGAFFEY AND MAIN GROUND WATER PLUME SUPERFUND SITE
EPA ID#: NMD0000605386
CHAVES COUNTY, NEW MEXICO

Blake J. Atkins for — 9/26/17

Michael Torres — Date
Remedial Project Manager

Blake J. Atkins — 9/26/17

Blake Atkins — Date
Chief, LA/NM/OK Section

John C Meyer — 9/26/17

John C. Meyer — Date
Chief, Superfund Remedial Branch

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James E. Costello — Date
Practice Group Leader, Office of Regional Counsel

09/27/17

Mark A. Peycke — Date
Chief, Superfund Branch, Office of Regional Counsel

Pam Phillips — 9/28/17

Pamela Phillips — Date
Deputy Director, Superfund Division

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ISSUES/RECOMMENDATIONS

FIRST FIVE-YEAR REVIEW REPORT
MCGAFFEY AND MAIN GROUND WATER PLUME SUPERFUND SITE
EPA ID#: NMD0000605386
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Issues and Recommendations Identified in the Five-Year Review:

<table>
<tr><td rowspan="3">Remedial Component: Source Area Soil, Soil Vapor and Indoor Air</td><td colspan="4">Issue Category: Changed Site Conditions</td></tr>
<tr><td colspan="4">Issue: Indoor air RGs are not consistent with current toxicity data. The ROD's RGs for PCE and TCE in indoor air are based on outdated toxicity data. At the time the ROD was implemented (2008), cancer toxicity values for evaluating potential exposure to PCE were under review. Since the ROD, updated toxicity values for PCE were published in IRIS in 2011, 2012 and 2014.</td></tr>
<tr><td colspan="4">Recommendation: EPA will consider updating the Site RGs for indoor air to reflect EPA's current understanding of the toxicity of the COCs. Public health protection would not be affected by this potential change because the existing RGs are below the current Regional Screening Levels (RSLs). Any proposed change to the RGs would include public participation and NMED review as part of a ROD amendment that follows the NCP process.</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Party Responsible</td><td>Oversight Party/Support Agency</td><td>Milestone Date</td></tr>
<tr><td>No</td><td>No</td><td>EPA</td><td>EPA</td><td>9/30/2023</td></tr>
</table>

<table>
<tr><td rowspan="3">Remedial Component: Source Area Soil, Soil Vapor and Indoor Air</td><td colspan="4">Issue Category: Institutional Controls</td></tr>
<tr><td colspan="4">Issue: ICs identified in the ROD have not been implemented. The ROD identified temporary institutional controls (TIC) that should be implemented to protect against inadvertent exposure to contaminated soil, soil vapor and ground water during the timeframe between remedial construction and the achievement of RGs.</td></tr>
<tr><td colspan="4">Recommendation: EPA and NMED must facilitate implementation of the ICs described in the ROD for the following remedy components (see ROD Section 2.9.1, Common Elements): Source Area Soil, Soil Vapor and Indoor Air,</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Party Responsible</td><td>Support Agency</td><td>Milestone Date</td></tr>
<tr><td>Yes</td><td>Yes</td><td>EPA</td><td>State</td><td>10/01/2018</td></tr>
</table>

<table>
<tr><td rowspan="3">Remedial Components: Source Area Ground Water and Ground Water Plume Area</td><td colspan="4">Issue Category: Monitoring</td></tr>
<tr><td colspan="4">Issue: PCE distribution in ground water is not adequately defined or characterized in a number of areas and aquifer zones.</td></tr>
<tr><td colspan="4">Recommendation: Continue ground water monitoring and site characterization to adequately define PCE distribution at the site to ensure that proposed RA activities can effectively clean up the plume. At the leading-edge portion of the plume, provide point-of-use GAC units at the wellhead, if necessary.</td></tr>
<tr><th>Affect Current Protectiveness</th><th>Affect Future Protectiveness</th><th>Party Responsible</th><th>Support Agency</th><th>Milestone Date</th></tr>
<tr><td>Yes</td><td>Yes</td><td>EPA/State</td><td>State</td><td>September 2018</td></tr>
</table>

<table>
<tr><td rowspan="3">Remedial Components: Source Area Ground Water and Ground Water Plume Area</td><td colspan="4">Issue Category: Changed Site Conditions</td></tr>
<tr><td colspan="4">Issue: The ground water plume has expanded since the 2008 ROD (see Figures 1, 5, and 6). From 2008 to 2015, the leading edge of the plume has expanded about 2200 feet to the southeast.</td></tr>
<tr><td colspan="4">Recommendation: Implement a ground water plume management plan that will insure that the well owners and users will not be drinking potentially impacted water. This will include a public information campaign and a month-long water well sampling event in conjunction with the State.</td></tr>
<tr><th>Affect Current Protectiveness</th><th>Affect Future Protectiveness</th><th>Party Responsible</th><th>Support Agency</th><th>Milestone Date</th></tr>
<tr><td>Yes</td><td>Yes</td><td>EPA</td><td>EPA</td><td>ASAP</td></tr>
</table>

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Figures (Provided in Appendix B)

Tables (Tables 3-6 are provided in Appendix B)

LIST OF ABBREVIATIONS & ACRONYMS

µg/kg	microgram(s) per kilogram
µg/L	microgram(s) per liter
µg/m^3	microgram(s) per cubic meter
ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	*Code of Federal Regulations*
cis-1,2-DCE	cis-1,2-dichloroethene
COC	contaminant of concern
CSM	conceptual site model
CTF	central treatment facility
ELCR	excess lifetime cancer risk
EPA	U.S. Environmental Protection Agency
ERD	enhanced reductive dechlorination
FFS	focused feasibility study
FS	feasibility study
ft^3	cubic foot (feet)
FYR	Five-Year Review
GAC	granular activated carbon
GWP	ground water plume
IC	institutional control
IRIS	Integrated Risk Information System
ISCO	in situ chemical oxidation
MCL	maximum contaminant level
MNA	monitored natural attenuation
NMED	New Mexico Environment Department
NMOSE	New Mexico Office of the State Engineer
NPL	National Priorities List
OU	operable unit
PCE	tetrachloroethylene
POTW	publicly owned treatment works
RA	remedial action
RAO	remedial action objective
RD	remedial design
RDI	remedial design investigation
RGs	remediation goals
RI	remedial investigation
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
SAGW	source area ground water
SOS	Superfund Oversight Section
SVE	soil vapor extraction
TCE	trichloroethene
TIC	temporary institutional control
trans-1,2-DCE	trans-1,2-dichloroethene
UU/UE	unlimited use and unrestricted exposure
VC	vinyl chloride
VIMS	vapor intrusion mitigation system
VMP	vapor monitoring point

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy to determine whether that remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Section 121, 42 U.S.C. § 9621, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (*Code of Federal Regulations* [CFR], Title 40, Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the first FYR for the McGaffey and Main Ground Water Plume Superfund Site (the "Site"). The triggering action for this policy FYR is the start of remedial action construction activities on May 21, 2012. The FYR has been prepared because hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

An "operable unit" (OU) is a discrete action that comprises an incremental step toward comprehensively addressing Superfund site problems. The Site consists of one OU.

The Site FYR was led by Mr. Michael Torres, EPA Region 6 Remedial Project Manager (RPM) and Mr. Allan Pasteris, NMED Superfund Oversight Section (SOS) Project Manager. Participants included Mr. Ron Courts, Environmental Services Manager, City of Roswell and Mr. Chris Cortez, Operations Manager with Atkins Engineering Associates Inc., as well as members of the community. The review began on May 17, 2016.

Site Background

The Site is located within the city limits of Roswell, Chaves County, New Mexico at geographic coordinates 33º 22' 47.25" north and 104º 31' 7.4" west. The Site is situated in the southeast portion of the City and spans approximately 500 acres in Sections 9, 10, 15, and 16 of Township 11 South, Range 24 East. The Site lies within a commercial and residential area where several dry cleaning businesses formerly operated (see Figure 1). This area encompasses the former dry cleaning facilities located at 1107 and 1133 South Main Street.

Undocumented releases from dry cleaning facilities located within the 1100 block of South Main Street resulted in the formation of a ground water contaminant plume containing PCE and its breakdown products TCE, *cis*-1,2-dichloroethylene (*cis*-1,2-DCE), *trans*-1,2-dichloroethylene (*trans*-1,2-DCE) and vinyl chloride (VC). Information from monitoring wells installed by NMED and EPA indicates that the ground water plume originates within the 1100 block of South Main Street and extends approximately southeast.

EPA is the lead agency for conducting the remediation of the Site. The NMED is the support agency.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: McGaffey and Main Ground Water Plume Superfund Site		
EPA ID: NMD0000605386		
Region: 6	**State:** NM	**City/County:** Roswell/Chaves
SITE STATUS		
NPL Status: Final		
Multiple OUs? No	**Has the site achieved construction completion?** No	
REVIEW STATUS		
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:**		
Author name (Federal or State Project Manager): Michael Torres, Remedial Project Manager		
Author affiliation: EPA		
Review period: 5/12/2012 – 09/30/2017		
Date of site inspection: 10/26/2016		
Type of review: Statutory		
Review number: 1		
Triggering action date: 5/21/2012		
Due date *(five years after triggering action date)*: 9/30/2017		

II. RESPONSE ACTION SUMMARY

Most of the information summarized in this FYR was obtained from the remedial investigation (RI) and feasibility study (FS) reports, the 2008 ROD, the remedial design investigation (RDI) reports, two remedial design (RD) reports and various remedial action (RA) interim completion and cleanup status reports for the remedy components. Appendix A is a reference list of the documents that were reviewed for the preparation of this report. Figures and data summary tables are provided in Appendix B.

Basis for Taking Action

Environmental media that drive the need to take action at the Site include contaminated soil and soil vapor underlying the 1100 block of South Main Street (Source Area); contaminated indoor air resulting from the intrusion of subsurface vapors into several buildings overlying the Source Area; and contaminated ground water underlying the Source Area (SAGW) and the GWP area. The contaminants of concern (COCs) detected in environmental media include PCE and, to a lesser extent, its degradation products TCE, *cis*-1,2 DCE, *trans*-1,2-DCE and VC.

Based on the findings of the RI (CH2M, 2008a), there was evidence of subsurface vapor intrusion at several commercial and residential building locations in the Source Area. EPA calculated conservative risk estimates of the hazards for vapor intrusion based on measured indoor air concentrations as well as indoor air concentrations modeled from soil vapor concentrations using the Johnson and Ettinger model (EPA, 1991). The risk estimates revealed that concentrations of PCE in indoor air in the commercial buildings corresponded to an estimated lifetime cancer risk (ELCR)[1] greater than 1×10^{-4} at four of the six commercial buildings evaluated. In addition, two houses located on Hahn Street just east of the commercial area had concentrations of PCE in indoor air that exceeded the 1×10^{-6} risk management threshold. Under site conditions present at the time of the ROD, potential receptors associated with indoor air included occupational workers in the commercial buildings overlying the Source Area, and residents in the two homes along Hahn Street that also overly the Source Area; potential future receptors include construction workers.

The RI documented COCs present within the alluvial aquifer (SAGW and GWP) at concentrations that exceeded the maximum contaminant levels (MCLs) established in the Safe Drinking Water Act. Although the alluvial aquifer is not used as a drinking water source for the City of Roswell due to the availability of municipal water from the artesian aquifer, these concentrations would prevent the use of the alluvial aquifer as a potential future drinking water source. Contaminants may have migrated to downgradient areas where the ground water is used as a water supply for various other uses other than drinking. Under site conditions present at the time of the ROD, potential current and future receptors associated with ground water were identified as residents who might have already installed or who may later install drinking water wells within the GWP area.

Response Actions

This section outlines the remedial action objectives (RAOs) and the remedy selected in the 2008 ROD.

Remedial Action Objectives

The RAOs established in the ROD are presented below.

[1] For carcinogenic COPCs, risks are generally expressed as the incremental probability of an individual's developing cancer over a lifetime as a result of exposure to the carcinogen. ELCR is calculated from the following equation: ELCR = CDI x SF Where: ELCR = a unitless probability (e.g., 2x10-5) of an individual's developing cancer CDI = chronic daily intake averaged over 70 years (mg/kg-day) SF = cancer slope factor (mg/kg-day). A calculated risk value of 1x10-6 indicates that an individual experiencing the RME has a 1 in one million chance of developing cancer as a result of site-related exposure. This is referred to as the ELCR because it would be in addition to the cancer risks individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual's developing cancer from all other causes has been estimated to be as high as one in three. Generally, EPA considers remedial action to be warranted at a site when the ELCR exceeds 1x10-4. The need for remedial action when the ELCR falls within the 1x10-4 to 1x10-6 range is generally judged on a case-by-case basis [unless applicable or relevant and appropriate requirements (ARARs) are exceeded]. Risks less than 1x10-6 generally do not require remedial action.

Soil and Soil Vapor RAOs

- Protect human health by preventing direct contact, through the ingestion exposure pathway, with PCE- and TCE-contaminated Source Area soil, and by reducing soil PCE and TCE concentrations to levels less than 550 micrograms per kilogram (µg/kg) and 43 µg/kg, respectively.
- Protect human health, through the indoor air inhalation exposure pathway, by reducing the concentrations of PCE and TCE present in soil vapor to levels less than 370 micrograms per cubic meter ($\mu g/m^3$) and 17.6 $\mu g/m^3$, respectively.
- Protect the environment by reducing or eliminating the migration of PCE and TCE present in vadose zone soil and soil vapor to ground water at levels that would result in ground water concentrations greater than 5 parts per billion (ppb)[2].

Indoor Air RAOs

- Protect human health, through the indoor air inhalation exposure pathway, by reducing the concentration of Site-related PCE and TCE present in indoor air to levels less than 0.81 $\mu g/m^3$ and 0.022 $\mu g/m^3$, respectively.

Ground Water RAOs

- Protect human health by preventing direct contact, through the ingestion and inhalation exposure pathways, with ground water that has concentrations of PCE and TCE exceeding 5 ppb. To achieve this protection, EPA will reduce or eliminate the migration of Site-related PCE- and TCE-contaminated ground water where concentrations of PCE and TCE exceed 5 ppb. EPA will also restore Site ground water to concentrations below the MCL of 5 ppb for PCE and TCE. Restoration will also include reducing any PCE degradation products to their respective MCLs or applicable or relevant and appropriate requirements (ARARs) where the cis-1,2 DCE concentration exceeds 70 ppb, trans-1,2 DCE exceeds 100 ppb, and VC exceeds 1.0 ppb.

Description of Selected Remedy

To meet these RAOs, the ROD selected the following RAs:

Source Area Soil, Soil Vapor and Vapor Intrusion to Indoor Air Remedial Component

- Design, install and operate for up to 10-years vapor-control systems to reduce or eliminate vapor-phase COC entry to indoor air in targeted commercial and residential structures that overlie the Source Area. Buildings targeted for vapor-control systems overlie portions of the soil vapor plume where PCE and TCE concentrations in soil vapor or indoor air exceed levels corresponding to EPA's risk management threshold of one in one million or a 1×10^{-6} ELCR.
- Excavate and dispose of offsite approximately 2,500 cubic yards of contaminated soil present beneath the alleyway underlying the Source Area. Excavated material with COC concentrations exceeding specified remediation goals (RGs) will be transported to the nearest waste

[2] Units of ppb and micrograms per liter (µg/L) are equal.

management facility (which EPA determines to be acceptable under the Offsite Rule) for proper treatment and final disposal.
- Install in situ chemical oxidation (ISCO) injection probes to deliver a chemical oxidant for treatment of contaminated soil not removed by the excavation.
- Allow monitored natural attenuation (MNA) of low-level contaminated soil and/or soil vapor to occur following excavation, ISCO treatment, and operation and maintenance of the vapor-control systems.
- Implement temporary institutional controls (TICs) to provide short-term protection against inadvertent exposure to COCs present in soil and/or soil vapor at concentrations exceeding their established RGs, until RAOs are achieved.

The ROD anticipated that PCE-contaminated soil might not be identified during RD and, therefore, included soil vapor extraction (SVE) as a contingency remedy to replace soil excavation and ISCO treatment.

Source Area Ground Water Remedial Component

- Design, install and operate for up to 20 years a ground water extraction and ex situ treatment system to reduce COC concentrations in Source Area ground water to federal drinking water MCLs or New Mexico (State) ground water standards.
- Develop and implement TICs to prevent exposure to COCs present in SAGW at concentrations exceeding their respective MCLs or State ground water standards until RAOs are achieved.

Ground Water Plume Area Remedial Component

- Design, install and operate for up to 15 years a hydraulic containment system to prevent downgradient expansion of the GWP in the alluvial aquifer.
- Design, install and operate for up to 15 years an in situ treatment system (enhanced reductive dechlorination) to treat a "hotspot" area present within the larger GWP.
- Allow MNA of low-level COC-contaminated ground water.
- Develop and implement TICs within a specified area to prevent exposure to COCs present at concentrations above MCLs or State standards until RAOs are achieved.

Table 1. ROD Environmental Media Remediation Goals

Environmental Media	COCs	Remediation Goals
Soil and Soil Vapor		
- Soil	PCE, TCE	550 µg/kg, 43 µg/kg
- Soil Vapor	PCE, TCE	370 µg/m^3, 17.6 µg/m^3
Indoor Air		
	PCE	0.18 µg/m^3
	TCE	0.022 µg/m^3
Ground Water		
	PCE	5.0 µg/L
	TCE	5.0 µg/L
	cis-1,2 DCE	70 µg/L
	trans-1,2 DCE	100 µg/L
	VC	1.0 µg/L

Status of Implementation

Source Area Soil, Soil Vapor and Vapor Intrusion to Indoor Air Remedial Component

Current Status of Operation

The vapor intrusion mitigation system (VIMS) was operated continuously from November 2012 through early April 2015, and was shut down after indoor air sampling showed PCE and TCE concentrations below their corresponding RSLs. Following shutdown, a PCE concentration rebound test commenced in April 2015 for a 12-month period. While the VIMS was shut down, indoor air sampling was performed at all six VIMS-equipped buildings after 1, 2, 3, 6 and 12 months to monitor indoor air PCE and TCE concentration trends.

In February 2016, EPA was contacted regarding the proposed purchase of two parcels on the 1100 block of South Main Street for the construction of a car wash facility. The two buildings located on these parcels, which were equipped with VIMS, were slated for demolition by the new property owner. Therefore, EPA's remediation contractor prepared a technical memorandum in August 2016 with recommendations for decommissioning the VIMS at these two buildings. The remaining four VIMS are being retained until SVE optimization is complete (described below). By mid-January 2017, the VIMS at the two locations were fully decommissioned and the buildings were demolished.

In June 2016, following reduction of PCE and TCE concentrations to below the RGs in Zone 3 soil vapor, the Zone 3 leg of the SVE system was shut down to perform a rebound test. In this test, the four Zone 3 SVE wells were shut down, while Zones 1 and 2 continued to operate, and vapor was tested to see what the COC concentrations were with the Zone 3 wells off. The test duration was initially planned for 30 to 60 days but was extended to 180 days (and is still ongoing) following review of the 30-day and 60-day sample results. The rebound test results will be used to guide future Zone 3 SVE operations, and to inform development of the future Zone 1 and Zone 2 rebound tests. Based on Zone 3 rebound test results, which are presented in Remedial Action Cleanup Status Report No. 12 (CH2M, 2017b), a 30- to 45-day pulsed-on (i.e., intermittent instead of continuous) and 30- to 45-day pulsed-off schedule is anticipated. A final determination on the pulsed-on and pulsed-off durations will be made following completion of the December 2016 through June 2017 Zone 1/Zone 2 rebound test.

Remedial Process Optimization

EPA headquarters staff (the Optimization Team) completed a study of ongoing and future remedy construction and operations (EPA, 2015a). Remedial Process Optimization is the systematic site review by a team of independent technical experts, at any phase of a cleanup process, to identify opportunities to improve remedy protectiveness, effectiveness and cost efficiency, and to facilitate progress toward completing site remediation. The report included recommendations to prioritize the remaining RA at the Site. The recommendations are identified in Section VI of this FYR report. For the VIMS, because of the steadily declining sub-slab soil vapor PCE and TCE concentrations, it was concluded the VIMS could be shut down but additional sampling was recommended to assess the potential for rebound, at least twice following a 6-month shutdown period. For the SVE system, because of the steadily decreasing vapor concentrations, the Optimization Team recommended switching to pulsed or part-time operations. At the time of the study, the Optimization Team identified the presence of persistent PCE concentrations at several locations that may justify installing up to four new SVE wells. The VIMS and pulsed SVE operations have already been implemented. EPA is considering the SVE system expansion recommendation.

Source Area Ground Water Remedial Component

The RD for the SAGW remedy component (i.e., extraction of contaminated ground water and ex situ treatment) was started in 2015, and completed in September 2017. Prior to the start of the RD in 2015, EPA's Optimization Team recommended that the SAGW remedy remain a high priority for implementation and should focus on source control for the portion of the plume needed to allow for aquifer restoration in the GWP area. Consistent with the Optimization Team's recommendations, the RD for the SAGW remedy component includes ground water extraction from one existing well, identified as P3-1, at a rate of 20 gallons per minute, treatment of the ground water using an air-stripper treatment plant to be installed at the existing CTF, and discharge of the treated water to the City of Roswell publicly owned treatment works (POTW). Discharging treated ground water to the POTW will enable all treated ground water to be beneficially reused for irrigation or other purposes.

Ground Water Plume Remedial Component

The GWP remedy is intended to address the GWP hotspot and to hydraulically contain the downgradient, diffuse leading edge of the PCE plume to prevent further expansion. The hotspot is an area within the GWP, located approximately 1 mile downgradient of the Source Area (Figure 2), having moderate to high concentrations of PCE (typically in excess of 250 µg/L) relative to the concentrations present at other well locations within the GWP. NMED designed and installed an enhanced reductive dechlorination (ERD) bio barrier remedy for the GWP hotspot between 2013 and 2014. The ERD bio barrier was designed before the other ground water remedy components in order to proceed with remedy implementation. No ERD injections have been completed to date because of changes in site conditions that identified additional contamination that could require further design consideration.

Ground water extraction and treatment or hydraulic control of the leading-edge portion of the downgradient plume has not been implemented. More plume characterization data needs to be collected. An update of the risk assessment needs to be performed to reevaluate the need for this remedy component. Ground water extraction and treatment or hydraulic control may not be needed if future well surveys show that the ground water is not being drawn from the contaminated aquifer.

The Optimization Team's recommendations for the GWP area were to assess risks from use of domestic wells and from possible ground water vapor intrusion to indoor air and soil gas, and to provide point-of-use GAC treatment systems if needed. A point-of-use system treats water at the individual wellhead or at the point where it is accessed by the consumer (e.g., at the tap). The second recommendation for the GWP area included additional characterization and treatment of the GWP hotspot. Pertaining to the ERD remedy, the Optimization Team concluded that ground water extraction and treatment may be a more efficient and cost-effective remedy for the hotspot.

The ROD (Section 2.9.1) indicated that extracted ground water brought to the surface containing low COC concentrations, such as that present in the GWP area, would be treated at the City of Roswell

POTW. Since the ROD was issued, the City of Roswell has enacted a no-discharge ordinance for chlorinated solvents such as PCE and TCE. EPA has been coordinating with the City of Roswell on an industrial pretreatment permit that will allow treated ground water from the SAGW extraction and treatment system to be discharged to the POTW after pretreatment is performed. However, it is uncertain if the City of Roswell will require pretreatment for the much lower COC concentrations present in the GWP area.

Institutional Controls

Table 2 provides a summary of the required ICs and the status of their implementation, as detailed in the paragraphs that follow.

Table 2. Summary of Planned and/or Implemented Institutional Controls

Media Areas That Do Not Presently Support UU/UE	ICs Needed	ICs Called for in the ROD	Impacted Area(s)	IC Objective	Title of IC Instrument Implemented and Date
Soil, Soil Vapor and Indoor Air	Yes	Yes	Source Area	Protect against inadvertent exposure to soil and soil vapor contamination during timeframe between remedial construction and achievement of RGs	None identified to date
Source Area Ground Water and Ground Water Plume	No	Yes	Ground Water Plume	Protect against inadvertent exposure to contaminated alluvial aquifer ground water	NMOSE order restricting new well permits within the on-file boundaries of the GWP May 2, 2016

For soil and soil vapor, the ROD identified TICs that should be implemented to protect against inadvertent exposure to soil and soil vapor contamination during the timeframe between remedial construction and achievement of RAOs. These ICs consist of amendments to the City building code that requires any future buildings in the Source Area to be constructed with vapor barrier or control systems until RGs are achieved. The ICs identified in the ROD also call for notifications to be filed with deed/property records for Source Area parcels that identify COC concentrations in the soil and soil vapor underlying the properties. The FYR site inspection (described in Section IV) included a review of the status of the ICs. This review found that no notifications had been filed with the County Clerk's office, and there were no changes to the City building codes in the Source Area.

For the alluvial aquifer ground water, the ROD identified TICs that should be implemented to protect against inadvertent exposure to contaminated alluvial aquifer ground water. These TICs included notification to new well permit applicants in the GWP area, by the New Mexico Office of the State Engineer (NMOSE), identifying the location and depth of the COCs. The TICs also included the development and implementation of a City/County ordinance that would prohibit installing new wells within the GWP area.

On May 2, 2016, the NMOSE granted NMED's request to implement a temporary well drilling moratorium for new wells located within a designated area, which includes the entire area within the contaminated GWP boundary (NMOSE's well-drilling moratorium map is provided in Appendix C). NMED used the NMOSE database to inventory the private wells located within the GWP.

Systems Operations/Operation and Maintenance

Information on VIMS/SVE operations and performance is presented in Section IV.

III. PROGRESS SINCE THE LAST REVIEW

This is the first FYR for the Site.

IV. FIVE-YEAR REVIEW PROCESS

This FYR has been conducted in accordance with the EPA's *Comprehensive Five-Year Review Guidance* (June 2001), and the report has been prepared in accordance with EPA Region 6 Five-Year Review template (October 2016) adapted from the EPA Headquarters-recommended template *Five-Year Review Recommended Template – OLEM 9200.0-89*, dated January 2016. The FYR was conducted by Mr. Michael Torres, EPA Region 6 RPM, and Mr. Allan Pasteris, the NMED-SOS Project Manager for the Site.

Community Notification, Involvement and Site Interviews

A public notice titled "First Five-Year Review for the McGaffey and Main Ground Water Plume Superfund Site" was published in the *Roswell Daily Record* newspaper on October 10, 2016; the notice states that a FYR was being conducted and invited the public to submit comments to EPA. The results of the review and the report will be made available at the Site information repository located at the Roswell Public Library, 301 North Pennsylvania Avenue, Roswell, New Mexico 88203.

During the FYR process, interviews with stakeholders and community members were conducted to document any perceived problems or successes with the remedy as it has been implemented to date. Due to this area having environmental justice concerns, interviews were also conducted with community members in the GWP plume area. The results of these interviews are summarized below.

Interviews were conducted with Ms. Mary Jane Barron, property owner within the Source Area; Ms. Nancy Fram, former property owner within the Source Area; Mr. Ron Courts, City of Roswell Environmental Services Manager; Mr. Steve Jetter, NMED SOS Technical Team Leader; and, Mr. Chris Cortez, Operations Manager with Atkins Engineering Associates Inc.

No emergency responses have been required at the CTF. All interviewees felt well informed about the Site, believed the cleanup was good and needed for the community and that progress is being made. Interviewees complimented RPM Michael Torres for his professionalism, working well with stakeholders and interested parties, keeping people informed and advancing the cleanup project.

The interviewees expressed several concerns, including the expansion of the ground water plume, the lack of funding for full remedy implementation and wasting tax payer's money by putting in ERD injection wells and not following up with amendment injections into those wells. One interviewee suggested that EPA could have saved money by purchasing the properties in the Source Area and demolishing the buildings, which consequently would not require VIMS and would allow more freedom to place SVE and ground water "pump and treat" systems that could be more efficient. Furthermore, according to this interviewee, this demolition approach could have allowed for more efficient redevelopment of the Site. Moreover, this interviewee also suggested that EPA should implement this demolition option if the Agency can save money. EPA's decision making process on remedial actions are based on multiple requirements and we will work with property owners to identify the most favorable approach possible.

Mr. Cortez, the Operations Manager, said that the VIMS and SVE technology/systems are operating efficiently and effectively, based on the fact that the VIMS has been turned off and part of the SVE system has been shut down for rebound testing. According to Mr. Cortez, maintenance on the VIMS and SVE systems appears to be minor with no major problems reported. Mr. Cortez said that it has been easy to work with EPA and CH2M by using the internet-based SharePoint for communicating, documenting and report sharing. Mr. Cortez said the SharePoint portal is an efficient, cost-saving measure.

NMED's SOS Technical Team Leader, Mr. Jetter, identified implementation of the Source Area Soil, Soil Vapor and Vapor Intrusion remedy components and the partial redevelopment occurring in the Source Area as positive movements. However, he is concerned about the limited funding available, considering that the GWP continues to migrate and expand, which could also increase the Site-wide remedy and construction completion costs. Mr. Jetter pointed out that the GWP hotspot has more than tripled in size and the GWP has extended to the south by over 1.5 miles since the ROD was issued in 2008.

The complete interview forms are provided in Appendix E.

<u>Data Review</u>

Source Area Soil, Soil Vapor and Indoor Air

VIMS

PCE concentrations in the indoor air VIMS rebound samples did not exceed the RSL of 11 $\mu g/m^3$ during the 12-month VIMS shutdown period, but several samples had PCE concentrations above the indoor air RG of 0.81 $\mu g/m^3$ established in the ROD (Figure 3). PCE concentrations in indoor air rebound samples collected at the VIMS-equipped buildings in July 2015 (3 months), October 2015 (6 months) and April 2016 (12 months) after shutdown were generally similar to those observed in April 2015 (before VIMS shutdown), except for the PCE concentrations detected in one building in June 2015 (9.18 $\mu g/m^3$), July 2015 (4.74 $\mu g/m^3$) and October 2015 (0.90 $\mu g/m^3$), which were higher than the concentration observed in April 2015 (0.08 $\mu g/m^3$).

TCE was also detected in the indoor air samples at concentrations greater than the RSL of 0.48 $\mu g/m^3$ collected at one building during July 2015 (2.68 $\mu g/m^3$), October 2015 (1.22 $\mu g/m^3$) and April 2016 (0.61 $\mu g/m^3$). The elevated PCE and TCE concentrations observed in these samples are not believed to be related to vapor intrusion because other VIMS-equipped buildings would have likely demonstrated similarly abrupt increases in COC concentrations. These elevated COC concentrations were attributed to an unidentified background volatile organic compound source (caulking or sealing foam for example) or from the building interior such as recently replaced carpeting. PCE and TCE concentrations have decreased below the RSLs since the June 2015 sampling event.

The home on Hahn Street was sampled in April 2017, and the PCE concentration in indoor air (0.06 $\mu g/m^3$) was found to be below the indoor air RG established in the ROD.

Soil Vapor Extraction System

Roughly 367 million cubic feet (ft^3) of soil vapor have been extracted by the SVE system from startup in January 2013 through April 2016. Between startup of the VIMS in November 2012 and the end of December 2015, approximately 1.7 billion ft^3 of soil vapor (VIMS and SVE) have been treated and approximately 450 pounds (33 gallons) of PCE have been recovered from the vadose zone.

The combined VIMS and SVE influent PCE concentration decreased from 72,400 $\mu g/m^3$ in November 2012 (startup of VIMS) to approximately 40 $\mu g/m^3$ in January 2015. PCE concentrations have increased to approximately 400 $\mu g/m^3$ as of October 2016, following VIMS shutdown in April 2015 and shutdown of the lower concentration Zone 3 SVE extraction wells in June 2016. Seasonal variability in the SVE influent PCE concentration has been observed, with concentrations increasing during the spring and summer months and declining during the fall and winter months. This variability could be attributed to two factors: warming of shallow subsurface soil and water table fluctuations.

Overall, the PCE mass removal rate has declined significantly since startup in January 2013, when between 32 and 38 pounds were recovered during the first quarter of SVE system operation (January to March 2013). Table 3 and Figure 4 (both provided in Appendix B) present PCE concentrations observed at the Zone 1, Zone 2 and Zone 3 SVE wells and VMPs, which have shown significant PCE concentration reductions since the November 2012 baseline sampling event. The highest PCE concentrations still occur in the deep portion of Zone 2, where an average concentration of 9,100 $\mu g/m^3$ was present in April 2016, versus 2,809 $\mu g/m^3$ in Zone 1 and 68 $\mu g/m^3$ in Zone 3. The Zone 1 and Zone 2 soil vapor PCE concentration still exceed the soil vapor RG of 370 $\mu g/m^3$.

Source Area Ground Water

The PCE sampling history for all SAGW and GWP area monitoring and private supply wells are summarized in Table 4 (provided in Appendix B). In general, PCE concentrations observed in 2015 remain consistent with historical trends that show large fluctuations at some monitoring wells (greater than 200%), and both increasing and decreasing concentrations observed at others. Within the Source Area, PCE concentrations have decreased at many alluvial Zone P1 and Zone P3 monitoring wells since 2010. The most significant declines have occurred in the most heavily contaminated Zone P1 monitoring wells (ED95-08, MW-11, MW-13 and MW-14). There are insufficient data to attribute the declining concentrations to a specific cause, but SVE system operations may be promoting volatilization of PCE from ground water to soil vapor, contributing to the lower PCE concentrations observed within the Zone P1 ground water in this area.

In 2015, 11 alluvial Zone P1 and Zone P3 monitoring wells in the Source Area had PCE concentrations greater than 1,000 µg/L. The highest concentration of PCE in the Zone P1 ground water occurred at monitoring well MW-14 (13,600 µg/L) and in Zone P3 at monitoring well ED95-12 (5,640 µg/L). It is also noted that PCE concentrations at monitoring well MW-21 (Zone P5 alluvial well) exceeded the EPA MCL of 5 µg/L for the first time in November 2013, and remained above the MCL in April 2015. Monitoring well MW-21 is the northernmost Zone P5 monitoring well in the Source Area.

Ground Water Plume

EPA and NMED have completed two additional private well surveys at the leading-edge portion of the GWP since the ROD was issued in 2008. These 2010 and 2012 surveys identified 76 private wells within the surveyed area that are used for either domestic water supply (40 wells) or landscape or livestock/crop irrigation (Atkins Engineering Associates, 2010, Atkins Engineering Associates, 2012). Fifty-eight of these wells are screened in the shallow aquifer and 18 are screened in the artesian aquifer. The majority of these 76 private wells have not been sampled for COCs.

The sampling histories of PCE and TCE for wells that were sampled are summarized in Tables 4 and 5, respectively. Table 6 contains a summary of 31 private wells sampled during the RDI (2010-2015). The list includes private wells identified in the post-ROD surveys and select wells identified and sampled during the earlier investigations. Since 2010, PCE has been detected in ground water samples collected from 20 of the 31 private wells and TCE has been detected in 6 of the 31 private wells. PCE concentrations in the private wells ranged from a high of 120 µg/L to a low of 0.16 µg/L. The highest concentration of TCE detected in a private well ground water sample was 5.8 µg/L.

Due to natural ground water flow patterns, the GWP hotspot and the leading edge of the GWP have expanded since the ROD was issued in 2008. As of 2012, the GWP hotspot area had expanded to the south from monitoring wells MW-27 and MW-28 to include monitoring wells MW-29 and MW-3 (Figure 1), while the PCE plume's leading edge expanded south and east to include monitoring wells MW-40, MW-41 and MW-42 (Figure 1). PCE concentrations at monitoring wells MW-40 and MW-41 increased from 4.6 µg/L and 24 µg/L, respectively, in April 2010, to 18.5 µg/L and 37.4 µg/L in April 2015. GWP ground water is used for livestock/crop irrigation, landscaping, and pond/private swimming pools.

Based on sampling performed in April 2015, PCE concentrations in the six Zone P3 ERD injection wells ("IW" prefix) (the GWP hotspot area) ranged from 107 µg/L to 206 µg/L. In the Zone P7 monitoring wells, PCE concentrations ranged from less than 0.5 µg/L to 668µ g/L. TCE concentrations in the Zone P3 and P7 monitoring wells ranged from less than 2.0 µg/L to 7.3 µg/L, with a concentration of 11.3 µg/L detected in ERD injection well IWW-7. In the vicinity of the FINA 60 monitoring wells, PCE levels rose at monitoring well FINA 60 MW-10 from 0.98 µg/L in December 2014 to 109 µg/L in April 2015, while dropping from 490 µg/L to 210 µg/L over the same period at monitoring well FINA 60 MW-8. PCE was not detected at the three other FINA 60 monitoring wells.

The highest PCE concentrations in the GWP area occur at Zone P7 monitoring wells MW-28 (668 µg/L), MW-32 (328 µg/L) and MW-29 (258 µg/L) and ERD injection well IW-25 (247 µg/L), with slightly lower concentrations observed in Zone 3 monitoring well FINA 60 MW-8 (210 µg/L) and injection IW-P3-24 (206 µg/L). It remains unclear whether the comingled PCE occurrences in the GWP hotspot area and FINA 60 area originate from the same source. The current distributions of PCE and TCE in the GWP area are shown on Figures 5 and 6, respectively.

The hydrogeological conceptual site model (CSM) was reviewed based on the post-ROD ground water flow and laboratory analysis results. The most important finding from the RDI was the identification of alluvial Zone P3 within the FINA 60 portion of the GWP area. The Zone P3 FINA monitoring wells are screened at depths of 75 feet to 105 feet, which overlap with the 58-foot to 94-foot depth intervals present in the Source Area, indicating a potential for hydrogeologic connectivity between the Source Area and FINA 60. However, based on the observed distribution of PCE in Zone P7, it is believed there may be multiple hydrogeologic transport pathways between the Site's Source Area and the GWP. Seasonal water level fluctuations are also more pronounced (approximately 20 feet in monitoring well MW-29) in the downgradient area of Zone P7 than in the upgradient area (approximately 9 feet in monitoring well MW-25). This is likely due to the proximity of irrigation wells, and possibly related to a higher degree of vertical connectivity between Zones P3 and P7 in the downgradient areas, but this is not certain.

Focused Risk Assessment

Consistent with the Optimization Team recommendations, EPA performed a focused risk assessment (EPA, 2015b, 2017a) to assess potential cancer and noncancer health risks associated with exposure to PCE and TCE present in ground water within the GWP Area. The exposure pathways evaluated included those typical of an agricultural land use, and a vapor intrusion scenario to estimate potential risks associated with PCE and TCE volatilization from ground water to indoor air. The agricultural land use scenario includes direct exposure to contaminated ground water through ingestion, dermal contact and inhalation and indirect exposure to contaminated media through the consumption of produce (including pecans) from private gardens irrigated with contaminated well water, beef and milk from locally raised cattle and local poultry and eggs. It was also found that some farmers in Roswell raise emu for meat and egg consumption. While a person might not be exposed to all these contaminated sources all at one time, the risk assessment considered that a farmer could be at risk due to combinations of direct exposures.

To estimate exposure point concentrations for the agricultural exposure scenario, PCE and TCE concentrations for ground water samples collected from monitoring well FINA 60 MW-08 and private well SM-04 were used. For the vapor intrusion assessment, data from monitoring well FINA 60 MW-08 and private wells SM-04, SM-19, 1802 S. Beach, AEA-7 and AEA-11 were used.

This assessment determined the following:

- **Agricultural Exposure Scenario**. The estimated ELCR for the two wells was 8×10^{-5} (FINA 60 MW-08) and 1×10^{-5} (SM-04), which lie within the CERCLA target risk range of 1×10^{-4} to 1×10^{-6}. The noncancer hazard index was estimated at 10 (monitoring well FINA MW-08) and 1.5 (private well SM-04), which are greater than the CERCLA threshold of 1.0.

- **Vapor Intrusion.** The estimated inhalation ELCR ranged from 2.6×10^{-5} to 3.2×10^{-6}, which lie within the CERCLA 1×10^{-4} to 1×10^{-6} risk range. The noncancer hazard index ranged from 0.8 to 6.4; five of the six wells had a hazard index greater than the CERCLA threshold of 1.0.

More information is needed on the temporal and spatial representativeness of the samples used for the vapor intrusion evaluation to assess the cancer and noncancer risk estimates across the GWP area. The PCE (202 µg/L) and TCE (14.8 µg/L) concentrations at monitoring well FINA 60 MW-08 that were used are lower than those observed in the residential area southwest of the Source Area near monitoring well MW-36. PCE concentrations at monitoring well MW-36 range from 209 to 598 µg/L and TCE concentrations range from 6.9 to 14.2 µg/L. Based on the risk analysis performed on monitoring well FINA 60 MW-08, unacceptable indoor air risks may occur at homes in the neighborhood southwest of the Source Area. This FYR recommends further investigations of this risk and conducting representative vapor intrusion indoor air and soil gas sampling in areas that exceed the screening levels used in the calculation (See Section VI Issues/Recommendations of this FYR report).

Site Inspection

EPA conducted the FYR site inspection on October 26, 2016. In attendance were Mr. Michael Torres, EPA Region 6 RPM; Mr. Allan Pasteris, NMED Project Manager; Mr. Chris Cortez, Operations Manager with Atkins Engineering Associates Inc.; and Mr. Ron Courts, Environmental Services Manager, City of Roswell. The primary purpose of the inspection was to assess the protectiveness of the remedy at the Source Area, since this is the only remedy component implemented and functioning since September 2012.

Participants met at the Source Area. After a safety briefing, Mr. Chris Cortez led the inspection through the CTF. Mr. Cortez identified the various CTF equipment and vapor sampling ports. Everything appeared in good repair and proper working order. Mr. Cortez demonstrated CH2M's Project SharePoint website, where he can access relevant documents that include a Health and Safety Plan, Quality Assurance Project Plan, Sampling Plan, and as-built drawings for the facility. The signage on the building entrances and exits properly identified potential hazards. Mr. Cortez identified the VIMS and SVE wells, trenches and junction boxes. Mr. Allan Pasteris identified the injection wells and additional monitoring wells installed related to the implementation of the GWP hotspot ERD remedy.

Site inspection documentation is provided in Appendix D.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents

Source Area Soil, Soil Vapor and Indoor Air

Performance data from the VIMS indicate that this remedy component is effective at reducing PCE concentrations in indoor air at the VIMS-equipped buildings. Although the implemented remedy is not meeting the RGs in the 2008 ROD, it is reducing indoor air contaminant levels to a $1x10^{-6}$ excess lifetime cancer risk (*see supra* footnote 1), which is the risk level that EPA sought to attain with the RGs selected in the ROD.

The SVE system has also been effective in reducing PCE concentrations in each of the three zones in the vicinity of each SVE well and VMP. It appears that overall PCE removal rates have become diffusion-limited (limited by the rate of gas movement from small pores within the soil matrix) in each of the three SVE zones, with PCE concentrations in Zone 3 (northern portion of the 1100 block) declining below the soil vapor RG at all VMPs for the first time since SVE startup in January 2013. Now that PCE removal is diffusion-limited, the system will shift from continuous to pulsed (i.e., intermittent) operation.

A temporary well drilling moratorium has been instituted for new wells located within a designated area, which includes the entire area within the contaminated GWP boundary (NMOSE's well-drilling moratorium map is provided in Appendix C). NMED used the NMOSE database to inventory the private wells located within the GWP.

Source Area Ground Water

The SAGW remedy has not been constructed. RD is complete and construction may begin in early 2018.

Ground Water Plume

The GWP ERD is not in operation and the hydraulic containment remedy has not been constructed. Additional activities as outlined by the Optimization Team, are planned.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and RAOs used at the time of the remedy selection still valid?

Changes in Standards and To Be Considered Criteria

The soil vapor RG of 370 $\mu g/m^3$ for PCE was developed using the Johnson and Ettinger model at the time of the ROD (2008). It is designed to ensure that the level of subsurface soil vapor remediation achieved is protective of the indoor air. At the time the ROD was executed, toxicity values for evaluating potential cancer and noncancer risks for PCE exposure were under review. In the absence of relevant toxicity values in the Integrated Risk Information System (IRIS), EPA used the California EPA Air Toxic Hot Spots Program inhalation unit risk factor. However, since the ROD, updated toxicity values for PCE were published in IRIS in 2011, 2012 and 2014 (EPA, 2017b). The updated toxicity values have changed, resulting in proportionally higher indoor air and soil vapor RGs. This change does not affect public health and environmental protectiveness, but provides new information to be considered for a future remedy modification at the Site.

Changes in Exposure Pathways

The Optimization Review Report (EPA, 2015a) pointed out that the RAOs specified in the ROD state that EPA will prevent direct exposure to ground water contamination above MCLs. However, the evaluation of human health risks is based on a variety of potential exposure pathways, and children may be potential receptors at some of the unincorporated area residences that have PCE- or TCE-impacted domestic wells where ground water is used for various uses. The Optimization Team's recommendation to perform an independent review of existing or new potential site risks was completed by EPA. The review identified agricultural exposure scenarios not originally contemplated in the ROD. Based on the agricultural exposure scenarios, target reference levels of 20 µg/L for PCE and 1.5 µg/L for TCE were calculated (EPA, 2017a). The reference levels identify the concentrations of comingled PCE and TCE in ground water at a domestic well, which if not used for drinking water purposes will meet the CERCLA target risk range for non-drinking water uses.

In the baseline risk assessment that supported the ROD, vapor intrusion to indoor air within the GWP area was not identified as an exposure pathway due to the depth to Zone P7 (i.e. greater than 100 feet).

The vapor intrusion assessment described in the Focused Risk Assessment section above indicates that vapor intrusion is an important pathway in the GWP area.

Expected Progress Toward Meeting RAOs

The Optimization Team Report (EPA, 2015a) recommended a focus on addressing the Source Area as a high-priority activity. The Optimization Team concluded that treating or controlling the Source Area is the activity that will most significantly influence plume mass and reduce the time required to restore beneficial use in the GWP area. Addressing the Source Area as a high priority will also reduce life-cycle remediation costs because it will reduce the number of years that downgradient remedies will need to be maintained and monitored. In addition, by controlling the Source Area, decreasing PCE concentrations downgradient of the Source Area should provide information to better understand contaminant fate and transport for the broader ground water plume. Once the unacceptable risks have been addressed and the source is controlled or treated, the Site team can better characterize the GWP, including the hotspot, evaluate whether there are other potential sources contributing to the plume and evaluate the costs and benefits of additional plume remediation.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

Current RDI information indicates that the leading edge of the ground water plume is expanding to the southeast.

VI. ISSUES/RECOMMENDATIONS

Issues and Recommendations Identified in the Five-Year Review:

Remedial Component: Source Area Soil, Soil Vapor and Indoor Air	**Issue Category: Changed Site Conditions**			
	Issue: Indoor air RGs are not consistent with current toxicity data. The ROD's RGs for PCE and TCE in indoor air are based on outdated toxicity data. At the time the ROD was implemented (2008), cancer toxicity values for evaluating potential exposure to PCE were under review. Since the ROD, updated toxicity values for PCE were published in IRIS in 2011, 2012 and 2014.			
	Recommendation: EPA will consider updating the Site RGs for indoor air to reflect EPA's current understanding of the toxicity of the COCs. Public health protection would not be affected by this potential change because the existing RGs are below the current Regional Screening Levels (RSLs). Any proposed change to the RGs would include public participation and NMED review as part of a ROD amendment that follows the NCP process.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party/Support Agency**	**Milestone Date**
No	No	EPA	EPA	9/30/2023

<table>
<tr><td rowspan="3">Remedial Component: Source Area Soil, Soil Vapor and Indoor Air</td><td colspan="4">Issue Category: Institutional Controls</td></tr>
<tr><td colspan="4">Issue: ICs identified in the ROD have not been implemented. The ROD identified temporary institutional controls (TIC) that should be implemented to protect against inadvertent exposure to contaminated soil, soil vapor and ground water during the timeframe between remedial construction and the achievement of RGs.</td></tr>
<tr><td colspan="4">Recommendation: EPA and NMED must facilitate implementation of the ICs described in the ROD for the following remedy components (see ROD Section 2.9.1, Common Elements): Source Area Soil, Soil Vapor and Indoor Air,</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Party Responsible</td><td>Support Agency</td><td>Milestone Date</td></tr>
<tr><td>Yes</td><td>Yes</td><td>EPA</td><td>State</td><td>10/01/2018</td></tr>
</table>

<table>
<tr><td rowspan="3">Remedial Components: Source Area Ground Water and Ground Water Plume Area</td><td colspan="4">Issue Category: Monitoring</td></tr>
<tr><td colspan="4">Issue: PCE distribution in ground water is not adequately defined or characterized in a number of areas and aquifer zones.</td></tr>
<tr><td colspan="4">Recommendation: Continue ground water monitoring and site characterization to adequately define PCE distribution at the site to ensure that proposed RA activities can effectively clean up the plume. At the leading-edge portion of the plume, provide point-of-use GAC units at the wellhead, if necessary.</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Party Responsible</td><td>Support Agency</td><td>Milestone Date</td></tr>
<tr><td>Yes</td><td>Yes</td><td>EPA/State</td><td>State</td><td>September 2018</td></tr>
</table>

<table>
<tr><td rowspan="3">Remedial Components: Source Area Ground Water and Ground Water Plume Area</td><td colspan="4">Issue Category: Changed Site Conditions</td></tr>
<tr><td colspan="4">Issue: The ground water plume has expanded since the 2008 ROD (see Figures 1, 5, and 6). From 2008 to 2015, the leading edge of the plume has expanded about 2200 feet to the southeast.</td></tr>
<tr><td colspan="4">Recommendation: Implement a ground water plume management plan that will insure that the well owners and users will not be drinking potentially impacted water. This will include a public information campaign and a month-long water well sampling event in conjunction with the State.</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Party Responsible</td><td>Support Agency</td><td>Milestone Date</td></tr>
<tr><td>Yes</td><td>Yes</td><td>EPA</td><td>EPA</td><td>ASAP</td></tr>
</table>

VII. PROTECTIVENESS STATEMENT

Sitewide Protectiveness Statement	
Protectiveness Determination. Protectiveness Deferred	*Planned Addendum Completion Date:* 9/28/2018
Protectiveness Statement: ***Protectiveness Deferred*** A protectiveness determination for the remedy at the Site cannot be made at this time until further information is obtained. Further information will be obtained by taking the following actions: 1) As soon as possible, conduct a month-long sampling event for private well residents to submit their well water for testing in the hot spot and ground water plume area (see Figures 1, 5 and 5). (During this event we will implement a ground water plume management plan that will ensure that the well owners and users will not be drinking potentially impacted water in the hot spot and ground water plume area (see Figures 1, 4, and 5). This will include a public information campaign to notify well owners and users that well water could potentially be impacted and to notify residents what the safe uses of untested well water may be.) 2) Resample existing monitoring wells, and survey and evaluate the construction details and uses of existing private wells beginning in January 2018. 3) Conduct representative vapor intrusion to indoor air and soil gas sampling in areas where ground water exceeds the screening levels used in the calculation for COCs by summer 2018.	

VIII. NEXT REVIEW

The next FYR report for the McGaffey and Main Ground Water Plume Superfund Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

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APPENDIX B – FIGURES AND DATA SUMMARY TABLES

FIGURES

Figure 1. Ground Water Plume PCE Extent

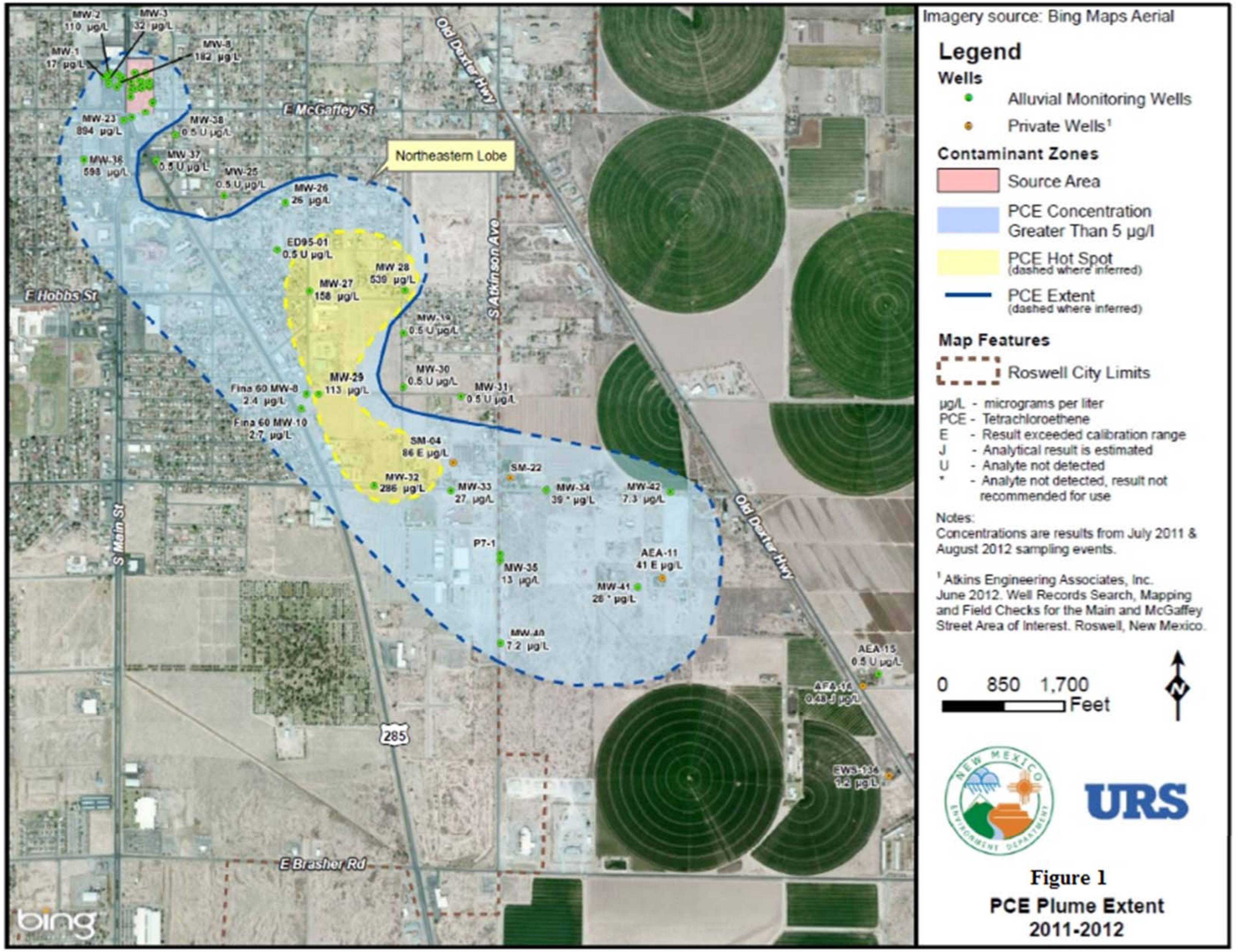


Figure 2. Vapor Intrusion Mitigation System and Soil Vapor Extraction System

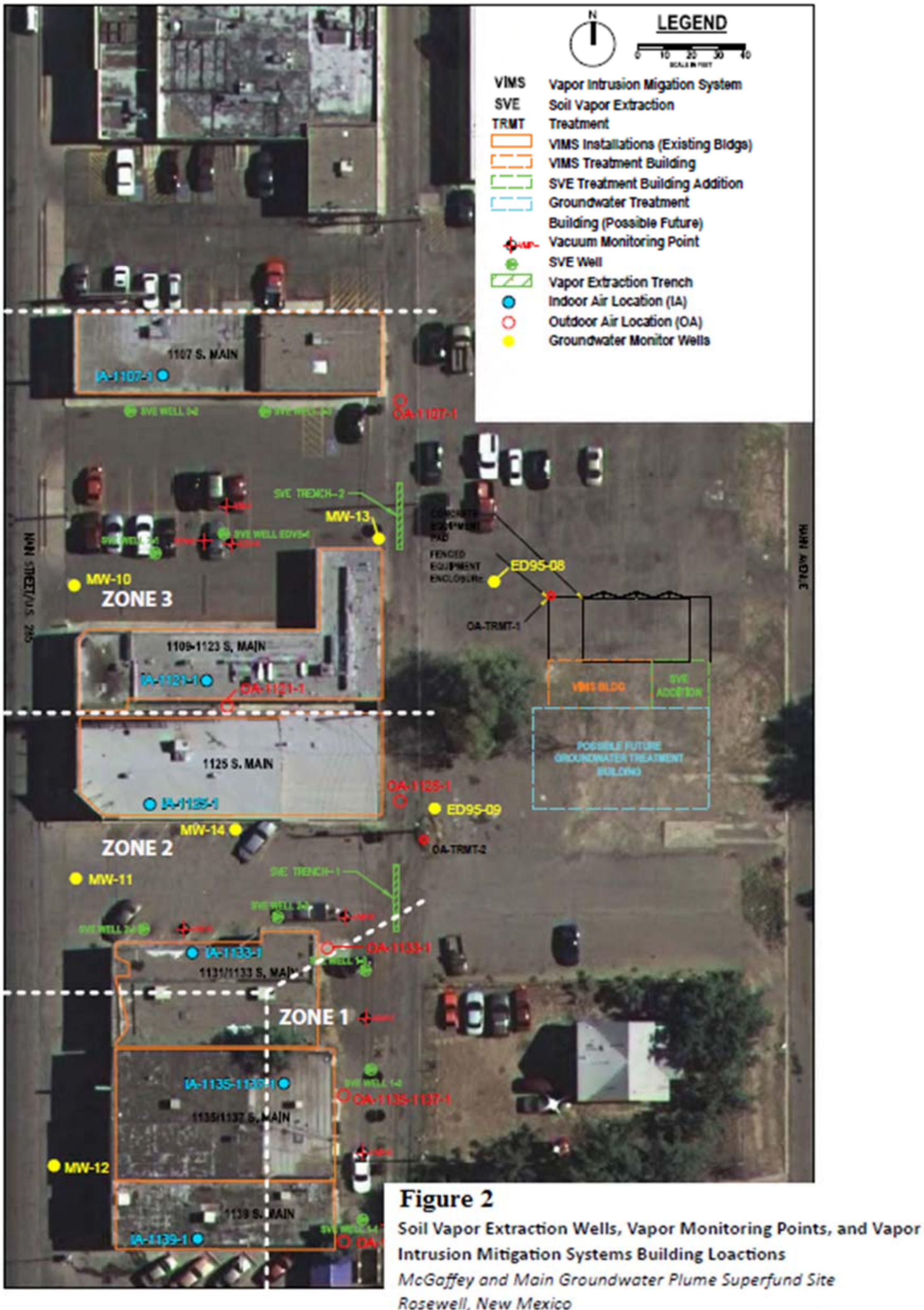
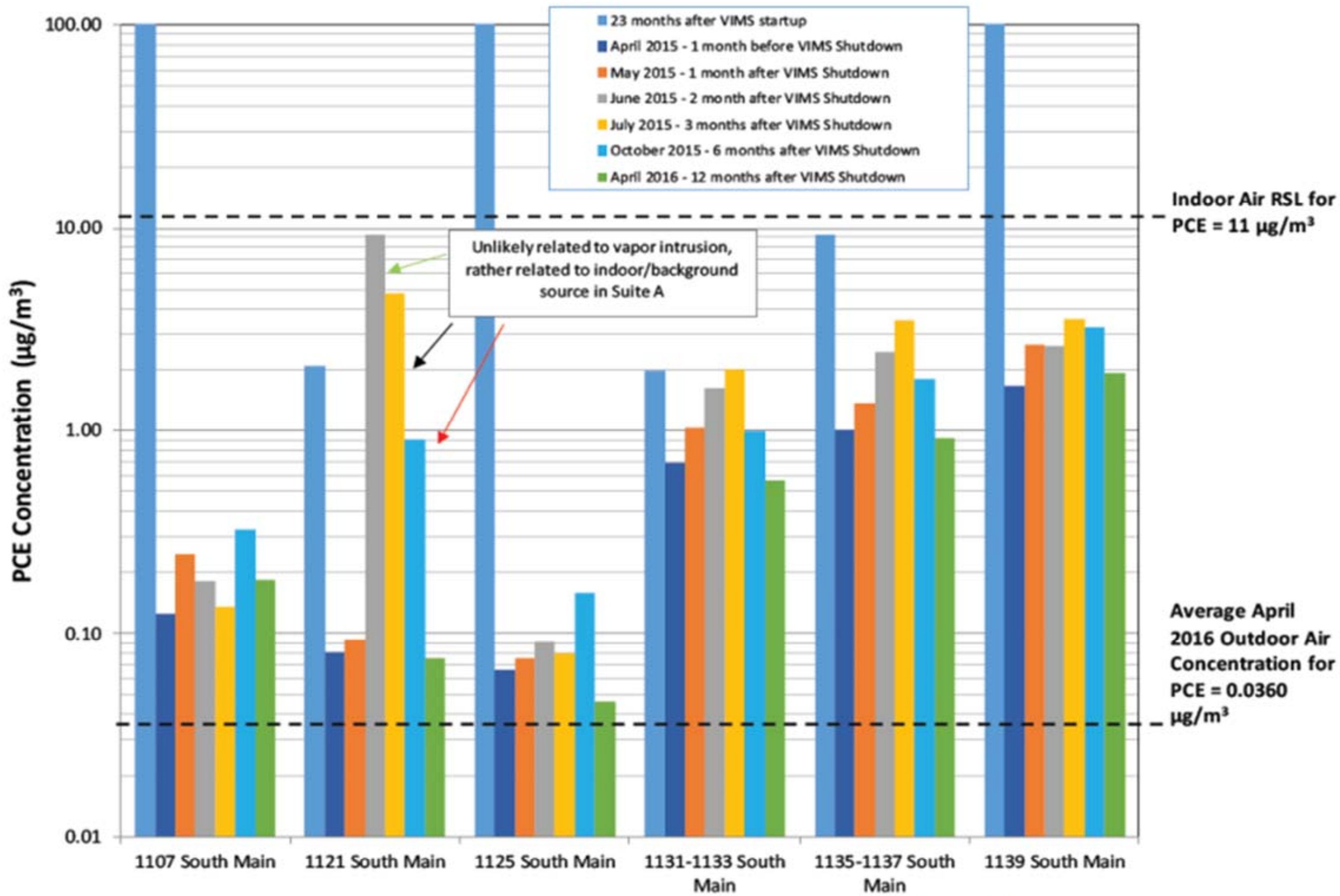


Figure 3. PCE Indoor Air Concentrations During Vapor Intrusion Mitigation System Shutdown

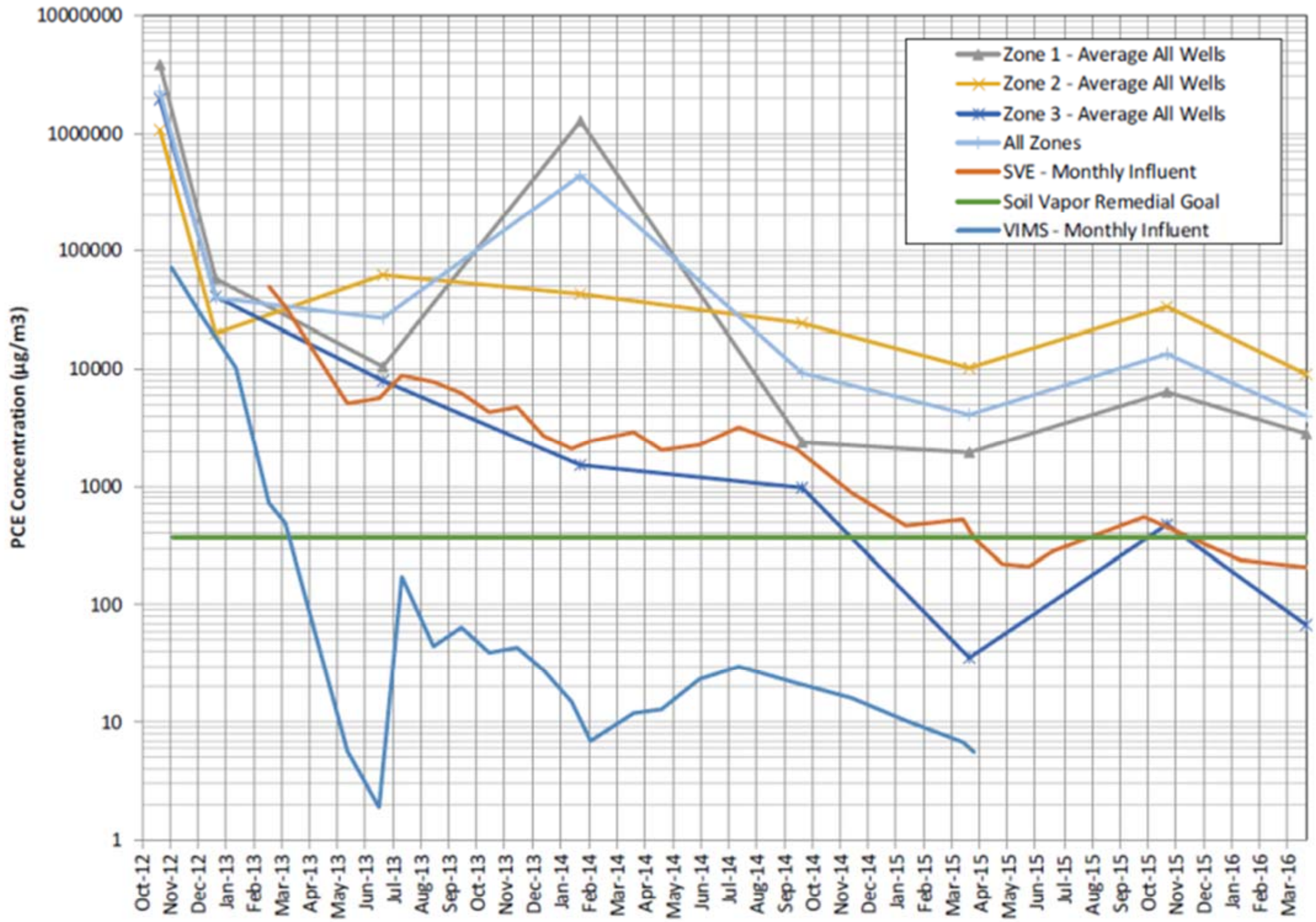


Legend:
µg/m3 = micrograms per cubic meter
PCE = tetrachloroethene
RSL = regional screening level
VIMS = Vapor Intrusion Mitigation System

Figure 3
PCE Indoor Air Concentrations During VIMS Shutdown
McGaffey and Main Groundwater Plume Superfund Site
Rosewell, New Mexico

ch2m:

Figure 4. PCE Concentrations All SVE Zones



Legend:
µg/m3 = micrograms per cubic meter
PCE = tetrachloroethene
SVE = soil vapor extraction zone
VIMS = Vapor Intrusion Mitigation System

Figure 4
PCE Concentrations All SVE Zones
McGaffey and Main Groundwater Plume Superfund Site
Rosewell, New Mexico

ch2m:

Figure 5. PCE Plume Extent (2015)

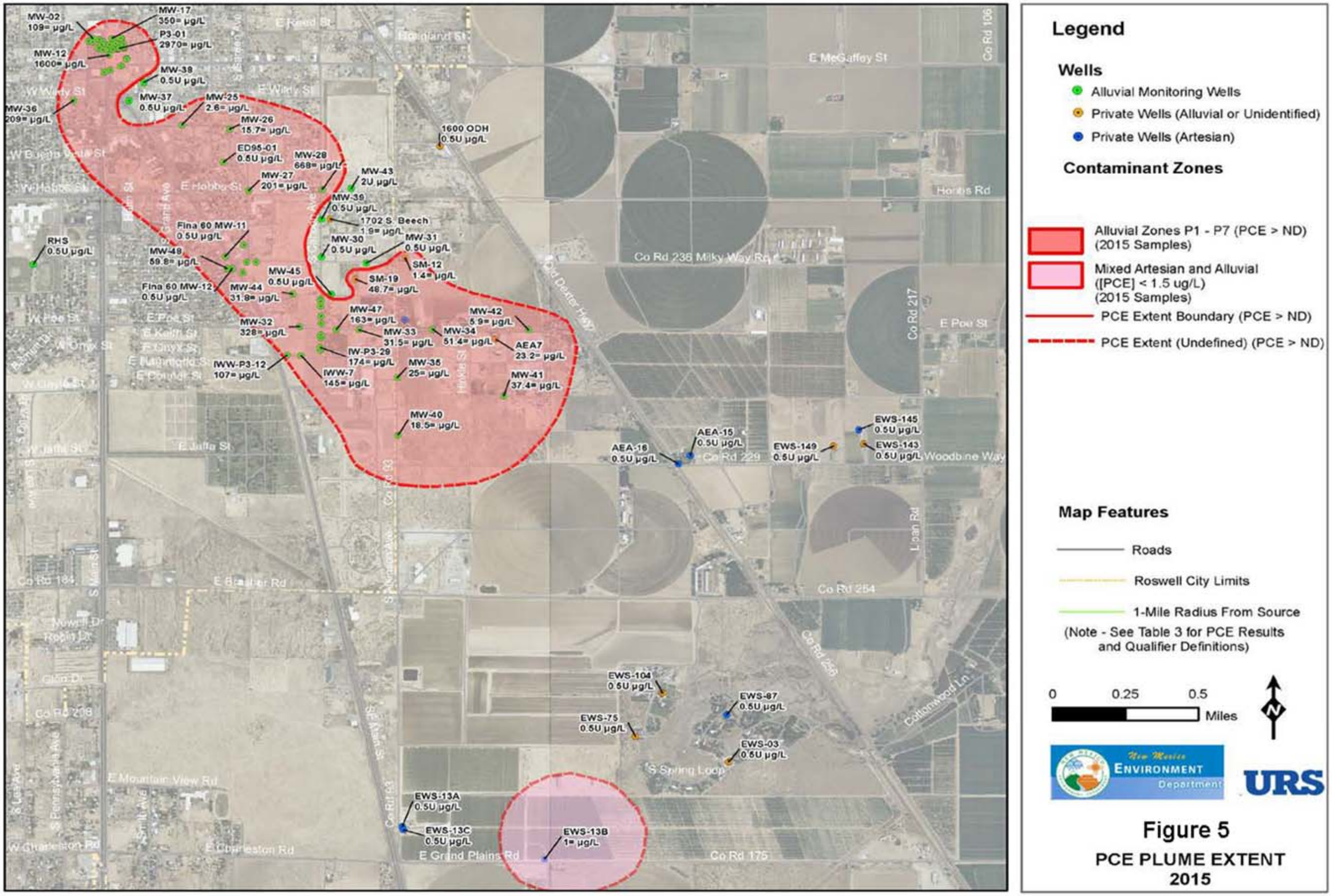
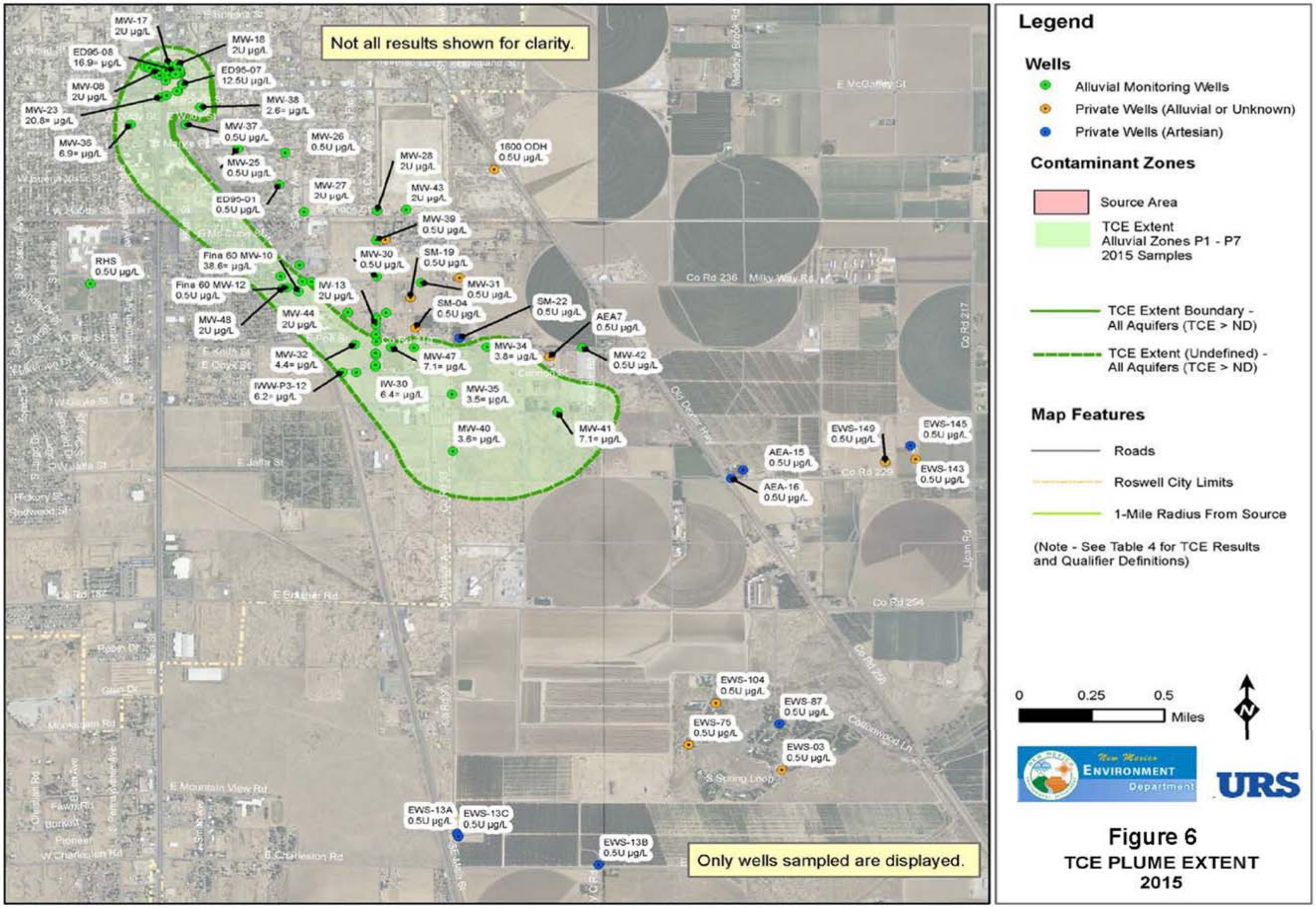


Figure 6. TCE Plume Extent (2015)



McGaffey and Main Ground Water
Plume Superfund Site
Chaves County, New Mexico

First Five-Year Review Report
September 2017

TABLES

Table 3. Soil Vapor Extraction System - Volatile Organic Compounds Sampling Summary

Sample Location	Event (Time from Start-up [January 2013])	Sample Date	Volatile Organic Compounds (µg/m³) Vinyl Chloride	1,1-Dichloroethene	Trans-1,2-Dichloroethylene	Cis-1,2-Dichloroethylene	TCE	PCE
Remedial Goal [a]			220	21,000	6,300	6,300	18	370
SVE Wells - Zone 1								
SVE 1-1	Baseline	11/15/2012	**2,560** U	4,640 J	**7,860** J	**948,000**	**138,000**	**4,040,000**
SVE 1-1	Baseline	11/15/2012	**2,600** U	4,760 J	**7,900** J	**871,000**	**127,000**	**3,580,000**
SVE 1-1	2 month	3/19/2013	0.952 U	1.48 U	1.48 U	1.48 U	2.00 U	23.1
SVE 1-1	2 month	3/19/2013	1.01 U	1.57 U	1.57 U	1.57 U	2.12 U	2.68 U
SVE 1-1 well vault (WV)	2 month	3/19/2013	102 U	158 U	158 U	158 U	**214** U	**38,300**
SVE 1-1 well vault	7 month	7/23/2013	0.69 U	1.1 U	1.1 U	1.1 U	1.5 U	53
SVE 1-1 well vault	14 month	2/12/2014	117 U	182 U	182 U	393 J	**246** U	**5,730**
SVE 1-1 well vault	22 month	10/22/2014	0.887 U	1.38 U	1.38 U	1.38 U	1.86 U	2.35 U
SVE 1-1 well vault	28 month	4/8/2015	2.17 U	3.36 U	3.36 U	3.36 U	4.55 U	364
SVE 1-1 well vault	35 month	11/10/2015	0.78 U	1.21 U	1.21 U	3.27 J	6.55	**631**
SVE 1-1 well vault	40 month	4/6/2016	0.819 U	1.27 U	1.27 U	1.27 U	1.72 U	18.6
SVE 1-1 well vault	46 month	10/4/2016	0.764 U	1.19 U	1.19 U	22.2	19.3	**1,240**
SVE 1-2	Baseline	11/15/2012	**15,000** U	**23,300** U	**23,300** U	**706,000**	**517,000**	**22,200,000**
SVE 1-2	2 month	3/19/2013	197 U	306 U	306 U	378 J	**1,150** J	**139,000**
SVE 1-2 well vault	7 month	7/23/2013	276 U	428 U	428 U	428 U	**595** J	**46,800**
SVE 1-2 well vault	14 month	2/11/2014	12.3 U	19.1 U	19.1 U	80.7	**222**	**10,400**
SVE 1-2 well vault	22 month	10/22/2014	1.03 U	1.59 U	1.59 U	1.59 U	2.16 U	2.72 U
SVE 1-2 well vault	28 month	4/8/2015	1.05 U	1.62 U	1.62 U	1.62 U	2.20 U	70.4
SVE 1-2 well vault	35 month	11/10/2015	0.998 U	1.55 U	1.55 U	10.4	21.00	**1,720**
SVE 1-2 well vault	40 month	4/6/2016	1.05 U	1.63 U	1.63 U	1.63 U	2.21 U	112
SVE 1-2 well vault	46 month	10/4/2016	2.39 U	3.71 U	3.71 U	3.71 U	5.03 U	**2,390**
SVE 1-3	Baseline	11/14/2012	**10,100** U	15,700 U	**15,700** U	**1,780,000**	**182,000**	**15,200,000**
SVE 1-3	2 month	3/19/2013	12.1 U	18.8 U	18.8 U	25.9 J	**46.4** J	**6,640**
SVE 1-3 well vault	7 month	7/23/2013	12 U	19 U	19 U	46 J	**195**	**8,280**
SVE 1-3 well vault	14 month	2/12/2014	1.01 U	1.56 U	1.56 U	1.56 U	2.62 J	64
SVE 1-3 well vault	22 month	10/22/2014	1.08 U	1.68 U	1.68 U	1.68 U	2.28 U	2.88 U
SVE 1-3 well vault	28 month	4/8/2015	1.10 U	1.70 U	1.70 U	1.70 U	2.30 U	31.4

Table 3. Soil Vapor Extraction System - Volatile Organic Compounds Sampling Summary

Sample Location	Event (Time from Start-up [January 2013])	Sample Date	Volatile Organic Compounds (μg/m³) Vinyl Chloride		1,1-Dichloroethene		Trans-1,2-Dichloroethylene		Cis-1,2-Dichloroethylene		TCE		PCE	
Remedial Goal [a]			220		21,000		6,300		6,300		18		370	
SVE 1-3 well vault	35 month	11/10/2015	0.998	U	1.55	U	1.55	U	3.83	J	6.83	J	**502**	
SVE 1-3 well vault	40 month	4/6/2016	0.967	U	1.50	U	1.50	U	1.50	U	2.03	U	29.3	
SVE 1-3 well vault	46 month	10/4/2016	1.16	U	1.80	U	1.80	U	1.80	U	2.44	U	3.08	U
VMPs - Zone 1														
VMP-7s	Baseline	11/14/2012	149	U	231	U	231	U	231	U	**612**	J	**188,000**	
VMP-7s	2 month	3/21/2013	0.772	U	1.2	U	1.2	U	1.2	U	2.02	J	**441**	
VMP-7s	7 month	7/25/2013	3.9	U	6.1	U	6.1	U	6	U	8.2	U	**2,280**	
VMP-7s	14 month	2/13/2014	3.59	U	5.57	U	5.57	U	5.57	U	7.54	U	**4,590**	
VMP-7s	14 month	2/13/2014	3.87	U	6.01	U	6.01	U	6.01	U	8.14	U	**5,240**	
VMP-7s	22 month	10/23/2014	3.25	U	5.04	U	5.04	U	5.04	U	10.4	J	**5,420**	
VMP-7s	22 month	10/23/2014	1.29	U	2.01	U	2.01	U	2.01	U	3.33	J	**2,240**	
VMP-7s	28 month	4/9/2015	2.06	U	3.19	U	3.19	U	3.19	U	4.33	U	**2,190**	
VMP-7s	35 month	11/11/2015	11.1	U	17.3	U	17.3	U	17.3	U	23.40	U	**8,420**	
VMP-7s	40 month	4/6/2016	2.00	U	3.11	U	3.11	U	3.11	U	4.21	U	**2,680**	
VMP-7s	46 month	10/5/2016	4.89	U	7.58	U	7.58	U	7.58	U	10.3	U	**5,970**	
VMP-7s	46 month	10/5/2016	4.86	U	7.54	U	7.54	U	7.54	U	10.2	U	**6,070**	
VMP-7i	Baseline	11/14/2012	1.95	U	3.02	U	3.02	U	3.02	U	5.52	J	**1,170**	J
VMP-7i	Baseline	11/14/2012	0.816	U	1.27	U	1.27	U	1.27	U	1.72	U	2.17	UJ
VMP-7i	2 month	3/21/2013	1.02	U	1.59	U	1.58	U	1.58	U	2.15	U	22.8	
VMP-7i	7 month	7/25/2013	10	U	16	U	16	U	188		**130**		**8,280**	
VMP-7i	14 month	2/13/2014	48.9	U	75.8	U	75.8	U	100	J	**134**	J	**18,700**	
VMP-7i	22 month	10/23/2014	0.824	U	1.28	U	1.28	U	1.28	U	1.73	U	**973**	
VMP-7i	28 month	NA	NA		NA		NA		NA		NA		NA	
VMP-7i	35 month	NA	NA		NA		NA		NA		NA		NA	
VMP-7i	40 month	NA	NA		NA		NA		NA		NA		NA	
VMP-7i	46 month	NA	NA		NA		NA		NA		NA		NA	
VMP-7d	Baseline	11/14/2012	149	U	231	U	231	U	**10,500**		**2,830**		**185,000**	
VMP-7d	2 month	3/21/2013	21.8	U	33.8	U	33.8	U	1,530		**1,070**		**373,000**	
VMP-7d	2 month	3/21/2013	39.8	U	61.7	U	61.7	U	1,500		**956**		**362,000**	

Table 3. Soil Vapor Extraction System - Volatile Organic Compounds Sampling Summary

Sample Location	Event (Time from Start-up [January 2013])	Sample Date	Volatile Organic Compounds (μg/m³)					
			Vinyl Chloride	1,1-Dichloroethene	Trans-1,2-Dichloroethylene	Cis-1,2-Dichloroethylene	TCE	PCE
Remedial Goal [a]			220	21,000	6,300	6,300	18	370
VMP-7d	7 month	7/25/2013	9.8 U	15 U	15 U	216	**250**	**8,210**
VMP-7d	7 month	7/25/2013	9.1 U	14 U	14 U	210	**235**	**7,520**
VMP-7d	14 month	2/13/2014	19.7 U	30.6 U	30.6 U	114	**159**	**17,000**
VMP-7d	22 month	10/23/2014	4.03 U	6.25 U	6.25 U	6.25 U	14.9 J	**4,680**
VMP-7d	28 month	4/9/2015	4.29 U	6.66 U	6.65 U	6.65 U	10.3 J	**4,550**
VMP-7d	35 month	11/11/2015	10.9 U	16.9 U	16.9 U	128.00	**120.0**	**13,900**
VMP-7d	35 month	11/11/2015	10.8 U	16.7 U	16.7 U	131.00	**123.0**	**13,700**
VMP-7d	40 month	4/6/2016	1.99 U	3.09 U	3.09 U	3.09 U	4.18 U	**2,510**
VMP-7d	40 month	4/6/2016	2.02 U	3.13 U	3.13 U	3.13 U	4.3 J	**2,640**
VMP-7d	46 month	10/5/2016	5.23 U	8.11 U	8.11 U	8.11 U	11.0 U	**5,660**
VMP-8s	Baseline	11/15/2012	136	10.8 U	15.8 J	188	**661**	**5,420**
VMP-8s	2 month	3/21/2013	0.863 U	1.34 U	1.34 U	1.37 J	6.55	137
VMP-8s	7 month	7/25/2013	12 U	18 U	18 U	18 U	**155**	**3,670**
VMP-8s	14 month	2/14/2014	1.11 U	1.72 U	1.72 U	3.59 J	**49.6**	**1,000**
VMP-8s	22 month	10/23/2014	1.56 J	2.41 U	2.41 U	5.36 J	**45.4**	**2,190**
VMP-8s	28 month	4/10/2015	0.796 U	1.23 U	1.23 U	1.23 U	3.71 J	172
VMP-8s	28 month	4/10/2015	0.777 U	1.21 U	1.21 U	1.21 U	4.37 J	169
VMP-8s	35 month	11/11/2015	0.827 U	1.28 U	1.28 U	1.28 U	14.7	**1,100**
VMP-8s	40 month	4/6/2016	1.94 U	3.01 U	3.01 U	3.01 U	12.3 J	**1,960**
VMP-8s	46 month	10/5/2016	5.20 U	8.10 U	8.10 U	8.10 U	10.9 U	**1,230**
VMP-8i	Baseline	11/15/2012	2.26 J	1.23 U	1.29 J	21.2	**34.5**	**731**
VMP-8i	2 month	3/21/2013	0.926 U	1.44 U	1.44 U	6.78	8.14	21.8
VMP-8i	7 month	7/25/2013	0.75 U	1.2 U	1.2 U	1.2 U	3.3 J	96
VMP-8i	14 month	2/14/2014	0.866 U	1.34 U	1.34 U	1.34 U	3.11 J	33.0
VMP-8i	22 month	10/23/2014	0.824 U	1.28 U	1.28 U	1.28 U	4.48 J	193
VMP-8i	28 month	NA	NA	NA	NA	NA	NA	NA
VMP-8i	35 month	NA	NA	NA	NA	NA	NA	NA
VMP-8i	40 month	NA	NA	NA	NA	NA	NA	NA
VMP-8i	46 month	NA	NA	NA	NA	NA	NA	NA

Table 3. Soil Vapor Extraction System - Volatile Organic Compounds Sampling Summary

			Volatile Organic Compounds (µg/m^3)					
Sample Location	**Event (Time from Start-up [January 2013])**	**Sample Date**	**Vinyl Chloride**	**1,1-Dichloroethene**	**Trans-1,2-Dichloroethylene**	**Cis-1,2-Dichloroethylene**	**TCE**	**PCE**
Remedial Goal [a]			220	21,000	6,300	6,300	18	370
VMP-8d	Baseline	11/15/2012	1.53 J	1.37 U	1.37 U	1.37 U	3.11 J	2.34 U
VMP-8d	2 month	3/21/2013	0.941 U	1.46 U	1.46 U	1.46 U	3.17 J	**339**
VMP-8d	7 month	7/25/2013	12 U	19 U	19 U	41 J	**192**	**13,700**
VMP-8d	14 month	2/14/2014	20.3 U	31.5 U	31.5 U	32.2 J	**212**	**22,100**
VMP-8d	22 month	10/23/2014	4.13 U	6.41 U	6.41 U	6.41 U	**62.3**	**4,210**
VMP-8d	28 month	4/10/2015	8.24 U	12.8 U	12.8 U	12.8 U	**53.0** J	**4,520**
VMP-8d	35 month	11/11/2015	4.50 U	6.98 U	6.98 U	6.98 U	**34.6**	**4,800**
VMP-8d	40 month	4/6/2016	1.97 U	3.06 U	3.06 U	3.06 U	**25.3**	**3,480**
VMP-8d	46 month	10/5/2016	3.35 U	5.20 U	5.20 U	5.20 U	7.05 U	**2,060**
VMP-9s	Baseline	11/15/2012	19.3 U	30 U	30 U	33.2 J	**56.3** J	**22,200**
VMP-9s	2 month	3/21/2013	0.975 U	1.51 U	1.51 U	1.51 U	3.06 J	**1,290**
VMP-9s	7 month	7/25/2013	1.7 U	2.7 U	2.7 U	2.7 U	4.1 J	**2,170**
VMP-9s	14 month	2/14/2014	2.35 U	3.65 U	3.65 U	3.65 U	4.94 U	**3,900**
VMP-9s	22 month	10/24/2014	0.835 U	1.29 U	1.29 U	1.29 U	1.75 U	**918**
VMP-9s	28 month	4/10/2015	4.19 U	6.49 U	6.49 U	6.49 U	8.79 U	**4,090**
VMP-9s	35 month	11/11/2015	10.7 U	16.5 U	16.5 U	16.5 U	**22.4** U	**10,300**
VMP-9s	40 month	4/6/2016	10.3 U	16.1 U	16.1 U	16.1 U	**21.7** U	**8,140**
VMP-9s	46 month	10/5/2016	10.2 U	15.8 U	15.8 U	15.8 U	**21.4** U	**4,660**
VMP-9i	Baseline	11/15/2012	39.8 U	61.7 U	61.7 U	61.7 U	**83.6** U	**38,400**
VMP-9i	2 month	3/21/2013	1.72 U	2.66 U	2.66 U	2.66 U	4.31 J	**2,190**
VMP-9i	2 month	3/21/2013	4.5 U	6.98 U	6.98 U	6.98 U	9.45 U	**2,190**
VMP-9i	7 month	7/26/2013	0.79 U	1.2 U	1.2 U	1.2 U	2.6 J	**952**
VMP-9i	14 month	2/14/2014	0.92 U	1.43 U	1.43 U	1.43 U	1.93 U	**1,050**
VMP-9i	22 month	10/24/2014	0.910 U	1.41 U	1.41 U	1.41 U	1.91 U	**633**
VMP-9i	28 month	NA	NA	NA	NA	NA	NA	NA
VMP-9i	35 month	NA	NA	NA	NA	NA	NA	NA
VMP-9i	40 month	NA	NA	NA	NA	NA	NA	NA
VMP-9i	46 month	NA	NA	NA	NA	NA	NA	NA
VMP-9d	Baseline	11/15/2012	2,010 U	3,120 U	3,120 U	**10,200** J	**11,600** J	**3,290,000**

Table 3. Soil Vapor Extraction System - Volatile Organic Compounds Sampling Summary

Sample Location	Event (Time from Start-up [January 2013])	Sample Date	Volatile Organic Compounds (μg/m³)											
			Vinyl Chloride		1,1-Dichloroethene		Trans-1,2-Dichloroethylene		Cis-1,2-Dichloroethylene		TCE		PCE	
Remedial Goal [a]			220		21,000		6,300		6,300		18		370	
VMP-9d	2 month	3/21/2013	387	U	601	U	601	U	601	U	**814**	U	**77,300**	
VMP-9d	7 month	7/26/2013	22	U	35	U	35	U	41	J	**132**	J	**30,600**	
VMP-9d	14 month	2/14/2014	49.1	U	76.2	U	76.2	U	76.2	U	**103**	U	**18,800**	
VMP-9d	22 month	10/24/2014	11.1	U	17.1	U	17.1	U	17.1	U	23.2	U	**10,900**	
VMP-9d	28 month	4/10/2015	10.1	U	15.6	U	15.6	U	15.6	U	21.1	U	**1,610**	
VMP-9d	35 month	11/11/2015	10.5	U	16.2	U	16.2	U	16.2	U	**22**	U	**15,600**	
VMP-9d	40 month	4/6/2016	11.3	U	17.5	U	17.5	U	17.5	U	**23.8**	U	**6,350**	
VMP-9d	46 month	10/5/2016	0.827	U	1.28	U	1.28	U	1.28	U	1.74	U	**680**	
SVE Wells - Zone 2														
SVE 2-1	Baseline	11/13/2012	**1,440**	U	2,230	U	2,230	U	**51,600**		**9,780**	J	**1,430,000**	
SVE 2-1	2 month	3/19/2013	10.3	U	16.1	U	16.1	U	127		**122**		**4,460**	
SVE 2-1 Well Vault	7 month	7/23/2013	2.7	U	4.1	U	4.1	U	47		**77**		**3,430**	
SVE 2-1 Well Vault	14 month	2/12/2014	1.06	U	1.64	U	1.64	U	2.38	J	2.22	U	79.3	
SVE 2-1 Well Vault	22 month	10/22/2014	1.10	U	1.71	U	1.71	U	1.71	U	2.31	U	2.92	U
SVE 2-1 Well Vault	28 month	4/8/2015	1.07	U	1.67	U	1.67	U	20.9		**19.5**		**766**	
SVE 2-1 Well Vault	35 month	11/10/2015	0.897	U	1.39	U	1.39	U	1.39	U	**1.97**	J	188	
SVE 2-1 Well Vault	40 month	4/6/2016	0.996	U	1.54	U	1.54	U	1.54	U	2.09	U	11.5	
SVE 2-1 Well Vault	46 month	10/4/2016	2.48	U	3.85	U	3.85	U	3.85	U	5.21	U	**2,170**	
SVE 2-2	Baseline	11/14/2012	**7,380**	U	11,500	U	**11,500**	U	**722,000**		**75,900**	J	**7,040,000**	
SVE 2-2	2 month	3/19/2013	101	U	157	U	157	U	1,440		**836**		**161,000**	
SVE 2-2 Well Vault	7 month	7/23/2013	52	U	81	U	81	U	369		**230**	J	**48,200**	
SVE 2-2 Well Vault	14 month	2/12/2014	1.03	U	1.61	U	1.61	U	1.61	U	2.17	U	2.75	U
SVE 2-2 Well Vault	14 month	2/12/2014	1.03	U	1.61	U	1.61	U	1.61	U	2.17	U	2.75	U
SVE 2-2 Well Vault	22 month	10/22/2014	1.07	U	1.67	U	1.67	U	1.67	U	2.26	U	2.85	U
SVE 2-2 Well Vault	22 month	10/22/2014	1.07	U	1.67	U	1.67	U	1.67	U	2.26	U	2.85	U
SVE 2-2 Well Vault	28 month	4/8/2015	0.972	U	1.51	U	1.51	U	1.51	U	2.04	U	2.58	U
SVE 2-2 Well Vault	28 month	4/8/2015	1.08	U	1.68	U	1.68	U	1.68	U	2.27	U	2.87	U
SVE 2-2 Well Vault	35 month	11/10/2015	0.918	U	1.42	U	1.42	U	1.42	U	1.93	U	2.44	U
SVE 2-2 Well Vault	35 month	11/10/2015	0.967	U	1.50	U	1.50	U	1.50	U	2.03	U	2.57	U

Table 3. Soil Vapor Extraction System - Volatile Organic Compounds Sampling Summary

Sample Location	Event (Time from Start-up [January 2013])	Sample Date	Volatile Organic Compounds (µg/m³)											
			Vinyl Chloride		1,1-Dichloroethene		Trans-1,2-Dichloroethylene		Cis-1,2-Dichloroethylene		TCE		PCE	
Remedial Goal [a]			220		21,000		6,300		6,300		18		370	
SVE 2-2 Well Vault	40 month	4/6/2016	0.952	U	1.48	U	1.48	U	1.48	U	2.00	U	5.52	J
SVE 2-2 Well Vault	40 month	4/6/2016	0.988	U	1.53	U	1.53	U	1.53	U	2.08	U	8.00	J
SVE 2-2 Well Vault	46 month	10/4/2016	2.32	U	3.61	U	3.61	U	3.61	U	4.88	U	**842**	
SVE 2-2 Well Vault	46 month	10/4/2016	2.30	U	3.57	U	3.57	U	3.57	U	4.83	U	**993**	
SVE Trench 1	Baseline	11/13/2012	**1,970**	U	3,060	U	3,060	U	3,060	U	**7,050**	J	**1,190,000**	
SVE Trench 1	2 month	3/19/2013	3.82	U	5.93	U	5.93	U	38.9		**18.2**	J	**2,000**	
SVE Trench 1 Well Vault	7 month	7/23/2013	0.82	U	1.3	U	1.3	U	39		**29**		**606**	
SVE Trench 1 Well Vault	14 month	2/12/2014	0.749	U	1.16	U	1.16	U	1.16	U	1.57	U	7.45	
SVE Trench 1 Well Vault	22 month	10/22/2014	0.855	U	1.33	U	1.33	U	1.33	U	1.80	U	4.55	J
SVE Trench 1 Well Vault	28 month	4/8/2015	0.777	U	1.21	U	1.21	U	1.21	U	1.63	U	5.38	J
SVE Trench 1 Well Vault	35 month	11/10/2015	1.15	U	1.78	U	1.78	U	1.78	U	2.41	U	6.62	J
SVE Trench 1 Well Vault	40 month	4/5/2016	0.902	U	1.40	U	1.40	U	1.40	U	1.90	J	2.83	J
SVE Trench 1 Well Vault	46 month	10/4/2016	1.54	U	2.38	U	2.38	U	2.38	U	3.23	U	4.08	U
SVE Trench 1 Well Vault	46 month	10/4/2016	1.56	U	2.42	U	2.42	U	2.42	U	3.28	U	4.14	U
VMPs - Zone 2														
VMP-5s	Baseline	11/14/2012	3.2	U	4.96	U	4.96	U	4.96	U	8.96	J	**1,790**	
VMP-5s	2 month	3/20/2013	0.988	U	1.53	U	1.53	U	1.53	U	2.35	J	145	
VMP-5s	7 month	7/25/2013	0.68	U	1.1	U	1.1	U	1.1	U	1.4	U	**938**	
VMP-5s	14 month	2/13/2014	10.2	U	15.8	U	15.8	U	15.8	U	**33.4**	J	**6,970**	
VMP-5s	22 month	10/23/2014	8.50	U	13.2	U	13.2	U	13.2	U	**33.8**	J	**8,620**	
VMP-5s	28 month	4/9/2015	4.76	U	7.38	U	7.38	U	7.38	U	10.0	U	**966**	
VMP-5s	35 month	11/11/2015	2.09	U	3.24	U	3.24	U	3.24	U	4.4	U	**2,390**	

Table 3. Soil Vapor Extraction System - Volatile Organic Compounds Sampling Summary

Sample Location	Event (Time from Start-up [January 2013])	Sample Date	Volatile Organic Compounds (µg/m³) Vinyl Chloride		1,1-Dichloroethene		Trans-1,2-Dichloroethylene		Cis-1,2-Dichloroethylene		TCE		PCE	
Remedial Goal [a]			220		21,000		6,300		6,300		18		370	
VMP-5s	40 month	4/6/2016	0.731	U	1.13	U	1.13	U	1.13	U	1.53	U	**996**	
VMP-5s	46 month	10/4/2016	58.5	U	90.8	U	90.7	U	90.7	U	123	U	155	U
VMP-5i	Baseline	11/14/2012	1.93	U	3	U	3	U	3	U	8.74	J	**1,060**	
VMP-5i	2 month	3/20/2013	0.965	U	1.5	U	1.5	U	1.5	U	2.03	U	137	
VMP-5i	7 month	7/25/2013	0.88	U	1.4	U	1.4	U	1.4	U	2.1	J	**1,500**	
VMP-5i	14 month	2/13/2014	10.8	U	16.7	U	16.7	U	16.7	U	**22.6**	U	**7,660**	
VMP-5i	22 month	10/23/2014	1.65	U	2.57	U	2.56	U	2.56	U	3.47	U	**2,000**	
VMP-5i	28 month	NA	NA		NA		NA		NA		NA		NA	
VMP-5i	35 month	NA	NA		NA		NA		NA		NA		NA	
VMP-5i	40 month	NA	NA		NA		NA		NA		NA		NA	
VMP-5i	46 month	NA	NA		NA		NA		NA		NA		NA	
VMP-5d	Baseline	11/14/2012	3.2	U	4.96	U	4.96	U	4.96	U	8.74	J	**2,900**	
VMP-5d	1 month	3/20/2013	0.944	U	1.46	U	1.46	U	1.46	U	4.59	J	**1,050**	
VMP-5d	2 month	3/20/2013	0.998	U	1.55	U	1.55	U	1.55	U	3.66	J	**1,060**	
VMP-5d	7 month	7/25/2013	7.0	U	11	U	11	U	14	J	**44**	J	**6,560**	
VMP-5d	14 month	2/13/2014	99.6	U	154	U	154	U	154	U	**209**	U	**66,000**	
VMP-5d	22 month	20/23/2014	3.74	U	5.81	U	5.81	U	5.81	U	7.87	U	**4,530**	
VMP-5d	28 month	4/9/2015	39.5	U	61.3	U	61.3	U	88.7	J	**258**	J	**45,200**	
VMP-5d	35 month	11/11/2015	98.0	U	152	U	152	U	152	U	**666**	J	**125,000**	
VMP-5d	40 month	4/6/2016	0.793	U	1.23	U	1.23	U	1.23	U	1.80	J	182	
VMP-5d	46 month	10/4/2016	81.1	U	126	U	126	U	126	U	170	U	**80,700**	
VMP-6s	Baseline	11/14/2012	11.5	U	17.9	U	17.9	U	17.9	U	**57.4**	J	**5,930**	
VMP-6s	2 month	3/21/2013	5.46	U	8.47	U	8.47	U	8.47	U	**24.3**	J	**5,970**	
VMP-6s	7 month	7/25/2013	13	U	20	U	20	U	20	U	**61**	J	**9,930**	
VMP-6s	14 month	2/13/2014	0.809	U	1.25	U	1.25	U	1.25	U	1.70	U	2.15	
VMP-6s	22 month	10/23/2014	122	U	190	U	190	U	190	U	**380**	J	**153,000**	
VMP-6s	28 month	4/9/2015	11.5	U	17.9	U	17.9	U	17.9	U	**35.3**	J	**16,400**	
VMP-6s	35 month	11/11/2015	38.2	U	59.3	U	59.3	U	59.3	U	**80.3**	U	**44,800**	
VMP-6s	40 month	4/6/2016	40.6	U	62.9	U	62.9	U	62.9	U	**85.2**	U	**18,800**	

Table 3. Soil Vapor Extraction System - Volatile Organic Compounds Sampling Summary

Sample Location	Event (Time from Start-up [January 2013])	Sample Date	Volatile Organic Compounds ($\mu g/m^3$)					
			Vinyl Chloride	1,1-Dichloroethene	Trans-1,2-Dichloroethylene	Cis-1,2-Dichloroethylene	TCE	PCE
Remedial Goal [a]			220	21,000	6,300	6,300	18	370
VMP-6s	46 month	10/4/2016	48.9 U	75.8 U	75.8 U	75.8 U	**103** U	**55,500**
VMP-6i	Baseline	11/14/2012	8.32 U	12.9 U	12.9 U	12.9 U	**28.4** J	**4,510**
VMP-6i	2 month	3/21/2013	5.23 U	8.11 U	8.11 U	8.11 U	**19** J	**4,770**
VMP-6i	7 month	7/25/2013	**723** U	1,120 U	1,120 U	1,120 U	**2,790** J	**478,000**
VMP-6i	14 month	2/13/2014	197 U	306 U	306 U	306 U	**414** U	**178,000**
VMP-6i	22 month	10/23/2014	10.8 U	16.8 U	16.8 U	16.8 U	**28.8** J	**10,500**
VMP-6i	28 month	NA	NA	NA	NA	NA	NA	NA
VMP-6i	35 month	NA	NA	NA	NA	NA	NA	NA
VMP-6i	40 month	NA	NA	NA	NA	NA	NA	NA
VMP-6i	46 month	NA	NA	NA	NA	NA	NA	NA
VMP-6d	Baseline	11/14/2012	21.3 U	33 U	33 U	33 U	**85.2** J	**32,700**
VMP-6d	2 month	3/21/2013	4.34 U	6.74 U	6.74 U	6.74 U	9.12 U	**1,560**
VMP-6d	7 month	7/25/2013	11.0 U	17.0 U	17.0 U	17.0 U	**38.0** J	**11,600**
VMP-6d	14 month	2/13/2014	197 U	306 U	306 U	306 U	**414** U	**128,000**
VMP-6d	22 month	10/23/2014	39.8 U	61.7 U	61.7 U	61.7 U	83.6 U	**39,000**
VMP-6d	28 month	4/9/2015	11.0 U	17.0 U	17.0 U	17.0 U	**23.0** U	**8,620**
VMP-6d	35 month	11/11/2015	39.8 U	61.7 U	61.7 U	61.7 U	**97.2** J	**64,600**
VMP-6d	40 month	4/6/2016	40.3 U	62.5 U	62.5 U	62.5 U	**84.7** U	**43,700**
VMP-6d	46 month	10/4/2016	48.9 U	75.8 U	75.8 U	75.8 U	**103** U	**59,700**
SVE Wells - Zone 3								
SVE 3-1	Baseline	11/12/2012	**2,940** U	4,560 U	4,560 U	4,560 U	**6,170** U	**4,330,000**
SVE 3-1	2 month	3/19/2013	10.4 U	16.1 U	16.1 U	16.1 U	**21.8** U	**5,000**
SVE 3-1 Well Vault	7 month	7/23/2013	4.3 U	6.7 U	6.7 U	6.7 U	9.1 U	**4,470**
SVE 3-1 Well Vault	14 month	2/12/2014	1.08 U	1.67 U	1.67 U	1.67 U	2.26 U	6.00 J
SVE 3-1 Well Vault	22 month	10/22/2014	1.11 U	1.73 U	1.73 U	1.73 U	2.34 U	3.73 J
SVE 3-1 Well Vault	28 month	4/8/2015	1.06 U	1.65 U	1.65 U	1.65 U	2.23 U	4.00 J
SVE 3-1 Well Vault	35 month	11/10/2015	0.967 U	1.50 U	1.50 U	1.50 U	2.03 U	3.45 J
SVE 3-1 Well Vault	40 month	4/5/2016	0.754 U	1.17 U	1.17 U	1.17 U	1.58 U	11.7
SVE 3-1 Well Vault	46 month**	NA	NA	NA	NA	NA	NA	NA

Table 3. Soil Vapor Extraction System - Volatile Organic Compounds Sampling Summary

Sample Location	Event (Time from Start-up [January 2013])	Sample Date	Volatile Organic Compounds (µg/m³) Vinyl Chloride		1,1-Dichloroethene		Trans-1,2-Dichloroethylene		Cis-1,2-Dichloroethylene		TCE		PCE	
Remedial Goal [a]			220		21,000		6,300		6,300		18		370	
SVE 3-2	Baseline	11/12/2012	**1,220**	J	661	U	661	U	**124,000**		**4,310**	J	**330,000**	
SVE 3-2	2 month	3/19/2013	48.9	U	75.8	U	75.8	U	75.8	U	**392**		**78,000**	
SVE 3-2 Well Vault	7 month	7/24/2013	10	U	16	U	16	U	16	U	**140**		**17,800**	
SVE 3-2 Well Vault	14 month	2/12/2014	1.02	U	1.59	U	1.58	U	1.58	U	2.24	J	**549**	
SVE 3-2 Well Vault	22 month	10/22/2014	1.13	U	1.75	U	1.75	U	1.75	U	2.38	U	11.2	
SVE 3-2 Well Vault	28 month	4/8/2015	0.754	U	1.17	U	1.17	U	1.17	U	7.05		8.07	
SVE 3-2 Well Vault	35 month	11/10/2015	0.972	U	1.51	U	1.51	U	1.51	U	2.04	U	3.10	J
SVE 3-2 Well Vault	40 month	4/5/2016	1.03	U	1.60	U	1.60	U	1.60	U	2.16	U	2.73	U
SVE 3-2 Well Vault	46 month**	NA	NA		NA		NA		NA		NA		NA	
SVE 3-3	Baseline	11/12/2012	0.78	U	1.21	U	1.21	U	36.2	U	9.18	J	**410**	
SVE 3-3	2 month	3/19/2013	0.996	U	1.54	U	1.54	U	44.8		**20.7**		**814**	
SVE 3-3 Well Vault	7 month	7/24/2013	3.9	U	6	U	6	U	106		**144**		**6,570**	
SVE 3-3 Well Vault	14 month	2/12/2014	0.959	U	1.49	U	1.49	U	22.3		3.60	J	40.6	
SVE 3-3 Well Vault	22 month	10/22/2014	1.06	U	1.65	U	1.65	U	1.65	U	2.23	U	5.10	J
SVE 3-3 Well Vault	28 month	4/8/2015	1.07	U	1.65	U	1.65	U	1.65	U	2.24	U	28.1	
SVE 3-3 Well Vault	35 month	11/10/2015	0.918	U	1.42	U	1.42	U	1.42	U	1.93	U	2.44	U
SVE 3-3 Well Vault	40 month	4/5/2016	1.05	U	1.63	U	1.63	U	1.63	U	2.21	U	31.2	
SVE 3-3 Well Vault	46 month**	NA	NA		NA		NA		NA		NA		NA	
EDVE-1	Baseline	11/13/2012	**1,970**	U	3,060	U	3,060	U	3,060	U	**4,720**	J	**3,280,000**	
EDVE-1	2 month	3/19/2013	104	U	161	U	161	U	161	U	**1,560**		**123,000**	
EDVE-1 Well Vault	7 month	7/24/2013	9.4	U	15	U	15	U	15	U	**334**		**8,350**	
EDVE-1 Well Vault	14 month	2/12/2014	1.12	U	1.73	U	1.73	U	1.73	U	2.34	U	14.3	
EDVE-1 Well Vault	22 month	10/22/2014	1.17	U	1.81	U	1.81	U	1.81	U	2.46	U	10.9	
EDVE-1 Well Vault	28 month	4/8/2015	1.04	U	1.62	U	1.62	U	1.62	U	2.19	U	55.9	
EDVE-1 Well Vault	35 month	11/10/2015	0.983	U	1.52	U	1.52	U	1.52	U	5.74	J	2.61	U
EDVE-1 Well Vault	40 month	4/5/2016	1.04	U	1.62	U	1.62	U	1.62	U	2.19	U	162	
EDVE-1 Well Vault	46 month**	NA	NA		NA		NA		NA		NA		NA	
SVE Trench 2	Baseline	11/13/2012	**4,890**	U	7,580	U	**7,580**	U	**7,580**	U	**10,300**	U	**4,330,000**	
SVE Trench 2	Baseline	11/13/2012	**4,910**	U	7,620	U	**7,620**	U	**7,620**	U	**10,300**	U	**4,310,000**	

Table 3. Soil Vapor Extraction System - Volatile Organic Compounds Sampling Summary

			Volatile Organic Compounds (µg/m³)					
Sample Location	**Event (Time from Start-up [January 2013])**	**Sample Date**	**Vinyl Chloride**	**1,1-Dichloroethene**	**Trans-1,2-Dichloroethylene**	**Cis-1,2-Dichloroethylene**	**TCE**	**PCE**
Remedial Goal [a]			220	21,000	6,300	6,300	18	370
SVE Trench 2	2 month	3/19/2013	3.80 U	5.89 U	5.89 U	33.8	**31.4**	**2,990**
SVE Trench 2 Well Vault	7 month	7/24/2013	4.50 U	6.9 U	6.9 U	47	**61**	**4,860**
SVE Trench 2 Well Vault	14 month	2/12/2014	0.827 U	1.28 U	1.28 U	14.9	**18.1**	**1,430**
SVE Trench 2 Well Vault	14 month	2/12/2014	1.72 U	2.67 U	2.67 U	16.2	**24.1**	**2,370**
SVE Trench 2 Well Vault	22 month	10/22/2014	0.957 U	1.48 U	1.48 U	1.48 U	2.01 U	2.54 U
SVE Trench 2 Well Vault	22 month	10/22/2014	0.957 U	1.48 U	1.48 U	1.48 U	2.01 U	2.54 U
SVE Trench 2 Well Vault	28 month	4/8/2015	0.887 U	1.38 U	1.38 U	1.38 U	1.86 U	51.1
SVE Trench 2 Well Vault	28 month	4/8/2015	0.887 U	1.38 U	1.38 U	1.38 U	1.86 U	50.4
SVE Trench 2 Well Vault	35 month	11/10/2015	0.842 U	1.31 U	1.31 u	1.31 U	1.77 U	139
SVE Trench 2 Well Vault	40 month	4/5/2016	0.809 U	1.25 U	1.25 U	1.86 J	1.70 U	182
SVE Trench 2 Well Vault	40 month	4/5/2016	0.801 U	1.24 U	1.24 U	1.49 J	1.68 U	176
SVE Trench 2 Well Vault	46 month**	NA	NA	NA	NA	NA	NA	NA
VMPs - Zone 3								
VMP-4s	Baseline	11/13/2012	**4,910** U	7,620 U	**7,620** U	**7,620** U	**10,300** U	**2,570,000**
VMP-4s	2 month	3/20/2013	0.835 U	1.29 U	1.29 U	1.29 U	4.15 J	**519**
VMP-4s	7 month	7/26/2013	0.72 U	1.1 U	1.1 U	1.1 U	1.5 U	319
VMP-4s	7 month	7/26/2013	0.72 U	1.1 U	1.1 U	1.1 U	8.6	**260**
VMP-4s	14 month	2/13/2014	0.754 U	1.17 U	1.17 U	1.17 U	1.58 U	**717**
VMP-4s	22 month	10/23/2014	0.850 U	1.32 U	1.32 U	1.65 J	1.91 J	261
VMP-4s	22 month	10/23/2014	0.809 U	1.25 U	1.25 U	1.25 U	1.70 U	272

Table 3. Soil Vapor Extraction System - Volatile Organic Compounds Sampling Summary

Sample Location	Event (Time from Start-up [January 2013])	Sample Date	Volatile Organic Compounds (µg/m³)					
			Vinyl Chloride	1,1-Dichloroethene	Trans-1,2-Dichloroethylene	Cis-1,2-Dichloroethylene	TCE	PCE
Remedial Goal [a]			220	21,000	6,300	6,300	18	370
VMP-4s	28 month	4/10/2015	0.835 U	1.29 U	1.29 U	1.29 U	17.3	68.8
VMP-4s	28 month	4/10/2015	0.835 U	1.29 U	1.29 U	1.29 U	1.75 U	63.5
VMP-4s	35 month	11/10/2015	2.60 U	4.00 U	4.00 U	4.00 U	5.50 U	**2,700**
VMP-4s	35 month	11/10/2015	2.65 U	4.11 U	4.11 U	4.11 U	5.57 U	**2,790**
VMP-4s	40 month	4/6/2016	0.796 U	1.23 U	1.23 U	1.23 U	1.67 U	15.8
VMP-4s	40 month	4/6/2016	0.754 U	1.17 U	1.17 U	1.17 U	1.58 U	15.5
VMP-4s	SVE Shutdown - 15 day	6/21/2016	9 U	9 U	9 U	9 U	9 U	**1,600**
VMP-4s	SVE Shutdown - 30 day	7/6/2016	0.881 U	1.37 U	1.37 U	1.37 U	3.17 J	**1,330**
VMP-4s	SVE Shutdown - 60 day	8/4/2016	0.835 U	1.29 U	1.29 U	1.29 U	1.75 U	**541**
VMP-4s	SVE Shutdown - 90 day	9/7/2016	2.78 U	4.32 U	4.32 U	4.32 U	5.84 U	**2,310**
VMP-4s	SVE Shutdown - 180 day	11/22/2016	1.72 U	2.66 U	2.66 U	2.66 U	3.88 J	**1,690**
VMP-4i	Baseline	11/13/2012	980 U	1,520 U	1,520 U	1,520 U	**2,060** U	**759,000**
VMP-4i	2 month	3/20/2013	48.9 U	75.8 U	75.8 U	75.8 U	**243** J	**72,400**
VMP-4i	7 month	7/26/2013	11 U	16 U	16 U	16 U	**51** J	**13,900**
VMP-4i	14 month	2/13/2014	11.3 U	17.5 U	17.5 U	17.5 U	**23.7** U	**7,110**
VMP-4i	14 month	2/13/2014	11.1 U	17.1 U	17.1 U	17.1 U	**32.2** U	**7,590**
VMP-4i	22 month	10/23/2014	8.81 U	13.7 U	13.7 U	13.7 U	29.7 J	**6,600**
VMP-4i	28 month	NA	NA	NA	NA	NA	NA	NA
VMP-4i	35 month	NA	NA	NA	NA	NA	NA	NA
VMP-4i	40 month	NA	NA	NA	NA	NA	NA	NA
VMP-4i	SVE Shutdown - 15 day	6/21/2016	140 U	140 U	140 U	140 U	**140** U	**15,000**
VMP-4i	SVE Shutdown - 15 day	6/21/2016	95 U	95 U	95 U	95 U	**95** U	**14,000**

Table 3. Soil Vapor Extraction System - Volatile Organic Compounds Sampling Summary

			Volatile Organic Compounds (µg/m³)											
Sample Location	**Event (Time from Start-up [January 2013])**	**Sample Date**	**Vinyl Chloride**		**1,1-Dichloroethene**		**Trans-1,2-Dichloroethylene**		**Cis-1,2-Dichloroethylene**		**TCE**		**PCE**	
Remedial Goal [a]			220		21,000		6,300		6,300		18		370	
VMP-4i	SVE Shutdown - 30 day	7/6/2016	8.74	U	13.6	U	13.6	U	13.6	U	**18.4**	U	**7,240**	
VMP-4i	SVE Shutdown - 30 day	7/6/2016	7.41	U	11.5	U	11.5	U	11.5	U	16.7	J	**9,590**	
VMP-4i	SVE Shutdown - 60 day	8/4/2016	4.32	U	6.70	U	6.69	U	6.69	U	10.5	J	**6,570**	
VMP-4i	SVE Shutdown - 60 day	8/4/2016	4.50	U	6.98	U	6.98	U	6.98	U	9.45	U	**4,220**	
VMP-4i	SVE Shutdown - 90 day	9/7/2016	9.98	U	15.5	U	15.5	U	15.5	U	**21.0**	U	**11,400**	
VMP-4i	SVE Shutdown - 90 day	9/7/2016	25.1	U	39.0	U	39.0	U	39.0	U	**52.8**	U	**28,000**	
VMP-4i	SVE Shutdown - 180 day	11/22/2016	39.3	U	60.9	U	60.9	U	60.9	U	**82.5**	U	**41,200**	
VMP-4i	SVE Shutdown - 180 day	11/22/2016	39.0	U	60.5	U	60.5	U	60.5	U	**81.9**	U	**27,300**	
VMP-4d	Baseline	11/13/2012	20.5	U	31.8	U	31.8	U	31.8	U	**43**	U	**13,200**	
VMP-4d	Baseline	11/13/2012	9.8	U	15.3	U	15.3	U	15.3	U	**20.8**	U	**13,300**	
VMP-4d	2 month	3/20/2013	NA		NA		NA		NA		NA		NA	
VMP-4d	7 month	7/26/213	NA		NA		NA		NA		NA		NA	
VMP-4d	14 month	2/13/2014	NA		NA		NA		NA		NA		NA	
VMP-4d	22 month	10/23/2014	NA		NA		NA		NA		NA		NA	
VMP-4d	28 month	NA	NA		NA		NA		NA		NA		NA	
VMP-4d	35 month	NA	NA		NA		NA		NA		NA		NA	
VMP-4d	40 month	NA	NA		NA		NA		NA		NA		NA	
VMP-4d	46 month	NA	NA		NA		NA		NA		NA		NA	

Table 3. Soil Vapor Extraction System - Volatile Organic Compounds Sampling Summary

Sample Location	Event (Time from Start-up [January 2013])	Sample Date	Volatile Organic Compounds (µg/m³) Vinyl Chloride	1,1-Dichloroethene	Trans-1,2-Dichloroethylene	Cis-1,2-Dichloroethylene	TCE	PCE
Remedial Goal [a]			220	21,000	6,300	6,300	18	370

Notes:

* A sample could not be collected from the deep interval due to ground water upwelling above the depth of the screen.

** A sample was note collected from this location because Zone 3 of the SVE system was shutdown for the rebound test; samples were collected from VMP-4 to track rebound during this time.

[a] Source: EPA, 2008.

Results based on unvalidated data; validated data tables will be submitted with a subsequent cleanup status report.

Bold faced values indicate detection in exceedance of remedial goal or regional screening level.

µg/m³ = microgram per cubic meter

D = field duplicate

J = estimated result; result is less than the reporting limit

NS = not sampled

U = concentration is less than the indicated reporting limit

Table 4. Tetrachloroethylene (PCE) Monitoring Data

Table 5. Tetrachloroethylene (PCE) (ug/L) 5																			
Aquifer	WELL ID	Fall 2002	Spring 2003	Fall 2003	Dec. 2004	May 2009	Aug. 2009	Feb. 2010	Mar. 2010	Apr. 2010	Aug. 2010	Oct. 2010	Dec. 2010	Jul. 2011	Aug. 2012	Nov. 2013	Jul. 2014	Dec. 2014	Apr. 2015
Alluvial Zone P1 – Monitoring Wells	ED95-01	1 U	0.5 U	0.5 U									0.5 U	0.5 U		0.5 U			0.5 U
	ED95-02	1 U	0.5 U	0.5 U									0.5 U	0.5 U		0.5 U			0.5 U
	ED95-07	10 U	10 J^	2 UJ		11.9 B								25 U					12.5 U
	ED95-08	9270 =	5200 =	5200 =		9800 =							35500 =	30000 =		11000 =			5130 =
	ED95-09	5.5 =	2.7 =	1.5 =		4350 =	3100 D2						1850 =	980 =		719 =			460 =
	ED95-11	19.1 =	8.3 =	0.5 U									35	35		62.6 =			16.9 =
	ED95-13	1 U	0.5 U	0.53 =		2.6 =							1.5	0.44 LJ		0.6 =			0.5 U
	MW-01												15	17		7.6 =			20.5 =
	MW-02					145 =							130 =	110 =		164 =			109 =
	MW-03												18.7 =	32		17.8 =			4 =
	MW-04												3.2 =	21		4.0 =			
	MW-05					129 =							68.4 =	53.8 =		18.3 =			61.3 =
	MW-06					5.9 K							8.4 =	13.7 =		13.6 =			3.8 FB
	MW-07												74.5 =	52.2 =		47.4 =			23.7 =
	MW-08												212 =	182 =					18.4 =
	MW-09	712 =	470 =	96.8 =									13.5 =	20		25.6 =			6.3 =
	MW-10	4480 =	3800 =	5320 =		5320 =							2820 =	2950 =		4530 =			2130 =
	MW-11	7410 =	3600 =	5830 =									22000 =	15600 =		10400 =			3910 =
	MW-12	3350 =	670 =	4540 =		3600 =							7160 =	7400 =		3030 =			1600 =
	MW-13	4750 =	2300 =	4250 =									11100 =	5180 =		6380 =			2520 =
	MW-14	3300 =	2300 =	2520 =									50100 =	35000 =		19700 =			13600 =
	MW-23		14 =	2460 =	19000 =	1560 J							870 =	894 =		572 =			788 =
	MW-24		0.5 U	0.5 U									0.5 U	0.5 U		0.5 U			0.5 U
	MW-36									350 =			570 =	598 =		500 =			209 =
Alluvial Zone P3 – Monitoring Wells and Injection Wells	ED95-04	9430 =	5300 =	8950 =									5500 =	4590 =		2700 =			2640 =
	ED95-05	1370 =	1300 =	1340 =									1900 =	1880 =		737 =			691 =
	ED95-06	2200 =	2100 J	3570 =									2920 =	1720 =		1440 =			1280 =
	ED95-10	5420 =	8200 =	8200 =		5580 =							3260 =	3960 =		2880 =			2120 =
	ED95-12	8040 =		8280 =									4660 =	9450 =		7890 =			5640 =
	ED95-14	538 =	2600 =	1040 =		206 =							338 =	801 =		385 =			484 =
	MW-15	5 UJ	5 =	2 U		0.8 B							5 U	1 U		0.5 U			0.5 U
	MW-16	15700 J-	14700 =	13800 =		6770 =							6010 =	4390 =		7510 =			3830 =
	MW-17	964 J-	1100 =	1050 =									340 =	410 =		265 =			350 =
	MW-18	1570 =	930 =	1390 =		398 =							394 =			307 =			116 =
	MW-37									1 U			0.5 U	0.5 U		0.5 U			0.5 U
	MW-38									1 U			0.5 U	0.5 U		0.5 U			0.5 U
	IW-P3-11																166 =	160=	187 =
	IW-P3-17																173 =	150=	159 =
	IW-P3-24																198 =	210=	206 =
	IW-P3-29																122 =	100=	174 =
	IWW-P3-12																64.1 =	66=	107 =
Alluvial Zone P5 – Monitoring Wells	MW-19	1 UJ	0.5 U	0.5 U									0.5 U	0.5 U		0.5 U			0.5 U
	MW-20	1 UJ	0.18 LJ	0.5 U									0.5 U	0.5 U		0.5 U			0.5 U
	MW-21	1 UJ	0.5 U	0.5 U									2.1 =	3.4		8.3 =			8 =
	MW-22	1 UJ	3.8 =	0.5 U									2.4 =	0.5 U		0.5 U			0.5 U

Table 4, Continued

Table 5. Tetrachloroethylene (PCE) (ug/L)																			
Aquifer	WELL ID	Fall 2002	Spring 2003	Fall 2003	Dec. 2004	May 2009	Aug. 2009	Feb. 2010	Mar. 2010	Apr. 2010	Aug. 2010	Oct. 2010	Dec. 2010	Jul. 2011	Aug. 2012	Nov. 2013	Jul. 2014	Dec. 2014	Apr. 2015
Alluvial Zone P7 – Monitoring Wells and Injection Wells*	MW-25		0.5 U	0.5 U	0.5 J							0.5 U		0.5 U		0.5 U			2.6 =
	MW-26		12 =	17 =	42 =	30 =						29.2 =		26		18.1 =			15.7 =
	MW-27		100 =	236 =	210 =	185 =						276 =		158 =		235 =	193 =	160=	201 =
	MW-28		13 =	620 =	890 =	653 =			143 =				550 =	539 =		667 =	602 D	510=	668 =
	MW-29		82 =	9.8 =	23 =							96.4 =		113 =		135 =	212 =	45=	258 =
	MW-30		0.5 U	0.5 U	0.5 U							0.5 U		0.5 U		0.5 U			0.5 U
	MW-31		0.5 U	0.5 U	0.5 U							0.5 U		0.5 U		0.5 U			0.5 U
	MW-32		25 =	24 J	23 B	249 =	360 D2						196 =	286 =		310 =	341 =	240=	328 =
	MW-33		5.3 =	7.9 =	12 B								17 =	27		25.1 =	24.9 =	28=	31.5 =
	MW-34		8 =	28 =	20 B	66.2 =							43	30		50.0 =			51.4 =
	MW-35		12 =	8 =	8.8 B							12.9 =		13		15.5 =			25 =
	MW-39							0.0924 U		0.5 U			0.4 LJ	0.5 U		0.5 U			0.5 U
	MW-40					64.6 =				4.6 =		5.5 =		7.2		13.7 =			18.5 =
	MW-41									24 =		42 =		22		38.9 =			37.4 =
	MW-42									4.4 =		5.2 =		7.3		3.1 =			5.9 =
	MW-43																2.0 U	0.74=	2.0 U
	MW-44																34.3 =	36=	31.8 =
	MW-45																2.0 U	0.59=	0.5 U
	MW-46																2.0 U	0.41=	
	MW-47																130 =	150=	163 =
	MW-48																46.3 =	49=	59.8 =
	IW-10																14.8 =	20=	15.3 =
	IW-13																15.4 =	20=	14.8 =
	IW-18																		
	IW-19																		
	IW-20																75.7 =	29=	70.4 =
	IW-21																		
	IW-22																	190=	
	IW-23																		
	IW-25																238 =	220=	247 =
	IW-28																		
	IW-30																246 =	260=	200 =
	IWW-7																158 =	150=	145 =
	P7-1							8.52 =		13 =									
	ED95-03*	1 U	2.8 =	0.5 U									0.5 U	3.6		4.5 =			3.6 =

Table 4, Continued

Table 5. Tetrachloroethylene (PCE) (ug/L)																			
Aquifer	WELL ID	Fall 2002	Spring 2003	Fall 2003	Dec. 2004	May 2009	Aug. 2009	Feb. 2010	Mar. 2010	Apr. 2010	Aug. 2010	Oct. 2010	Dec. 2010	Jul. 2011	Aug. 2012	Nov. 2013	Jul. 2014	Dec. 2014	Apr. 2015
Domestic, Irrigation and PSTB Wells – Shallow, Artesian and Unidentified Zones	1600 ODH															0.5U			0.5 U
	AEA-11													40	39D	29.7 =			
	AEA-15													0.5 U					0.5 U
	AEA-16													0.43 LJ	0.48 J				0.5 U
	AEA5												1.4						
	AEA7												70			29.4 =			23.2 =
	EWS-03														0.5 U	0.5 U			0.5 U
	EWS-104														0.38 J				0.5 U
	EWS-110														1.3				
	EWS-136														1.2	0.8 =			
	EWS-13A														0.31 J				0.5 U
	EWS-13B														0.96				1 =
	EWS-13C														0.35 J	0.5 U			0.5 U
	EWS-143														0.5 U				0.5 U
	EWS-145														0.5 U				0.5 U
	EWS-149														0.5 U	0.5 U			0.5 U
	EWS-151														0.5 U				
	EWS-165														0.5 U				
	EWS-20														0.29 J	0.5 U			
	EWS-21														0.16 J				
	EWS-22														0.41 J				
	EWS-75														0.14 J	0.5 U			0.5 U
	EWS-87														0.26 J				0.5 U
	Fina 60 MW-10										0.9 =		11 =	2.7		2.5 =	11.8 =	0.98=	109 =
	Fina 60 MW-8										0.7 =		75 =	2.4		202 =	154 =	490=	210 =
	FINA 60 MW-11																2.0 U	0.15U	0.5 U
	FINA 60 MW-12																2.0 U	0.3U	0.5 U
	FINA 60 MW-13																2.0 U	0.3U	0.5 U
	RHS															0.5 U			0.5 U
	SM-01	4 U																	
	SM-04	214 J											30	82	89 E	49.8 =			74.1 =
	SM-05	147 =				133 =													
	SM-09										0.5U					0.5U			
	SM-11	3 U																	
	SM-12												1.4						1.4 =
	SM-14	2.5 =				2.1 FB													
	SM-15	3 U																	
	SM-16	3 U																	
	SM-17	10.6 =																	
	SM-19	9 U											0.66						48.7 =
	SM-22	2 U				1.4 B							0.5 U						0.5 U

Blank cells - not sampled
Result exceeds MCL of 5 ug/L
Artesian aquifer wells

* Note - ED95-03 is designated as Zone I6

Lab Qualifiers: "=" - Analytical result valid with no QC qualifiers; "D" - Analytical result is from sample dilution; "E" - Analytical result exceeds calibration range; "J" - Analytical result is estimated; "LJ" - Analytical result is estimated and is below reporting quantitation limit; "U" - Analyte not detected above quantitation limit; "R" - Result rejected due to QC problem; "U*" - Analyte not detected above quantitiation limit but this non-detect result is not recommended for use; "J-" - not defined; "J ^" - not defined; "Jv" - not defined

Table 5. Trichloroethene (TCE) Monitoring Data

Table 6. Trichloroethylene (TCE) (ug/L)																			
Aquifer	**WELL ID**	**Fall 2002**	**Spring 2003**	**Fall 2003**	**Dec. 2004**	**May 2009**	**Aug. 2009**	**Feb. 2010**	**Mar. 2010**	**Apr. 2010**	**Aug. 2010**	**Oct. 2010**	**Dec. 2010**	**Jul. 2011**	**Aug. 2012**	**Nov. 2013**	**Jul. 2014**	**Dec. 2014**	**Apr. 2015**
Alluvial Zone P1 – Monitoring Wells	**ED95-01**	1 U	0.5 U	0.5 U									0.5 U	0.5 U		0.5 U			0.5 U
	ED95-02	1 U	0.5 UJv	0.5 U									0.5 U	0.5 U		0.5 U			0.5 U
	ED95-07	10 U	0.5 U	2 UJ		16.6 =								16 LJ					12.5 U
	ED95-08	24.1 =	8 J	25.7 =		31.7 =							74.2 =	62 =		46.6 =			16.9 =
	ED95-09	1 U	1.3 =	0.3 LJ		13.8 =	15 =						4.9 =	3.9 =		3.6 =			2.0 U
	ED95-11	1 U	0.26 LJv	0.5 U									1.2 =	1.8 =		1.5 =			2.0 U
	ED95-13	2.2 =	0.5 U	0.38 LJ		1.5 =							0.73 =	0.4 LJ		1.1 =			0.5 U
	MW-01												6.5	2.2		1.0 =			1.8 =
	MW-02					1.7 =							4.2	2 U		2.9 =			2.4 =
	MW-03												29 =	61		44.2 =			5.7 =
	MW-04												27.6 =	38		2.5 U			
	MW-05					1.9 =							1.1 =	2 U		2.0 U			2.6 =
	MW-06					115 =							130 =	118 =		42.4 =			8.0 =
	MW-07												1 U	2 U		2.0 U			2.0 U
	MW-08												1.9 =	2 U					2.0 U
	MW-09	15.7 =	8.9 =	2 U									1.4 =	3		3.7 =			2.0 U
	MW-10	18 =	24 =	21.4 =		13.3 K							8.5 =	7.6 =		8.0 =			4.4 =
	MW-11	98.9 =	140 J	730 =									84.8 =	57.4 =		135 =			61.6 =
	MW-12	1.9 =	20 =	428 =		24.9 =							28.6 =	30.7 =		22.6 =			30.8 =
	MW-13	5.2 J-	6.8 =	4.9 =									48.8 =	20.9 =		33.4 =			14.6 =
	MW-14	42.8 =	12 J^	34 =									159 =	98.4 =		68.3 =			37.9 =
	MW-23		15 J	14.3 =	16 =	18.9 =							16.6 =	12.1 =		13.5 =			20.8 =
	MW-24		0.5 U	0.5 U									0.5 U	0.5 U		0.5 U			0.5 U
	MW-36									14 =			12.8 =	13.4 =		14.2 =			6.9 =
Alluvial Zone P3 – Monitoring Wells and Injection Wells	**ED95-04**	23.8 =	22 Jv	20.4 =									11.6 =	14.3 =		19.4 =			5.8 =
	ED95-05	45.2 =	2.5 Jv	3.7 =									4.6 =	4.3 =		4.0 U			2.4 =
	ED95-06	5.3 =	4.9 =	12.9 =									4.5 =	3.1 =		20.0 U			3.1 =
	ED95-10	14.2 =	16 J	13.7 =		10.2 =							8 =	6.8 =		8.5 =			4.6 =
	ED95-12	71.6 =	52 J	42.6 =									24.5 =	22.3 =		28.4 =			20.5 =
	ED95-14	8.4 =	15 =	13.8 =		6.1 =							5.7 =	13.9 =		16.0 =			10.9 =
	MW-15	5 UJ	0.5 U	2 U		2.2 =							5 U	1 U		0.5 U			0.5 U
	MW-16	21.6 J-	27 =	23.4 J		21 =							11.4 =	10.3 =		9.1 =			6.5 =
	MW-17	3.2 J-	5.2 Jv	6.1 =									2.3 =	3.2 =		2.0 U			2.0 U
	MW-18	12.8 J-	9 J^	12 =		5.7 =							4.3 =			2.6 =			2.0 U
	MW-37									1 U			0.5 U	0.5 U		0.5 U			0.5 U
	MW-38									7.6 =			4.4 =	5.8		3.4 =			2.6 =
	IW-P3-11																2.0 U	0.3 =	2.0 U
	IW-P3-17																2.0 U	0.47 =	2.0 U
	IW-P3-24																4.9 =	5 =	4.3 =
	IW-P3-29																5.6 =	6.9 =	4.9 =
	IWW-P3-12																5.3 =	5.5 =	6.2 =
Alluvial Zone P5 – Monitoring Wells	**MW-19**	1 UJ	0.5 U	0.5 U									0.5 U	0.5 U		0.5 U			0.5 U
	MW-20	1 UJ	0.5 U	0.5 U									0.5 U	0.5 U		0.5 U			0.5 U
	MW-21	1 UJ	0.5 U	0.5 U									0.5 U	0.5 U		0.5 U			0.5 U
	MW-22	1 UJ	0.5 U	0.5 U									4.6 =	0.5 U		0.5 U			0.5 U

Table 5. Continued

Table 6. Trichloroethylene (TCE) (ug/L)

Aquifer	WELL ID	Fall 2002	Spring 2003	Fall 2003	Dec. 2004	May 2009	Aug. 2009	Feb. 2010	Mar. 2010	Apr. 2010	Aug. 2010	Oct. 2010	Dec. 2010	Jul. 2011	Aug. 2012	Nov. 2013	Jul. 2014	Dec. 2014	Apr. 2015
Alluvial Zone P7 – Monitoring Wells and Injection Wells*	MW-25		0.5 U	0.5 U	0.5 U							0.5 U		0.5 U		0.5 U			0.5 U
	MW-26		0.5 U	0.2 LJ	1 U	0.5 U						0.5 U		2 U*		0.5 U			0.5 U
	MW-27		0.63 =	2 U	5 U	0.5 =						0.5 U		2 U		2.0 U	2.0 U	0.71 =	2.0 U
	MW-28		1.6 =	2 U	2.1 LJ	1.8 =			1.35 =				1.8 =	2 U		4.0 U	2.0 =	2 =	2.0 U
	MW-29		0.5 U	0.5 U	0.5 U							0.5 U		2 U		2.0 U	2.0 U	0.15 U	2.0 U
	MW-30		0.18 LJ	0.5 U	0.5 U							0.5 U		0.5 U		0.5 U			0.5 U
	MW-31		0.5 U	0.5 U	0.5 U							0.5 U		0.5 U		0.5 U			0.5 U
	MW-32		5 =	15 =	6.3 =	24 =	20 =						10 =	6.3 =		6.2 =	4.6 =	5 =	4.4 =
	MW-33		0.49 LJ	1.6 =	1.5 =								2.1 =	3.1 *		2.8 =	2.7 =	2.7 =	3 =
	MW-34		1.4 =	5.2 =	3.1 =	8.5 =							6.9	6.8		4.3 =			3.8 =
	MW-35		0.42 LJ	0.64 =	0.61 =							0.6 =		0.51		2.0 =			3.5 =
	MW-39							0.0812 U		0.5 U			0.5 U	0.5 U		0.5 U			0.5 U
	MW-40					8.5 =				0.5 U		0.5 U		0.61		2.8 =			3.6 =
	MW-41									5.7 =		7.9 =		8		8.1 =			7.1 =
	MW-42									0.5 U		0.5 U		0.5 U		0.5 U			0.5 U
	MW-43																2.0 U	0.15 U	2.0 U
	MW-44																2.0 U	0.15 U	2.0 U
	MW-45																2.0 U	0.15 U	0.5 U
	MW-46																2.0 U	0.15 U	
	MW-47																7.8 =	8.4 =	7.1 =
	MW-48																2.0 U	0.15 U	2.0 U
	IW-10																2.0 U	0.15 U	2.0 U
	IW-13																2.0 U	0.15 U	2.0 U
	IW-18																		
	IW-19																		
	IW-20																2.8 =	3.6 =	2.6 =
	IW-21																		
	IW-22																	10 =	
	IW-23																		
	IW-25																7.4 =	8.1 =	6.9 =
	IW-28																		
	IW-30																7.5 =	7.3 =	6.4 =
	IWW-7																11.2 =	13 =	11.3 =
	P7-1							2.38 =		0.65 =									
	ED95-03*	1.4 =	0.45 LJ	0.5 U									0.5 U	4.4		1.4 =			2.1 =

Table 5, Continued

Table 6. Trichloroethylene (TCE) (ug/L)

Aquifer	WELL ID	Fall 2002	Spring 2003	Fall 2003	Dec. 2004	May 2009	Aug. 2009	Feb. 2010	Mar. 2010	Apr. 2010	Aug. 2010	Oct. 2010	Dec. 2010	Jul. 2011	Aug. 2012	Nov. 2013	Jul. 2014	Dec. 2014	Apr. 2015
Domestic, Irrigation and PSTB Wells – Shallow, Artesian and Unidentified Zoness	1600 ODH															0.5 U			0.5 U
	AEA-11													5.8 J	4.1	2.3 =			
	AEA-15													0.5 U					0.5 U
	AEA-16													0.5 U	0.5 U				0.5 U
	AEA5												0.5 U						
	AEA7												5 U *			0.5 U			0.5 U
	EWS-03														0.5 U	0.5 U			0.5 U
	EWS-104														0.5 U				0.5 U
	EWS-110														0.5 U				
	EWS-136														0.087 J	0.5 U			
	EWS-13A														0.089 J				0.5 U
	EWS-13B														0.45 J				0.5 U
	EWS-13C														0.12 J	0.5 U			0.5 U
	EWS-143														0.5 U				0.5 U
	EWS-145														0.5 U				0.5 U
	EWS-149														0.5 U	0.5 U			0.5 U
	EWS-151														0.5 U				
	EWS-165														0.5 U				
	EWS-20														0.5 U	0.5 U			
	EWS-21														0.5 U				
	EWS-22														0.5 U				
	EWS-75														0.5 U	0.5 U			0.5 U
	EWS-87														0.5 U				0.5 U
	Fina 60 MW-10										24.3 =		23	33		7.5 =	15.5 =	0.32 =	38.6 =
	Fina 60 MW-8										0.5 U		10	2.1		14.8 =	28.4 =	24 =	26.5 =
	Fina 60 MW-11																2.0 U	0.15 U	0.5 U
	Fina 60 MW-12																2.0 U	0.3 U	0.5 U
	Fina 60 MW-13																2.0 U	0.3 U	0.5 U
	RHS															0.5 U			0.5 U
	SM-01	1.6 =																	
	SM-04	6.2 =											2.5 U *	0.8	0.55	0.5 U			0.5 U
	SM-05	3.2 =				1.3 =													
	SM-09										0.5 U					0.5 U			
	SM-11	1 U																	
	SM-12												0.5 U			0.5 U			0.5 U
	SM-14	1 U				0.5 U													
	SM-15	1 U																	
	SM-16	1 U																	
	SM-17	2.4 =																	
	SM-19	1 U											0.5 U			0.5 U			0.5 U
	SM-22	1 U				0.5 U							0.5 U						0.5 U

Blank cells - not sampled
Result exceeds MCL of 5 ug/L
Artesian aquifer wells

* Note - ED95-03 is designated as Zone I6

Lab Qualifiers: "=" - Analytical result valid with no QC qualifiers; "D" - Analytical result is from sample dilution; "E" - Analytical result exceeds calibration range; "J" - Analytical result is estimated; "LJ" - Analytical result is estimated and is below reporting quantitation limit; "U" - Analyte not detected above quantitation limit;
"R" - Result rejected due to QC problem; "U*" - Analyte not detected above quantitiation limit but this non-detect result is not recommended for use; "J-" - not defined; "J ^" - not defined; "Jv" - not defined

Table 6. Summary of Private Wells Sampled During the Remedial Design Investigation

Well ID and Aquifer	Northing (NMSP, ft)	Easting (NMSP, ft)	Well Use	Household Domestic Supply	Household Drinking Water Supply	Remedial Design Investigation PCE Analytical Results (ug/L)*	Remedial Design Investigation TCE Analytical Results (ug/L)*	Most Recent Sampling Event
SM-04 / shallow	860,818.42	488,095.05	Pecan grove flood irrigation, livestock	Roswell Municipal	Roswell Municipal	30 to 82	ND to 0.8	Apr. 2015
SM-12 / shallow	861,840.54	488,906.89	Unknown	Roswell Municipal	Roswell Municipal	1.2 to 1.4	ND	Apr. 2015
SM-19 / shallow	861,431.05	488,006.95	Landscaping, swimming pool	Roswell Municipal	Roswell Municipal	ND to 48.7	ND	Apr. 2015
SM-22 / artesian	860,604.11	488,895.40	Koi pond, corn irrigation	Roswell Municipal	Roswell Municipal	ND	ND	Apr. 2015
1702 S Beech / shallow	862,637.19	487,554.85	Landscaping	Roswell Municipal	Roswell Municipal	1.4 to 120	ND	Apr. 2015
SM-09 (1801 S Atkinson) / shallow	862,889.29	488,917.81	Landscaping	Berrendo Coop	Berrendo Coop	ND	ND	Nov. 2013
AEA-5 / shallow	859,235.52	490,408.56	Landscaping	Berrendo Coop	Berrendo Coop	1.4	ND	Dec. 2010
AEA-7 / shallow	860,205.59	490,537.35	Landscaping, livestock watering	Berrendo Coop	Berrendo Coop	23.2 to 70	ND	Apr. 2015
AEA-11 / shallow	859,186.61	491,025.17	Landscaping, pecan tree watering	Berrendo Coop	Berrendo Coop	29.7 to 40	2.3 to 5.8 J	Nov. 2013
AEA-15 / artesian	857,842.98	494,049.02	Pecan grove flood irrigation	NA	NA	ND	ND	Apr. 2015
AEA-16 / artesian	857,679.72	493,830.78	Pecan grove flood irrigation	NA	NA	0.43 to 0.48 LJ	ND	Apr. 2015
EWS-03 / shallow	851,674.00	494,704.45	Domestic, landscaping	Shallow well	Bottled Water	ND	ND	Apr. 2015
EWS-13A / artesian	850,426.87	488,786.45	Pecan grove flood irrigation	NA	NA	ND to 0.31 J	ND to 0.089 J	Apr. 2015
EWS-13B / artesian	849,768.26	491,355.43	Pecan grove flood irrigation	NA	NA	0.96 to 1.0	ND to 0.45 J	Apr. 2015
EWS-13C / artesian	850,360.35	488,806.21	Domestic	Artesian Well	Artesian Well	ND to 0.35 J	ND to 0.12 J	Apr. 2015
EWS-20 / shallow	855,081.65	495,607.42	Domestic	Shallow well	Bottled Water	ND to 0.29 J	ND	Nov. 2013
EWS-21 / shallow	855,149.49	495,765.41	Domestic	Shallow well	Bottled Water	0.16 J	ND	Aug. 2012
EWS-22 / shallow	855,139.66	495,512.88	Domestic	Shallow well	Bottled Water	0.41 J	ND	Aug. 2012
EWS-75 / shallow	852,193.67	493,016.39	Domestic	Shallow well	Bottled Water	ND to 0.14 J	ND	Apr. 2015
EWS-87 / artesian	852,620.01	494,675.29	Community landscaping	NA	NA	ND to 0.26 J	ND	Apr. 2015
EWS-104 / shallow	853,058.39	493,515.67	Landscaping	Berrendo Coop	Berrendo Coop	ND to 0.38 J	ND	Apr. 2015
EWS-110 / shallow	853,399.86	488,164.95	Domestic	Shallow well	Bottled Water	1.3	ND	Aug. 2012
EWS-136 / shallow	856,414.17	494,197.27	Domestic, landscaping	Shallow well	Bottled Water	0.8 to 1.2	ND to 0.087 J	Nov. 2013

Table 6, Continued

Well ID and Aquifer	Northing (NMSP, ft)	Easting (NMSP, ft)	Well Use	Household Domestic Supply	Household Drinking Water Supply	Remedial Design Investigation PCE Analytical Results (ug/L)*	Remedial Design Investigation TCE Analytical Results (ug/L)*	Most Recent Sampling Event
EWS-143 / shallow	858,050.84	497,194.54	Domestic, livestock, landscaping	Shallow well	Bottled Water	ND	ND	Apr. 2015
EWS-145 / artesian	858,331.16	497,104.01	Corn irrigation	NA	NA	ND	ND	Apr. 2015
EWS-149 / shallow	858,003.25	496,641.61	Domestic	Shallow well	Shallow well	ND	ND	Apr. 2015
EWS-151 / shallow	858,492.36	495,894.71	Domestic	Shallow well	Shallow well	ND	ND	Aug. 2012
EWS-165 / shallow	859,005.14	496,905.28	Domestic	Shallow well	Unknown	ND	ND	Aug. 2012
SM-14 / shallow	862,268.22	489,286.62	Landscaping	Unknown	Unknown	8.7	ND	Apr. 2014
RHS / shallow	861,731.84	440,821.00	Athletic field irrigation	NA	NA	ND	ND	Apr. 2015
1600 ODH / shallow	864,096.00	489,564.63	Unknown	Unknown	Unknown	ND	ND	Apr. 2015

Note - Sample ranges for PCE and TCE are based on samples collected between February 2010 and April 2015.

APPENDIX C – OSE Well Drilling Moratorium Map

Figure C-1. McGaffey and Main Ground Water Plume Superfund Site – Well Drilling Moratorium Map

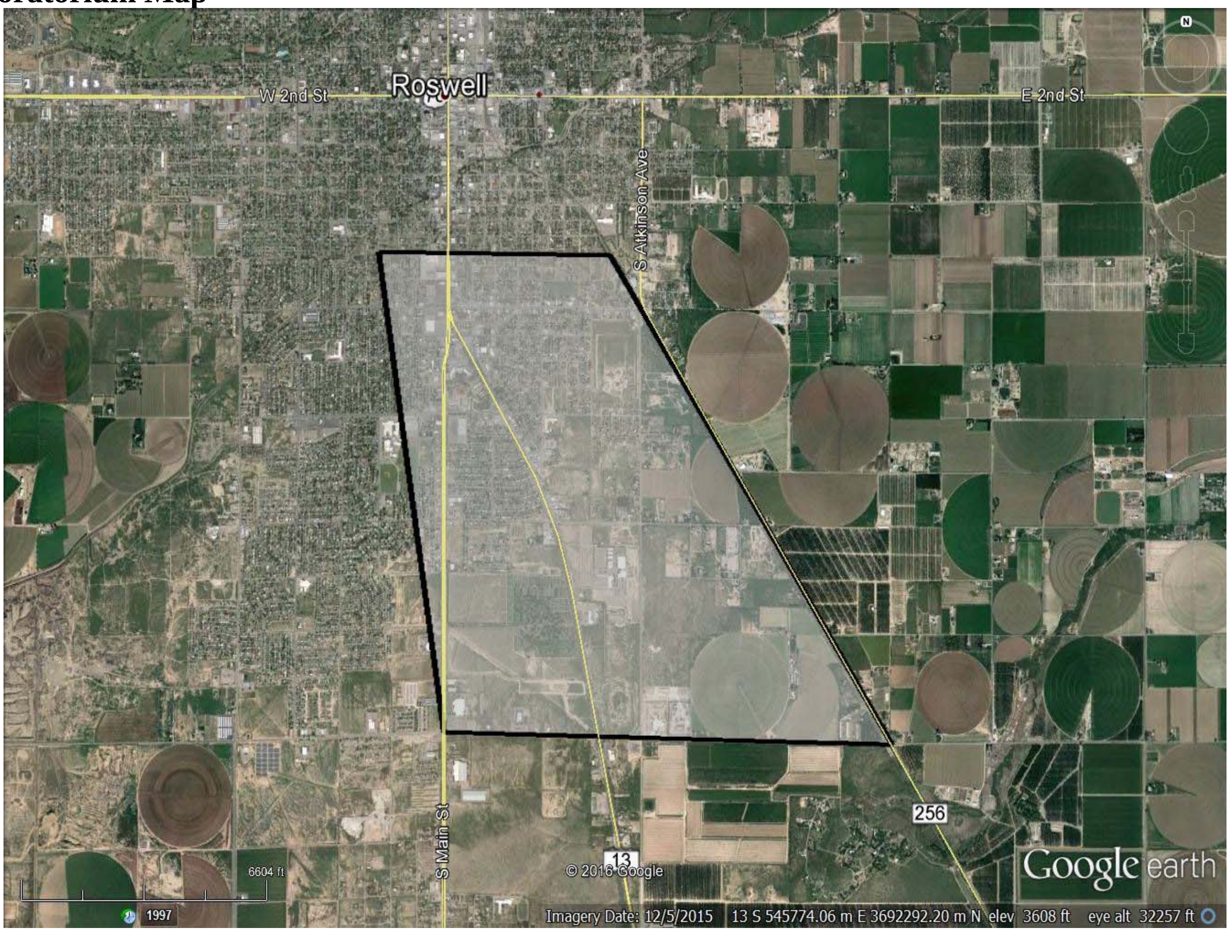


Table C-1. McGaffey and Main Ground Water Plume Superfund Site – Well Drilling Moratorium Coordinates

Latitude	Longitude	Description
33°23’00.90”	104°31’44.00”	S Lea Ave and W Summit St
33°23’00.10”	104°30’30.10”	Eastern terminus of E Summit St.
33°21’03.40”	104°31’23.10”	S Main St and Brasher Rd
33°21’00.30”	104°29’00.20”	E Brasher Rd and Old Dexter Highway

APPENDIX D – SITE INSPECTION

I. SITE INFORMATION	
Site name: McGaffey and Main Ground Water Plume Superfund Site	**Date of inspection: 10/26/2016**
Location and Region: Roswell, NM (Region 6)	**EPA ID: NM0000605386**
Agency, office, or company leading the five-year review: EPA/NMED	**Weather/temperature: Sunny/Warm**

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- ☐ Ground Water pump and treatment
- ☐ Surface water collection and treatment
- ☐ Monitored natural attenuation
- ☐ Ground Water containment
- ☐ Vertical barrier walls
- X Other _____Vapor Intrusion Mitigation System/Enhanced Soil Vapor Extraction System/Treatment Facility

Attachments: X Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _Chris Cortez_________________ _Operations Manager_ __10/26/2016
   Name Title Date
   Interviewed X at site ☐ at office ☐ by phone Phone no. _______________
   Problems, suggestions; X Report attached ____Interview is attached in Appendix D________

2. **O&M staff** _________N/A________________ ________________________ _____________
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _______________
   Problems, suggestions; ☐ Report attached ____

3.	**Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply. Agency City of Roswell Contact Ron Courts — Environmental Services Manager — 10/19/2016 Name / Title / Date Problems; suggestions; X Report attached Appendix D Agency NMED Contact Steve Jetter — Remedial Supervisor — 11/04/2016 Name / Title / Date Problems; suggestions; X Report attached Agency ____ Contact ____ Name / Title / Date / Phone no. Problems; suggestions; ☐ Report attached Agency ____ Contact ____ Name / Title / Date / Phone no. Problems; suggestions; ☐ Report attached
4.	**Other interviews** (optional) X Report attached.
	III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)
1.	**O&M Documents** X O&M manual ☐ Readily available X Up to date ☐ N/A X As-built drawings ☐ Readily available X Up to date ☐ N/A X Maintenance logs ☐ Readily available X Up to date ☐ N/A Remarks
2.	**Site-Specific Health and Safety Plan** X Readily available ☐ Up to date ☐ N/A X Contingency plan/emergency response plan X Readily available ☐ Up to date ☐ N/A Remarks
3.	**O&M and OSHA Training Records** ☐ Readily available X Up to date ☐ N/A Remarks

4. **Permits and Service Agreements**

☐ Air discharge permit ☐ Readily available ☐ Up to date ☐ N/A
☐ Effluent discharge ☐ Readily available ☐ Up to date ☐ N/A
☐ Waste disposal, POTW ☐ Readily available ☐ Up to date ☐ N/A
☐ Other permits______________________ ☐ Readily available ☐ Up to date ☐ N/A
Remarks ___No Permits are required for operation of treatment facility________________

5. **Gas Generation Records** ☐ Readily available ☐ Up to date X N/A
Remarks____

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date X N/A
Remarks____

7. **Ground Water Monitoring Records** ☐ Readily available ☐ Up to date X N/A
Remarks____

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date X N/A
Remarks____

9. **Discharge Compliance Records**
☐ Air ☐ Readily available ☐ Up to date X N/A
☐ Water (effluent) ☐ Readily available ☐ Up to date X N/A
Remarks____

10. **Daily Access/Security Logs** ☐ Readily available ☐ Up to date X N/A
Remarks __No body has access or visits the facility____________________________

IV. O&M COSTS

1. **O&M Organization**
☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
X Other ___None provided at time of Report_______________________________

2. **O&M Cost Records**
☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate____NA________________ ☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**
Describe costs and reasons: N/A, none to date

V. ACCESS AND INSTITUTIONAL CONTROLS ☐ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map X Gates secured ☐ N/A
Remarks Fencing is secure and in very good shape

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A
Remarks Warning signs are posted in plain sight on all entrances and fencing

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☐ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☐ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) ______
Frequency ______
Responsible party/agency ______
Contact ______ ______ ______ ______
Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☐ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☐ Yes No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☐ N/A
Other problems or suggestions: X Report attached
See Report, Section II. Response Action Summary, Status of Implementation

2. **Adequacy** ☐ ICs are adequate ☐ ICs are inadequate ☐ N/A
Remarks ______

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map X No vandalism evident
Remarks No vandalism has been reported or evident

2.	**Land use changes on site** ☐ N/A Remarks Redevelopement at source area, several buildings in source area are being demolished to make room for a car wash			
3.	**Land use changes off site** ☐ N/A Remarks Remains the same			
VI. GENERAL SITE CONDITIONS				
A. Roads X Applicable ☐ N/A				
1.	**Roads damaged**	☐ Location shown on site map	X Roads adequate	☐ N/A
	Remarks Everything is in good shape			
B. Other Site Conditions				
	Remarks			
VII. LANDFILL COVERS ☐ Applicable X N/A				
A. Landfill Surface				
1.	**Settlement** (Low spots)	☐ Location shown on site map	☐ Settlement not evident	
	Areal extent ______	Depth ______		
	Remarks			
2.	**Cracks**	☐ Location shown on site map	☐ Cracking not evident	
	Lengths ______ Widths ______ Depths ______			
	Remarks			
3.	**Erosion**	☐ Location shown on site map	☐ Erosion not evident	
	Areal extent ______	Depth ______		
	Remarks			
4.	**Holes**	☐ Location shown on site map	☐ Holes not evident	
	Areal extent ______	Depth ______		
	Remarks			
5.	**Vegetative Cover** ☐ Grass	☐ Cover properly established	☐ No signs of stress	
	☐ Trees/Shrubs (indicate size and locations on a diagram)			
	Remarks			

6.	**Alternative Cover (armored rock, concrete, etc.)** ☐ N/A Remarks____
7.	**Bulges** ☐ Location shown on site map ☐ Bulges not evident Areal extent______________ Height____________ Remarks____
8.	**Wet Areas/Water Damage** ☐ Wet areas/water damage not evident ☐ Wet areas ☐ Location shown on site map Areal extent______________ ☐ Ponding ☐ Location shown on site map Areal extent______________ ☐ Seeps ☐ Location shown on site map Areal extent______________ ☐ Soft subgrade ☐ Location shown on site map Areal extent______________ Remarks____
9.	**Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability Areal extent______________ Remarks____
B. Benches	☐ Applicable **X** N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)
1.	**Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay Remarks____
2.	**Bench Breached** ☐ Location shown on site map ☐ N/A or okay Remarks____
3.	**Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay Remarks____
C. Letdown Channels	☐ Applicable **X** N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)
1.	**Settlement** ☐ Location shown on site map ☐ No evidence of settlement Areal extent______________ Depth____________ Remarks____
2.	**Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation Material type______________ Areal extent____________ Remarks____

3.	**Erosion** ☐ Location shown on site map ☐ No evidence of erosion Areal extent______________ Depth____________ Remarks____ ____
4.	**Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting Areal extent______________ Depth____________ Remarks____ ____
5.	**Obstructions** Type____________________ ☐ No obstructions ☐ Location shown on site map Areal extent______________ Size____________ Remarks____ ____
6.	**Excessive Vegetative Growth** Type____________________ ☐ No evidence of excessive growth ☐ Vegetation in channels does not obstruct flow ☐ Location shown on site map Areal extent______________ Remarks____ ____
D. Cover Penetrations ☐ Applicable **X** N/A	
1.	**Gas Vents** ☐ Active☐ Passive ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks____ ____
2.	**Gas Monitoring Probes** ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks____ ____
3.	**Monitoring Wells** (within surface area of landfill) ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks____ ____
4.	**Leachate Extraction Wells** ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks____ ____
5.	**Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A Remarks____ ____
E. Gas Collection and Treatment ☐ Applicable **X** N/A	

1.	**Gas Treatment Facilities** ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse ☐ Good condition ☐ Needs Maintenance Remarks____
2.	**Gas Collection Wells, Manifolds and Piping** ☐ Good condition ☐ Needs Maintenance Remarks____
3.	**Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings) ☐ Good condition ☐ Needs Maintenance ☐ N/A Remarks____
F. Cover Drainage Layer	☐ Applicable **X** N/A
1.	**Outlet Pipes Inspected** ☐ Functioning ☐ N/A Remarks____
2.	**Outlet Rock Inspected** ☐ Functioning ☐ N/A Remarks____
G. Detention/Sedimentation Ponds	☐ Applicable **X** N/A
1.	**Siltation** Areal extent______________ Depth____________ ☐ N/A ☐ Siltation not evident Remarks____
2.	**Erosion** Areal extent______________ Depth____________ ☐ Erosion not evident Remarks____
3.	**Outlet Works** ☐ Functioning ☐ N/A Remarks____
4.	**Dam** ☐ Functioning ☐ N/A Remarks____
H. Retaining Walls	☐ Applicable **X** N/A
1.	**Deformations** ☐ Location shown on site map ☐ Deformation not evident Horizontal displacement____________ Vertical displacement_______________ Rotational displacement____________ Remarks____
2.	**Degradation** ☐ Location shown on site map ☐ Degradation not evident Remarks____

I. Perimeter Ditches/Off-Site Discharge	☐ Applicable **X** N/A
1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident Areal extent______________ Depth____________ Remarks____	
2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A ☐ Vegetation does not impede flow Areal extent______________ Type____________ Remarks____	
3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident Areal extent______________ Depth____________ Remarks____	
4. **Discharge Structure** ☐ Functioning ☐ N/A Remarks____	

VIII. VERTICAL BARRIER WALLS	☐ Applicable **X** N/A
1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident Areal extent______________ Depth____________ Remarks____	
2. **Performance Monitoring** Type of monitoring_________________________ ☐ Performance not monitored Frequency______________________________ ☐ Evidence of breaching Head differential_________________________ Remarks____	

IX. GROUND WATER/SURFACE WATER REMEDIES	☐ Applicable **X** N/A
A. Ground Water Extraction Wells, Pumps, and Pipelines	☐ Applicable ☐ N/A
1. **Pumps, Wellhead Plumbing, and Electrical** ☐ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A Remarks____	
2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition ☐ Needs Maintenance Remarks____	
3. **Spare Parts and Equipment** ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks____	
B. Surface Water Collection Structures, Pumps, and Pipelines	☐ Applicable **X** N/A

1.	**Collection Structures, Pumps, and Electrical** ☐ Good condition☐ Needs Maintenance Remarks______________________________
2.	**Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition☐ Needs Maintenance Remarks______________________________
3.	**Spare Parts and Equipment** ☐ Readily available ☐ Good condition☐ Requires upgrade ☐ Needs to be provided Remarks______________________________
C. Treatment System	X Applicable ☐ N/A
1.	**Treatment Train** (Check components that apply) ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation ☐ Air stripping ☐ Carbon adsorbers ☐ Filters______________________________ ☐ Additive (*e.g.*, chelation agent, flocculent)______________________________ ☐ Others______________________________ X Good condition ☐ Needs Maintenance X Sampling ports properly marked and functional ☐ Sampling/maintenance log displayed and up to date X Equipment properly identified ☐ Quantity of ground water treated annually________________ ☐ Quantity of surface water treated annually________________ Remarks **Indoor Air and Soil Vapor Treatment System (VIMS/ESVE System)**
2.	**Electrical Enclosures and Panels** (properly rated and functional) ☐ N/A X Good condition ☐ Needs Maintenance Remarks______________________________
3.	**Tanks, Vaults, Storage Vessels** ☐ N/A X Good condition ☐ Proper secondary containment ☐ Needs Maintenance Remarks______________________________
4.	**Discharge Structure and Appurtenances** ☐ N/A X Good condition ☐ Needs Maintenance Remarks______________________________
5.	**Treatment Building(s)** ☐ N/A X Good condition (esp. roof and doorways) ☐ Needs repair ☐ Chemicals and equipment properly stored Remarks______________________________

6.	**Monitoring Wells** (pump and treatment remedy) X Properly secured/locked X Functioning X Routinely sampled X Good condition X All required wells located ☐ Needs Maintenance ☐ N/A Remarks______
D. Monitoring Data	
1.	Monitoring Data X Is routinely submitted on time X Is of acceptable quality
2.	Monitoring data suggests: **N/A** ☐ Ground Water plume is effectively contained ☐ Contaminant concentrations are declining
D. Monitored Natural Attenuation	
1.	**Monitoring Wells** (natural attenuation remedy) ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ All required wells located ☐ Needs Maintenance X N/A Remarks______

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Reduce Indoor Air/Soil Vapor and Soil to clean up goals – It has reduced indoor air to clean up goals and has been shut off and a rebound test has been performed, VIMS remains shut off. ESVE has reduced soil vapor concentrations but some areas remain above clean up goals, system has become diffusion limit and a pilot test to reduce continuous operations to pulse is underway.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

No issues or observations identified

C. Early Indicators of Potential Remedy Problems

	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. None observed or identified
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. Being able to reduce the operation of the system from continuous to pulse will certainly reduce costs

APPENDIX E – INTERVIEWS

INTERVIEW DOCUMENTATION FORM			
The following is a list of individual interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.			
Mr. Ron Courts	Environmental Services Manager	City of Roswell	10/19/2016
Name	Title/Position	Organization	Date
Mr. Chris Cortez	Operations Manger	Atkins Engineering Inc.	10/26/2016
Name	Title/Position	Organization	Date
Mr. Steve Jetter	Technical Team Leader	NMED	11/05/2016
Name	Title/Position	Organization	Date
Ms. Nancy Fram	Property Owner	________________	10/26/2016
Name	Title/Position	Organization	Date
Ms. Mary Jane Barron	Property Owner	________________	11/01/2016
Name	Title/Position	Organization	Date
Ms. Modesta Mendez	Resident	Community	09/21/2017
Name	Title/Position	Organization	Date

INTERVIEW RECORD

Site Name: McGaffey & Main Ground Water Plume Superfund Site	**EPA ID No.:NMN0000605386**	
Subject:	**Time: 15:00**	**Date: 10/19/16**
Type: <u>X</u> Telephone Visit Other **Location of Visit:**	Incoming Outgoing	

Contact Made By:

Name: Allan Pasteris	**Title: Geoscientist**	**Organization: NMED**

Individual Contacted:

Name: Ron Courts	**Title: Environmental Services Manager**	**Organization: City of Roswell**

Telephone No: (575) 626-0754 **Fax No:** **E-Mail Address: Environdc_rosnm@yahoo.com**	**Street Address:** **City, State, Zip: Roswell, NM 88**

Summary Of Conversation

1 What is your overall impression of the project?
I have been involved in the project since the mid-1990s when the State first discovered ground water contamination. Assisted the State with identifying property and well owners. I continue to be the local contact for EPA now that the Site is on the NPL. I understand that the Project is indoor air driven. I know that the soil vapor and indoor air remedy in place is doing a very good job, better than expected. I was disappointed that the State put in all those wells for the bio barrier and did not follow through with any treatments; it seems like a waste of tax payer dollars. I believe injections could still have been tried just to see the affect. The Project overall is still a work in progress.

2. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.
I drive by the Source area at least once a week to see if the treatment facility has been damaged or identify any graffiti. I can report that as of today no damage or graffiti has been identified. I also serve as the local emergency contact for the treatment facility for the police and fire departments.

3. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.
I am aware of no complaints. The general public interest in the Project has always been low except for property and business owners in the Source area. Some in the source area have been very helpful.

4. Do you feel well informed about the site's activities and progress?
I feel very much informed.

5. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?
Kudos to Mr. Michael Torres he has been the one responsible for getting this Project moving forward. He has worked well citizens and property owners. He was responsible for working with EPA lawyers to provide comfort letters to property owners in the source area which was a great help for them.

INTERVIEW RECORD

Site Name: McGaffey and Main Ground Water Plume Superfund Site	**EPA ID No.:NM0000605386**	
Subject: First Five Year Review	**Time: 11:30**	**Date: 10/26/16**
Type: Telephone **X** Visit Other **Location of Visit:**	Incoming Outgoing	

Contact Made By:

Name: Allan Pasteris	**Title: Geoscientist**	**Organization: NMED**

Individual Contacted:

Name: Chris Cortez	**Title: Operations Manager**	**Organization: Atkins Engineering Inc.**

Telephone No: 575.914.2420 **Fax No:** **E-Mail Address: chris@atkinseng.com**	**Street Address: 2904 W 2nd Street** **City, State, Zip: Roswell NM 88201**

Summary Of Conversation

1. What is your overall impression of the project? (general sentiment)
I believe the Project is well organized and is going well. It is easy to collaborate with CHM2, EPA and the State. I feel Atkins serves a useful and important role by providing a local O&M presence that ultimately saves the Project money.

2. Is the remedy functioning as expected? How well is the remedy performing?
I do not necessarily deal with the data so I do not know how well the remedy is functioning. I do know that the VIMS has been turned off and no rebound has occurred and that part of the ESVE system has been turned off and rebound testing is occurring. That must suggest that progress is being made.

3. Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspections and activities.
There is not a continuous presence on-site in the sense of staff but the system is connected by telemetry to CHM2 staff and the system has alarms to identify problems. Atkins will inspect the facility once a week and bi-weekly will take influent and effluent PID readings. All inspection reports are put on Share Point a CHM2 internet portal to share info.

4. Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.
Only routine maintenance has occurred, nothing major.

5. Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.

None

6. Have there been opportunities to optimize O&M, or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.

Because we are local all the maintenance or sampling we do saves money for the project by not requiring CHM2 to mobilize to the Site from Dallas or Albuquerque. As we have learned maintenance procedures from CHM2 we have taken over more of the routine maintenance duties.

7. Do you have any comments, suggestions, or recommendations regarding the project?

Nothing specific, we are glad to be a part of the Project and the cleanup.

INTERVIEW RECORD

Site Name: McGaffey and Main Ground Water Plume	**EPA ID No.:**	
Subject:	**Time:**	**Date: 11/5/16**
Type: Telephone Visit <u>**X**</u> Other **Location of Visit:**	Incoming Outgoing	

Contact Made By:

Name:Allan Pasteris	**Title:Geoscientist**	**Organization:NMED**

Individual Contacted:

Name: Steve Jetter	**Title: Technical Team Leader**	**Organization: NMED**

Telephone No: (505)827-0072 **Fax No:** **E-Mail Address: steve.jetter@state.nm.us**	**Street Address: 1190 St. Francis Dr.** **City, State, Zip: Santa Fe, NM 87502**

Summary of Conversation

1. What is your overall impression of the project?

NMED is pleased that the remedy for the source area soils/indoor air was implemented during this FYR period and has been successful in reducing indoor air concentrations to below the remediation goals. The soil vapor extraction component has also been successful in treating soil contamination within the highest concentration areas. This was the high priority remedy due to the risk to human health at the buildings within the source area. NMED is also pleased that the source area property has been cleared for redevelopment and that the redevelopment has begun. NMED thanks EPA for working with the developers on this project.

NMED is concerned with the lack of progress on both the source area ground water (SAGW) and the downgradient ground water plume (GWP) remedies. This appears to be primarily due to a lack of adequate funding for the project.

2. Have any problems been encountered which required, or will require, changes to a remedial design or the ROD?

There appears to be an issue with obtaining the Office of State Engineer permits and water rights that would be required to discharge water to the POTW which is the current discharge proposed for both the SAGW and GWP. Water rights issues are a major concern for the Roswell (Pecos River) basin due to full adjudication of the water. Although sufficient rights may be available for the fairly small pumping rates currently under consideration for the SAGW, it is very unlikely for the GWP due to the volume of ground water extraction needed. A P&T remedy design with reinjection, or another remedy alternative should be considered.

3. Have any problems or difficulties been encountered which have impacted implementability of a Remedial Design?

There are several issues that could impact the Remedial Design and implementation.

1) *Water rights and the costs for leasing rights maybe prohibitive for the current remedies that include disposal to the local POTW. Therefore, alternative disposal methods (reinjection) or an alternative remedy in general may be required, especially for the downgradient GWP.*
2) *The P3 Zone around the source area (SA) is not fully defined to the east and could have ramification on the success of SAGW remedy if not accounted for in the design. PCE concentrations in the furthest eastern downgradient wells, ED95-04 and ED95-14, are currently (2016) at 2640 µg/l and 484 µg/L, respectively, and are 500 times and 100 times higher than the site remediation goal of 5 µg/L for PCE. In addition, the high concentrations discovered during the RDI southwest of the source area, in MW-36, should be considered for treatment by the SAGW, instead of allowing this contamination to migrate and be captured by the eventual GWP treatment system. This would require expansion of the current conceptual design proposed for the SAGW.*
3) *The initial Remedial Design Investigation determined that contamination in the P1 Zone extends further to the southwest than initially anticipated and the plume is still not defined in the direction. Based on NMED's understanding of the current SAGW design, it will not capture this area of the plume.*
4) *The GWP hotspot and the downgradient GWP have both expanded in size since the RI. The GWP hotspot has more than doubled in size and expanded to the south. The GWP has expanded by over 1.5 miles since the RI and numerous more private and irrigation wells have been identified within or immediately adjacent to the plume. In addition, previously undetected contamination in the P3 Zone within the GWP has been identified. All these conditions have a significant effect on the remedial design and its implementation.*

4. Is the remedy functioning as expected? How well is the remedy performing?

To date, there has been very slow progress made on the design and implementation of the 4 site remedies (1) Source Area soil/indoor air, 2) Source Area Ground Water, 3) downgradient Ground Water Plume (GWP), and 4) downgradient GWP Hotspot) addressed in the ROD. This slow progress is primarily due to a lack of adequate funding for the site. To date only one of the remedies (Source Area soil/indoor air) has been fully implemented. This was the highest priority remedy due to the high levels of contaminants found in indoor air at several building in the source area and was implemented in a timely manner. The remedy has been effective in removing and prevent indoor air impacts and in reducing soil vapors in the vadose zone. NMED completed the design and initial construction phase for the GWP Hotspot remedy, however, operation has not occurred due to unforeseen field conditions contamination discovered in the shallower (P3) aquifer that was not identified during the RI and a greatly which will require additional evaluation for remedy design consideration.

5. Is there opportunities to optimize a Remedial Design or remedy?

The current SA Soil remedy is undergoing optimization testing which should allow for shutdown of the VIMS treatment system. It is expected that the SVE system can be operated in a pulsed mode due to the relatively low vapor concentrations observed. Current optimization testing will be used to determine optimal on and off operations. Due to the low SVE influent concentrations, removal of the effluent treatment (GAC filters) should be considered.

6. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

As stated above, NMED is pleased with the progress made on the SA Soil clean up and the fact that the property has been made suitable for redevelopment.

NMED is concerned with the current level of funding provided for this site particularly considering that the GWP continues to migrate and expand which will inevitably add to the overall cost of the remedy.

INTERVIEW RECORD

Site Name: McGaffey and Main Ground Water Plume Superfund Site	**EPA ID No.: MN0000605386**	
Subject: First Five Year Review	**Time: 9:40**	**Date: 10/26/16**
Type: <u>**X**</u> Telephone Visit Other **Location of Visit:**	Incoming Outgoing	

Contact Made By:

Name: Allan Pasteris	**Title: Geoscientist**	**Organization: NMED**

Individual Contacted:

Name: Nancy Fram	**Title:**	**Organization: F&H Investments**

Telephone No: 575.623.9426 **Fax No:** **E-Mail Address: N/A**	**Street Address: PO Box 563** **City, State, Zip: Roswell, NM 88202**

Summary Of Conversation

1. What is your overall impression of the project? (general sentiment)
The cleanup is good and needed. From what I know funding is a problem, the ground water plume is getting larger and people were told not to use their well water.

2. What effects have site operations had on the surrounding community?
A lot of people don't care, nobody has shown any interest in the project except several property owners in the source area. EPA would hold public meetings and nobody would attend except the newspaper and myself.

3. Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.
I am aware of one pending sale of a property in the source area that fell through due to the contamination present.

4. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.
Not to my knowledge.

5. Do you feel well informed about the site's activities and progress?
Yes, building owners were made aware of the contamination including the indoor air and plans to remediate. From what I know progress is being made.

6. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?
Get funding to complete the cleanup, the plume is growing. People should have clean water. Michael Torres was informative and professional and I believe he cares about the project.

INTERVIEW RECORD

Site Name: McGaffey and Main Ground Water Plume Superfund Site	**EPA ID No.: NM0000605386**	
Subject: Five Year Review	**Time: 14:30**	**Date: 11/1/2016**
Type: X Telephone Visit Other **Location of Visit:**	Incoming Outgoing	

Contact Made By:

Name: Allan Pasteris	**Title: Geoscientist**	**Organization: NMED**

Individual Contacted:

Name: Mary Jane Barron	**Title: Trustee**	**Organization: Barron Revocable Trust**
Telephone No: 575.626.6765 **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip: Roswell, NM**	

Summary Of Conversation

1. **What is your overall** impression of the project? (general sentiment)

The cleanup is good; it needed to be done and was glad to assist. I really think EPA could have saved money by purchasing the source area properties, would not have to remediate indoor air, only soil and soil vapor. With the buildings gone more options for placement of remediation infrastructure.

2. **What effects have site operations had on the surrounding community?**

Not many from the community have shown concern about the Site. All renters who sign a lease are provided information about the contamination

3. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

I am not aware of any concerns from the community. Personally I would like to sell my property in the source area, the redevelopment (car wash) occurring on the Site should be good.

4. **Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.**

Not aware of anything.

5. **Do you feel well informed about the site's activities and progress?**

Yes I do, I have attended all the meetings and Michael Torres has stayed in touch and kept me well informed.

6. **Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**

As I stated above, I really think EPA could have saved money by purchasing the source area properties, would not have to remediate indoor air, only soil and soil vapor. I think EPA should really consider that as an option when cleaning up a Site. There should be some mechanism for EPA to consider that as an option.

INTERVIEW RECORD

Site Name: McGaffey and Main Ground Water Plume Superfund Site	**EPA ID No.: NM000060538**	
Subject: Five Year Review	**Time: 11:45 am**	**Date: 09/21/2017**
Type: <u>**X**</u> Telephone Visit Other **Location of Visit:**	Incoming Outgoing	

Contact Made By:

Name: Janet Brooks	**Title: Remedial Project Manager**	**Organization: EPA**

Individual Contacted:

Name: Modesta Mendez	**Title: Previous Resident**	**Organization: Community member in the GWP area**

Telephone No: 575.637-3552 **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip: Roswell, NM**

Summary Of Conversation

1. **What is your overall** impression of the project? (general sentiment)

Community has been very well informed and regularly received notices.

2. **What effects have site operations had on the surrounding community?** *Community is very interested and well aware of what is going on.*

3. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

I am not aware of any concerns from the community. I was on city water and drank it for 13 years without any indication of odor or taste. My neighbor used City water for drinking and his private well for irrigation.

4. **Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.**

Not aware of anything.

5. **Do you feel well informed about the site's activities and progress?**

Yes I do,

6. **Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**