



## EPA Announces Proposed Plan

**Eagle Picher Carefree Battery Superfund Site  
Socorro, New Mexico**

**June 2014**

### The purpose of this Proposed Plan is to:

- Identify the preferred remedial action alternative to address contamination at the Eagle Picher Site;
- Describe the other remedial alternatives considered in detail in the Feasibility Study report;
- Solicit public review and comment on the remedial action alternatives and supporting analysis, as well as on information contained in the Administrative Record File; and
- Provide information on how community members can be involved in the remedy selection process for the Site.

The U.S. Environmental Protection Agency has released the Proposed Plan for addressing hazardous substance contamination at the Eagle Picher Carefree Battery (Eagle Picher) Site, Socorro, New Mexico. EPA, the lead agency for site activity, is issuing the Proposed Plan with support from the New Mexico Environment Department (NMED). Following public review and discussion of the Proposed Plan, EPA will make a final remedy selection that will be documented in the Record of Decision (ROD).

The purpose of the Proposed Plan is to fulfill statutory requirements pursuant to Sections 113(k)(2)(B), 117(a), and 121(f)(1)(G) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), 42 U.S.C. §§ 9613(k)(2)(B), 9617(a), and 9621(f)(1)(G). It also describes the alternatives analyzed, identifies the preferred alternative, and solicits public involvement in the selection of a remedy.

The EPA has developed this Proposed Plan. In developing this Proposed Plan, the EPA consulted with NMED, which concurs with this Proposed Plan.

### Community Participation

The Proposed Plan fact sheet highlights key information from the Remedial Investigation (RI) and Feasibility Study (FS) reports for the Eagle Picher Site, but it is not a substitute for these reports. The results of the sampling activities and an assessment of the potential site risks are presented in the RI Report. The development and evaluation of remedial alternatives to address the contamination are presented in the FS Report. For a complete source of information, please refer to these reports, which are in the Administrative Record File located at the repositories listed below. EPA encourages the public to review these

documents in order to gain a more comprehensive understanding of the Eagle Picher Site, the Superfund activities that have been conducted there, and the various alternatives that have been developed and evaluated to address the contamination at the Eagle Picher Site. The EPA also encourages the public to participate in the decision-making process for the Eagle Picher Site by making comments on all aspects of the Administrative Record File including the RI/FS and the Proposed Plan. The Administrative Record File is available at the following information repositories:

#### **Socorro Public Library**

401 Park Street  
Socorro, NM 87801

#### **U.S. Environmental Protection Agency 12th Floor Library**

1445 Ross Avenue, Suite 12D13  
Dallas, Texas 75202-2733  
(214) 665-2792

A public meeting to receive comments will be held at:

#### **Socorro City Hall 111 School of Mines Road Socorro, New Mexico**

Thursday, June 26, at 6:00 PM in Socorro, New Mexico. The public is invited to comment on this Proposed Plan. Final decisions regarding the remediation of the Eagle Picher Site will only be made after public comments are considered. The official public comment period begins on **June 12, 2014** and ends on **July 11, 2014**. During the public comment period, written comments may be submitted to:

#### **Sai Appaji Remedial Project Manager**

EPA, Region 6 (6SF-R)  
1445 Ross Avenue  
Dallas, Texas 75202-2733  
(214) 665-3126 or toll free (800) 533-3508

### Site History

The Eagle Picher Site is located in the City of Socorro (City), Socorro County, New Mexico (See Figure 1 below and Figure 2 - Area Map with Well Locations on page 3). The site encompasses two large tracts that are approximately equal to 55 acres and located along I-25,

two miles north of Socorro. The area east of NM 408 contains a large structure (the manufacturing plant), several outbuildings, and vacant land. The property to the west of NM 408 includes the older historical facility and contains a number of buildings in various states of decay, along with assorted construction-type debris.

The property was initially owned by the United States Government and was used as Civilian Conservation Corps barracks in 1932. From 1936 to 1956, the facility was utilized as a State of New Mexico tuberculosis sanitarium. Septic waste from the sanitarium was discharged into wastewater impoundments (Figure 2) located in the south-east portion of the property.

After the sanitarium was closed, the facility was acquired by the City. In 1964, the City sold the property to Eagle Picher. From approximately 1964 to 1976, Eagle Picher manufactured various products, including printed circuit boards, on the property. Domestic sewage and industrial waste from the manufacturing process was discharged into the wastewater impoundments.

In 1976, the City obtained ownership of the property again and leased a portion of the property to a jewelry manufacturing company that was in operation until 1980. No chlorinated solvents were used in the jewelry manufacturing operation.

From 1977 through 1980 the City operated a landfill in an arroyo north of the former Eagle Picher manufacturing building. The landfill was permitted to accept waste from residential, commercial, institutional and recreational fac-

ilities. The landfill was closed as part of a lease agreement between the City and Eagle Picher.

In 1980, Eagle Picher leased the property from the City and produced non-automotive lead-acid batteries at the facility until the late 1990s. Eagle Picher constructed two lined evaporation impoundments for industrial effluent in the 1980s. The industrial impoundments were closed in the 1990s under the Resource Conservation and Recovery Act (RCRA) process. In 2005, the City leased approximately 11 acres of the property, including the Eagle Picher manufacturing building and surrounding property, to a motorcross track operation for recreational use. Flash flooding in the summer of 2006 damaged the former building and motocross track. Because of soil erosion and exposure to lead battery waste, motocross operations were suspended by the City.

In 2007, the City adopted a resolution in support of listing the site on the National Priorities List (NPL). The EPA proposed the site on the NPL in March 2007.

Multiple investigations have been conducted at the Eagle Picher Site from 1987 till present by NMED and its predecessor agency. Site investigations have revolved around evaluating contamination discovered in public wells (Eagle Picher and Olson wells) near the site. Results from past investigations have indicated source of contamination emanating from the former Eagle Picher facility. Contaminants in the groundwater are primarily chlorinated solvents such as tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethene (DCE) and 1,4 dioxane.

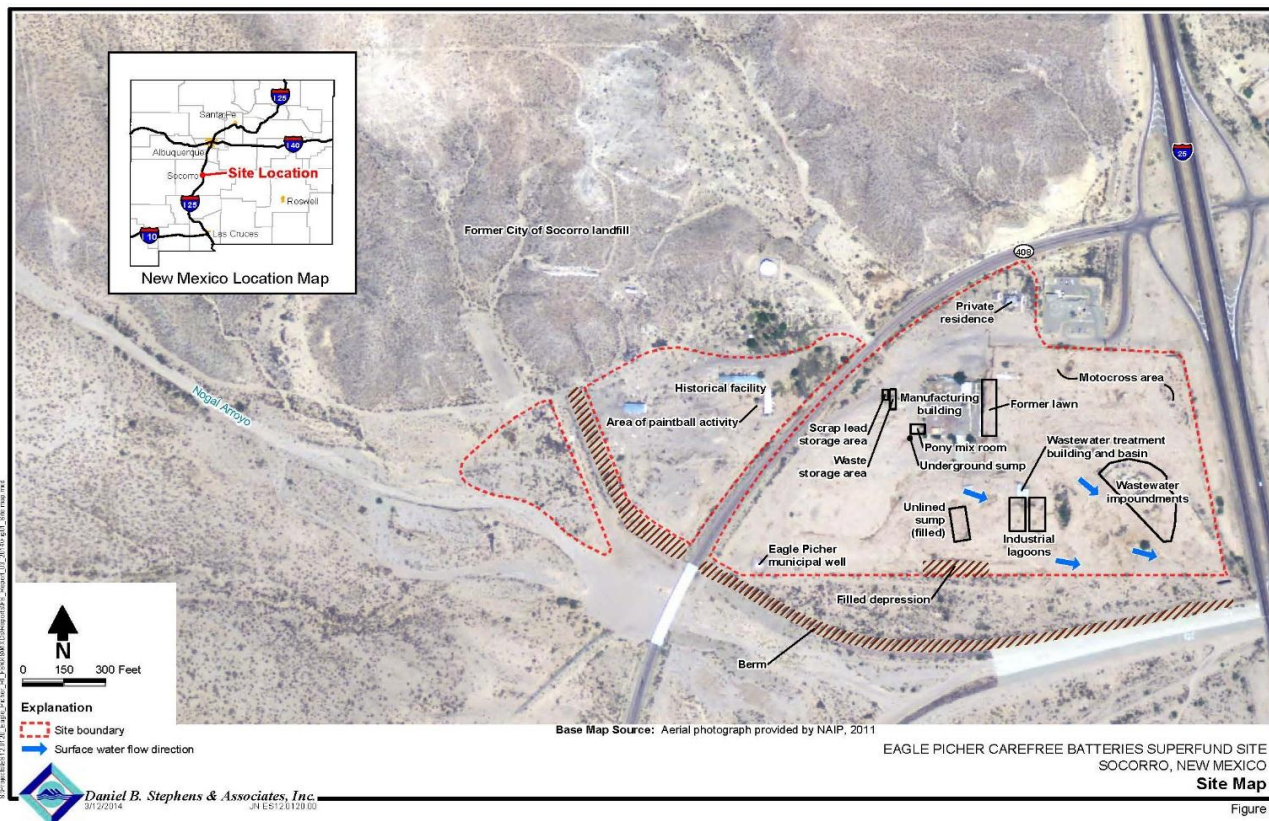
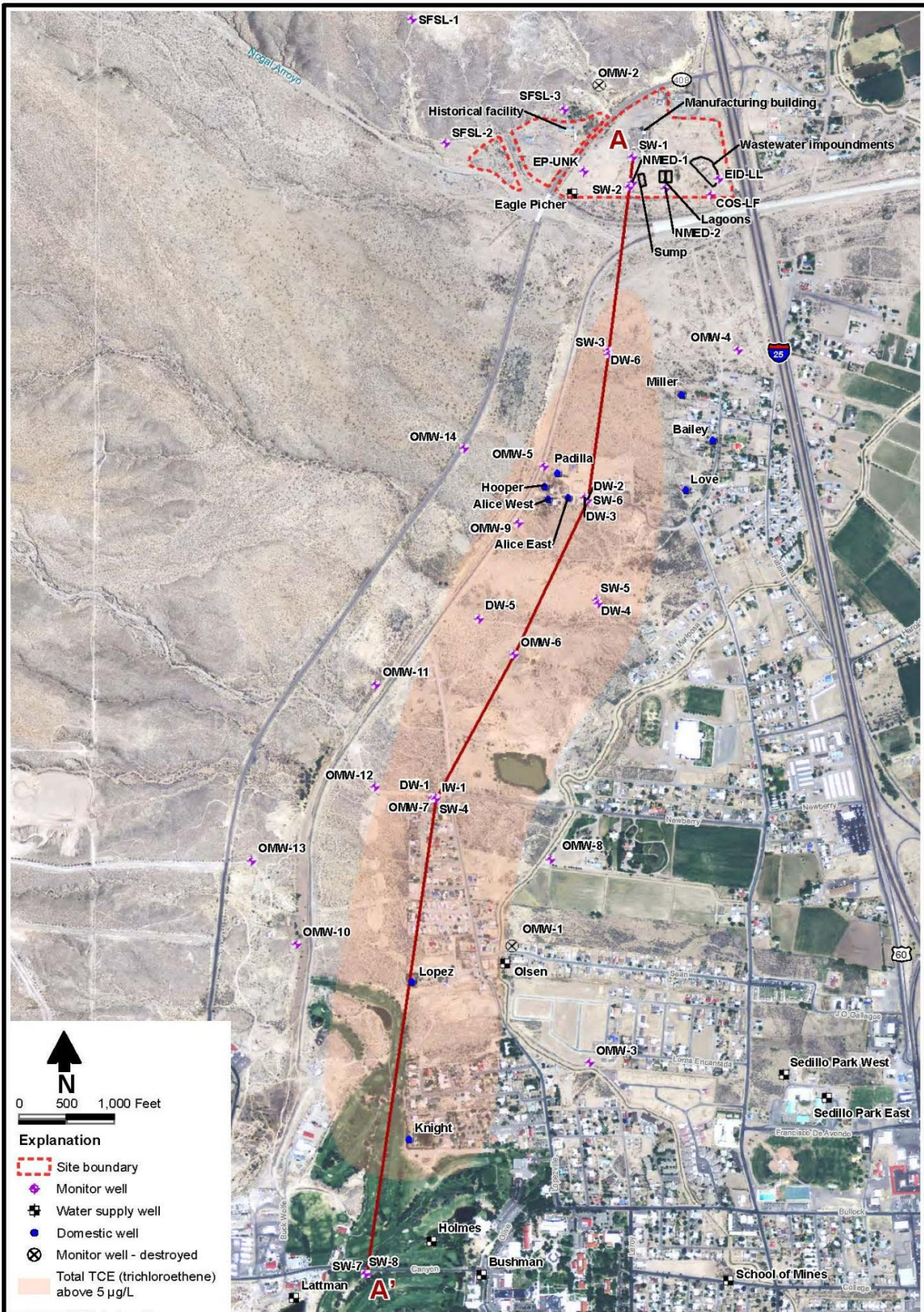


Figure 1



EAGLE PICHER CAREFREE BATTERIES SUPERFUND SITE  
SOCORRO, NEW MEXICO  
Area Map with Well Locations

Figure 2

In 2000, the Olson well located south of the Eagle Picher site was investigated in another attempt to further delineate the groundwater plume and identify the sources of TCE. The source of the TCE could not be conclusively identified during this investigation. The printed circuit board operation at the Eagle Picher site was identified as a potential source of the TCE. Several potential sources, including the Eagle Picher site, were identified.

In 2001/2002, NMED conducted a site investigation at the Olson well. A total of 5 monitor wells were installed to refine plume definition and source determination. Sampling results confirmed the presence of TCE, 1,1-DCE, PCE, and cis-1,2-DCE in groundwater at the Eagle Picher site.

From 2004 to 2006, NMED conducted an expanded site investigation that included: (1) installation of additional monitor wells, (2) collection of surface water, groundwater, soil, and soil gas samples, (3) an X-ray fluorescence (XRF) soil survey for heavy metals, and (4) off-site soil sampling (after the 2006 floods). This investigation determined that the Eagle Picher facility was likely the source of TCE in the aquifer in Socorro.

From 2010 to 2012, NMED conducted groundwater sampling activities at monitor, domestic, and municipal wells in the area of the Eagle Picher facility and the groundwater plume. The sampling events were intended to provide updated water quality data from the plume area and to provide further delineation of the plume extent.

In August 2012, NMED in cooperation with EPA began a RI/FS and completed site investigation and risk characterization in early 2014.

### **Summary of Site Characteristics**

Socorro is located in the central part of Socorro County, New Mexico along the Rio Grande Valley. The elevation of Socorro is 4,585 above mean sea level, where the climate is arid to semi-arid with average annual precipitation of 9.71 inches. The population of Socorro is approximately 9000. The principal aquifer system in the Socorro Basin is composed of the Quaternary and Tertiary Santa Fe Group (Popotosa and Sierra Ladrones Formation) and the overlying Quaternary deposits. The aquifer is divided in to three units: (1) an unconfined aquifer comprising of the Quaternary deposits and the Sierra Ladrones Formations, (2) the Popotosa confining unit consisting of playa deposits and mudstones, and (3) the underlying Popotosa Aquifer. Within the Socorro Basin, the unconfined aquifer is commonly referred to as the shallow aquifer. Most of the wells in the Socorro Basin, including the wells impacted by chlorinated solvents, are completed in the highly-transmissive shallow aquifer.

Depths to groundwater vary from over 100 feet on the higher terrain areas to less than 20 feet in low-lying areas. The groundwater flow direction is generally to the south-southwest in the groundwater plume area. To the west of

the Site, the groundwater flow is southeast parallel to the Nogal Arroyo.

Although the unconfined aquifer is undifferentiated (i.e. no laterally extensive confining units were found in the study area), the goal of the RI was to delineate the vertical extent of contamination. Accordingly, the upper sediments of the unconfined aquifer were subdivided in to the three following informal water bearing zones based on the screened intervals of wells within the groundwater plume: (1) a shallow water bearing zone (SWBZ) extending up to a depth of 25 feet bgs (below ground surface) (2) the intermediate water bearing zone (IWBZ) extending up to a depth of 75 feet bgs, and (3) the deep water bearing zone (DWBZ) extending up to 215 feet bgs.

Based on aquifer testing conducted during the RI, the groundwater velocity in the SWBZ and IWBZ is approximately 220 ft/year, indicating plume migration downgradient.

The Eagle Picher well is currently used by the City as one of the supply wells and is located on the Eagle Picher site. This well is no longer impacted as the contamination has migrated downgradient. One of the former City supply well, Olson Well (not in use), and a number of private wells are located within the plume area. Currently all residents have access to public water supplied by the City. Three supply wells located to the south of the plume are used by New Mexico Tech for irrigation of the golf course.

Based on groundwater monitoring and soil sampling data there is no evidence of source material remaining at the Eagle Picher site. The contaminants have migrated downgradient of the site. In the shallow aquifer zones (including the SWBZ and IWBZ), the TCE plume covers an area of 360 acres and extends over 9000 feet to the south and is 2000 feet at its widest point. The shallow plume contains two "hot spot" areas where the TCE concentrations are above 100 parts per billion (ppb) and as high as 310 ppb. The vast majority of the dissolved phase plume has TCE concentrations less than 50 ppb. Smaller PCE and 1,1-DCE plumes are within the larger TCE plume.

In the DWBZ, the plume extends for a length of approximately 4500 feet in a narrow swath under the northern part of the shallow plume. The deep-zone plume contains both TCE and 1,1-DCE, and is limited in depth to the upper portion of the DWBZ. The base of the dissolved-phase plume was identified at depth of approximately 200 ft bgs. The highest detected concentration of TCE within the deepest part of the plume was 230 ppb.

1,4-dioxane, an emerging contaminant was detected in low concentrations in one private well, four monitoring wells and one former supply well within the TCE plume. The highest concentration of 1,4-dioxane detected was 35 ppb.

On-site soils have been impacted by lead, cadmium and chromium contamination. Lead contamination is present in

soils ranging in concentrations from 16 parts per million (ppm) to 6,166 ppm. Lead concentrations exceed EPA industrial screening level of 800 ppm at the west entrance to the manufacturing building, in the battery debris areas southwest of the manufacturing building, wastewater impoundment area and south of the historical building as shown in Figure 3. Approximately 1000 cubic yards of soils have been impacted in these four locations.

Elevated chromium levels are present in soil but co-located with lead contamination. Both trivalent and hexavalent chromium forms were analyzed in soil samples. Predominantly the soil samples contain trivalent chromium that is stable. Samples showed that hexavalent chromium was less than one percent of the total measured chromium, suggesting a minimal amount of chromium was present in the hexavalent form. The highest concentration of hexavalent chromium observed was 16 mg/Kg.

Based on historical data and sampling conducted during the RI, soil contamination by metals is limited to on-site soils. VOCs not sorbed to soil materials may infiltrate to groundwater. This process and pathway – the soil leaching to groundwater pathway – is considered the principal mode of transport through the vadose zone at the Eagle Picher site.

The site contains scattered construction debris related to structures in poor condition. The former operating buildings are not secure with windows and doors broken. Two of the buildings were constructed with asbestos containing building material (ACBM) and asbestos has been released in to the environment as evidenced by debris on soil around the building. Co-located with ACBM, the building materials contain lead-based paint (LBP) that is in very poor condition.

## Scope and Role of the Response Action

The EPA expects that the site contamination will be addressed as one operable unit through the remedy selected in the Record of Decision (ROD), which will be issued following this Proposed Plan. (An operable unit is a discrete action that comprises an incremental step toward comprehensively addressing site contamination.) That is, the response action, which will be detailed in the site ROD, will address heavy metals in soils, asbestos, chlorinated solvents and 1,4-dioxane in groundwater.

## Summary of site risks

### *Chemicals of Concern (COCs)*

COCs are chemicals that pose a carcinogenic risk to human health greater than 1 in 1,000,000 ( $1 \times 10^{-6}$ ), have a non-carcinogenic hazard index (HI) greater than ( $>$ ) 1, or are found in the groundwater plume at concentrations that exceed MCLs. The following constituents are considered to be COCs:

### *Soil COCs*

Lead, chromium and cadmium

### *Construction Debris COCs*

Asbestos containing building material (ACBM) and lead-based paint (LBP)

### *Groundwater COCs*

PCE, TCE, DCE and 1, 4-dioxane.

### *Land and Groundwater Use Assumptions*

Currently, the City maintains and operates the Eagle Picher municipal well on the site. Eagle Picher well is one of six primary wells used for public water supply by the City. Future land use is expected to be commercial and industrial development.

To the south of the site there are residential properties within the groundwater plume boundary. These residents are served by the City water supply. However, a number of residential properties have private wells and some of them use groundwater for non-drinking purposes. The Olson Well, a former municipal supply well that is located within the plume boundary, is no longer in use by the city. The New Mexico Tech campus, located just south of the plume boundary, is using three wells that are adjacent to the plume for irrigating the golf course. The groundwater plume extends over a part of the golf course as shown in Figure 2.

### *Potentially Exposed Populations in Current and Future Risk Scenarios*

The Baseline Human Health Risk Assessment identified primary contaminant sources, contaminant release mechanisms, exposure pathways, and receptors for the COCs. The potentially exposed individuals evaluated were based on current and potential future land use and most probable current and future activities On-Site and Off-Site (down-gradient plume area). The following potential receptors were evaluated for exposure to chemicals in groundwater and indoor air.

#### **On-Site**

- Hypothetical future commercial or industrial worker
- Hypothetical future construction worker
- Current or future intermittent visitors (trespassers and visitors to potential future businesses at the Site)

#### **Off-Site**

- Current or future resident or farmer
- Current or future commercial/industrial worker

### *Exposure pathways affecting each population group*

The following are the various exposure pathways and routes that were evaluated:

**Soil Exposure Pathways/Route** – Future commercial/ construction workers and visitors or trespassers on site can be exposed to inhalation, ingestion and dermal routes.

**Asbestos and Lead Based Paint Pathways/Route** – Two of the buildings contain ACBM and asbestos has been released in to the environment as evidenced by debris on soil around the building. Co-located with ACBM, the building materials contain LBP that is in very poor condition. The inhalation pathway is currently complete for any visitor or trespasser.

**Groundwater Exposure Pathways/Route** – Even though residents have municipal water supply for consumption, some of them are using their private well for other uses such as irrigation. Residents using private well water for non-potable uses are currently exposed.

**Indoor Air Exposure Pathways/Route** – For individual residences, exposure to contaminants in indoor air through inhalation of VOCs was evaluated.

## **Toxicity Assessment**

Site contaminants were assessed for carcinogenicity and for non-carcinogenic systemic toxicity. For carcinogens, 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. Excess lifetime cancer risk is calculated from the following equation: Cancer Risk = CDI x CSF where: risk = a unitless probability (e.g.,  $2 \times 10^{-5}$ ) of an individual's developing cancer

CDI = Chronic daily intake averaged over 70 years [mg/kg (milligram/kilogram)-day]

CSF = chemical and route specific cancer slope factor, expressed as  $(\text{mg/kg-day})^{-1}$ .

These risks are probabilities that usually are expressed in scientific notation (e.g.,  $1 \times 10^{-6}$ ). An excess lifetime cancer of  $1 \times 10^{-6}$  indicates that an individual experiencing the Reasonable Maximum Exposure (RME) estimate has a 1 in a 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. EPA's generally acceptable risk range for site-related exposures is  $10^{-4}$  to  $10^{-6}$ .

The potential for non-carcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., lifetime) with a reference dose (RfD) derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). A HQ less than 1 indicates that an individual's dose of a single contaminant is less than the RfD, and that toxic non-carcinogenic effects from that chemical are unlikely. The Hazard Index (HI) is generated by adding the HQs for all chemical(s) of concern

that affect that same target organ (e.g., liver) or that act through the same mechanism within a medium or across all media to which a given individual may reasonably be exposed. An HI less than 1 indicates that, based on the sum of all HQ's from different contaminants and exposure routes, toxic non-carcinogenic effects from all contaminants are unlikely. An HI greater than 1 indicates that site-related exposures may present a risk to human health. The HQ is calculated as follows:

Non-cancer HQ = CDI/RfD where:

CDI = Chronic Daily Intake

RfD = Reference Dose

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

## **Human Health Risk Characterization**

Risk estimates were calculated for future land use scenarios for hypothetical human receptors at the Eagle Picher Site. Cancer risks were estimated as the probability of an individual developing cancer over a lifetime as a result of exposure to the Site's carcinogenic contaminants. Toxicity risk estimates for non-carcinogenic toxic chemicals are presented for COCs. The potential for non-carcinogenic hazards due to potential exposures to chemicals was evaluated by calculating an HI for the COCs at the Eagle Picher Site.

The Baseline Risk Assessment shows the detailed calculation of risk. The Baseline Risk Assessment organized the types of risk at the Eagle Picher Site according to various exposure scenarios. Each exposure scenario specifies the type of human receptor (e.g., child resident, adult industrial worker), the exposure pathway (e.g., inhalation, ingestion) and the COC. If a contaminant or exposure scenario is found to produce a risk which will require a remedial action (based on either the carcinogenic risk or the HI), that contaminant or exposure scenario is said to "drive the risk" or "drive" the need for action. A remediation goal is set for site-related contaminants that drive risk.

The following exposure scenarios are driving the need for action at the Site (all risks are expressed as Reasonable Maximum Exposure or RME).

- Unacceptable levels of lead are present in soils in some locations at the site and present a risk to human health and the environment.
- The groundwater COCs are present at concentrations above their MCL and EPA health risk level; therefore, they present an unacceptable risk to human health and the environment.
- There is evidence of asbestos release and a high potential for continued release posing a risk to human health and the environment.

## Soil Risk

Exposure to lead in Site soils was assessed using USEPA's Adult Lead Model (ALM). For the ALM, USEPA has selected a target blood lead level (BLL) for an adult female to protect a developing fetus. The ALM indicated that risks from exposure to lead in Site soils, based on an average lead concentration for all Site soils are below the BLL. The ALM was modified to evaluate exposure to trespassers, recreational visitors on-Site, and this modified ALM also indicated that risks are below the BLL. Based on this evaluation, current lead concentrations do not present an elevated risk for adult workers on-Site or intermittent visitors.

The ALM model is based on average soil lead concentration levels throughout the site, however, lead concentrations in surface soils near the unlined wastewater impoundments, new manufacturing plant, and southwest of the new manufacturing plant are above levels (800 ppm) that EPA considers safe for exposure in an industrial setting.

## Groundwater Risk

Drinking (ingesting) and breathing (inhaling vapors) of groundwater (including all uses of household water, such as showering/bathing, laundering, and dishwashing) and dermal exposure to groundwater were evaluated for each well individually from the plume area for both carcinogenic and non-carcinogenic risks. Groundwater risk is primarily from TCE. Out of eight domestic wells evaluated, three wells had elevated risk from TCE with excess life-time cancer risk ranging from  $8 \times 10^{-6}$  to  $4 \times 10^{-5}$  (within USEPA's acceptable range of  $1 \times 10^{-6}$  to  $1 \times 10^{-4}$ ) and HQs ranging from 1.2 to 7.2.

The residents are being provided with water from the municipal water supply; however, if groundwater is used for other non-potable uses, there is potential non-cancer risk. There is also non-cancer risks from eating fruits and vegetables irrigated with contaminated groundwater.

1,4-dioxane, a COC was detected in low concentrations in one private well, five monitor wells and one former supply well within the groundwater plume area. Currently, there are no federal or state standards for 1,4-dioxane. The concentrations found in the wells are below current EPA Health Advisory level of 200  $\mu\text{g/L}$ ; however using a more conservative approach, the concentrations found in two wells are more than 6.7  $\mu\text{g/L}$  (EPA tap water screening level or EPA human health risk level) associated with the excess life-time cancer risk of  $1 \times 10^{-5}$ .

## Vapor Intrusion Risk

Indoor air exposure to VOCs via vapor intrusion estimated from plume area groundwater, as well as exterior soil gas, resulted in four of the 15 wells screened at the water table and one exterior soil gas sample with excess life-time cancer risk ranging from  $1 \times 10^{-5}$  to  $5 \times 10^{-5}$  (within USEPA's acceptable range of  $1 \times 10^{-6}$  to  $1 \times 10^{-4}$ ) and noncancer HQs greater than 1 (ranging from 2.3 to 11). For these four wells and one exterior soil gas sample, TCE concentrations were the primary contributors to the calculated HQs and excess life-time cancer risks. The model used to calculate indoor air concentrations from groundwater and exterior soil gas relies on a number of conservative assumptions that could over-predict the amount of VOCs migrating into buildings. Based on ground water depths and proximity to source vapor intrusion risk is unlikely; however, additional evaluation will be conducted during the RD to determine if any of the homes downgradient of these wells has the potential for vapor intrusion.

## Ecological Risk

The ecological risk assessment conducted indicates low risk level that is acceptable across the site except for the presence of metals (chromium and lead) in surface soils near the unlined wastewater impoundments, new manufacturing plant, and southwest of the new manufacturing plant. Those identified areas could pose a potential very low to moderate risk to hypothetical receptors (song birds and small omnivorous mammals). None of these types of animals were observed on the site, and it is not expected that they would as long as the site remains industrial land use. The risk estimates obtained in this analysis may be overestimated due to the use of conservative exposure metrics and assumes 100 percent metal bioavailability.

## Remedial Action Objectives

Remedial Action Objectives (RAOs) provide a general description of what a Superfund cleanup is designed to accomplish. The EPA proposes the following RAOs for the site:

### Soil RAOs:

- Prevent exposure to soils with lead concentrations above the non-residential screening level of 800 mg/kg.
- Mitigate potential impacts to groundwater from soils if present.

### Construction Debris RAOs:

- Prevent exposure of asbestos.

### Groundwater RAOs:

- Prevent human exposure to groundwater with contaminant concentrations above MCLs and above EPA human health risk level for 1,4-dioxane.

- Restore the aquifer in a timely manner such that no COCs are present at concentrations above MCLs, the EPA human health risk level for 1,4-dioxane.
- Prevent plume migration and mitigate further groundwater degradation.

### Preliminary Remediation Goals

Preliminary Remediation Goals (PRGs) were developed for COCs and exposure areas where the total risk for a receptor exceeded  $1 \times 10^{-4}$  or an HI of 1. The site-specific PRGs were developed based on guidance published by the NMED. The PRGs for the Eagle Picher Site are as follows:

### Groundwater

PCE: 5 µg/L (microgram/liter); TCE: 5 µg/L; 1,1-DCE: 7 µg/L; 1,4-dioxane: 6.7 µg/L

### Summary of Remedial Alternatives

The EPA has developed alternatives based on media impacted. These alternatives are analyzed in more detail in the FS, which is part of the Administrative Record File. Figure 3 shows the extent of the plume and the areas targeted for remediation using the preferred alternative.

### Soil Alternatives

- **Alternative S-1:** *No Action*
- **Alternative S-2:** *Consolidate and Cap in Place*
- **Alternative S-3:** *Excavation and off-site Disposal*

The EPA will select the final remedial alternative based on the Administrative Record File and based on comments received during the public comment period.

### Alternative S-1: No Action

Estimated Capital Cost: \$0  
 Estimated Present Worth Annual Operation and Maintenance (O&M): \$0  
 Estimated Total Present Worth Cost: \$0

Alternative S-1 is the baseline condition against which other remedial alternatives are compared, as required by

the National Contingency Plan (NCP). Alternative 1 would provide no further remedial action at the Site. Alternative 1 would continue to exceed the Preliminary Remediation Goals (PRGs) such that the RAOs for soil would not be met.

### Alternative S-2: Consolidate and Cap in Place

Estimated Capital Cost: \$339,000  
 Estimated Present O&M Cost: \$322,000  
 Estimated Total Present Worth Cost: \$661,000

Contaminated soil would be excavated and consolidated at a single location and covered with either a low-permeability cap or evapotranspiration cover. Materials would be excavated using standard earth-moving equipment (backhoes, excavators, front-end loaders, etc.) and relocated on-site. Mixing with cement would be performed as material is placed to provide a stable final form to the waste. A soil cap would then be installed to prevent infiltration to groundwater through the contaminated materials. The approximate areas to be excavated are shown in Figure 3. Approximately 1,000 cubic yards of material would need to be capped in place.

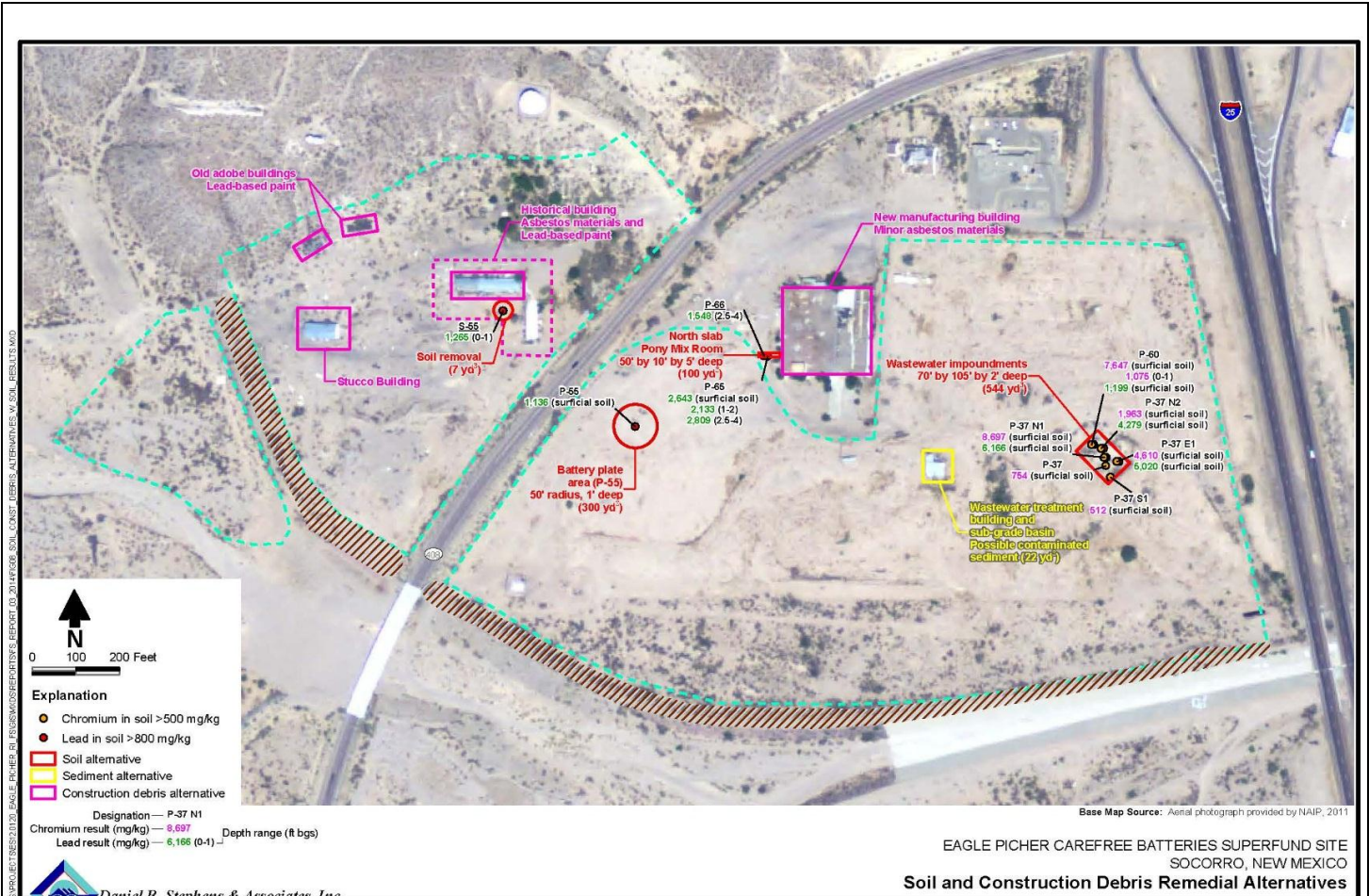
### Alternative S-3: Excavate and Off-Site Disposal

Estimated Capital Cost: \$1,601,000  
 Estimated Present O&M Cost: \$26,000  
 Estimated Total Present Worth Cost: \$1,627,000

This alternative includes removal of contaminated soil by excavation and off-site disposal. As in Alternative S-2, the volume of contaminated soil is estimated to be on the order of 1,000 cubic yards for the entire site, including the wastewater impoundments, building site, and battery dump site. Materials would be excavated using standard earth-moving equipment (backhoes, excavators, front-end loaders, etc.), placed in covered haul trucks, and disposed of at a licensed out-of-state facility.

### Construction Debris Alternatives

- **Alternative CD-1:** *No Action*
- **Alternative CD-2:** *Demolition and Disposal*



EAGLE PICHER CAREFREE BATTERIES SUPERFUND SITE  
SOCORRO, NEW MEXICO  
**Soil and Construction Debris Remedial Alternatives**

Figure 3

**Alternative CD-1: No Action**

Estimated Capital Cost: \$0  
 Estimated Present Worth O&M Cost: \$0  
 Estimated Total Present Worth Cost: \$0

No Action is a retained alternative as required by the NCP, and is used as a baseline for comparison with other technologies. Under this alternative, none of the ACBM or LBP materials would be moved.

**Alternative CD-2: Demolition and Disposal**

Estimated Capital Cost: \$105,000  
 Estimated Present Worth O&M Cost: \$0  
 Estimated Total Present Worth Cost: \$120,000

Under this alternative, ACBM and LBP materials are removed from the buildings (as opposed to building demolition) by a licensed contractor and disposed of at an appropriate disposal facility licensed to accept special wastes. Cost estimates are based on preliminary abatement plans and cost estimates from licensed hazardous materials contractors. Removal of construction debris through demolition and disposal is evaluated as a remedial alternative.

**Groundwater Alternatives**

- **Alternative GW-1: No Action**
- **Alternative GW-2: Monitored Natural Attenuation (MNA) - Rejected**

- **Alternative GW-3: MNA and Institutional Controls (ICs) - Rejected**
- **Alternative GW-4: Enhanced Reductive Dechlorination (ERD), MNA and ICs**
- **Alternative GW-5: Pump and Treat, ERD, MNA and ICs**
- **Alternative GW-6: Focused Pump and Treat with Hydraulic Containment, MNA and ICs**
- **Alternative GW-6A: Phased Focused Pump and Treat with Hydraulic Containment, MNA and ICs**

**Alternative GW-1: No Action**

Estimated Capital Cost: \$0  
 Estimated Present Worth O&M Cost: \$0  
 Estimated Total Present Worth Cost: \$0

No Action is a retained alternative as required by the NCP, and is used as a baseline for comparison with other technologies. Under this alternative, the contaminant plume is allowed to expand and no monitoring is performed.

**Alternative GW-2: Monitored Natural Attenuation**

In final FS, standalone MNA was considered as an Alternative; however, after further review in a supplemental FS, GW-2 was rejected as the time-frame required to achieve the RAOs is not reasonable.

### **Alternative GW-3: MNA and ICs**

In final FS, MNA with ICs was considered as an alternative. However, after further review in a supplemental FS, GW-3 was rejected as the time-frame required to achieve the RAOs is not reasonable.

### **Alternative GW-4: ERD, MNA and ICs**

Estimated Capital Cost: \$20,208,000  
Estimated Present Worth O&M Cost: \$9,202,000  
Estimated Total Present Worth cost: \$31,208,000

Groundwater alternative GW-4 includes the Enhanced Reductive Dechlorination (ERD) in situ treatment technology in combination with MNA and ICs. Conceptually, ERD would be implemented along 11 500-foot-long transects of injection wells across the higher central shallow and deep TCE plume concentrations. Preliminary locations of these transects are shown on Figures 4a and 4b. Preliminary design assumes that injection wells are placed every 25 feet along each transect. Implementation of this alternative, if 11 transects are installed, would require installation of 240 permanent two-inch-diameter injection wells to 110 or 210 feet bgs. No final decision of the substrate that will be injected is made for this screening evaluation, but would likely be either emulsified vegetable oil or HRC®. Depending on the selection, reapplication of the substrate would be required every 24 to 36 months.

In considering this process, it is recognized that the transformation of the aquifer to anaerobic conditions will likely result in the release of odors related to the degradation of the organics, as well as the potential release of sulfur as sulfate degrades. Therefore, water that has been treated using ERD will not be potable until additional blending with oxygenated water from the surrounding aquifer occurs. This will occur over time as water migrates through the zone of treatment; recovery to naturally occurring conditions could take a number of years.

MNA includes the monitoring and evaluation of the degradation processes to assess whether the contaminant plume is stable and whether contaminant mass is decreasing over time. MNA performance monitoring would require installation of additional monitor wells to ensure adequate plume delineation and number of groundwater samples collected.

### **Alternative GW-5: Pump and Treat, ERD, MNA and ICs**

Estimated Capital Cost: \$11,059,000  
Estimated Present Worth O&M Cost: \$16,404,000  
Estimated Total Present Worth Cost: \$27,471,000

Groundwater alternative GW-5 adds groundwater extraction, treatment, and disposal to alternative GW-4. The application of each of the other processes is targeted to specific areas of the plume as shown on Figure 5. Mass removal by groundwater extraction and ex situ treatment is applied in the middle of the plume, where solute contaminant concentrations are the highest. This technology uses three 6-inch-diameter extraction wells, conveyance piping to a treatment compound, a treatment facility, site improvements, and disposal of treated water. The extracted groundwater is conveyed back to a centrally located treatment compound for treatment and disposition. The pipelines are sized as 4-inch, 6-inch, and 8-inch polyvinyl chloride (PVC) pipes installed 4 feet deep. Several variations of this technology will be evaluated, including forms of ex situ treatment (air stripping and GAC), disposal methods (surface discharge, groundwater injection), and disposal locations (upgradient of the extracted locations and conveyed south to the golf course).

Plume containment also uses groundwater extraction near the leading edge of the groundwater plume. Application at this location would limit plume migration. This technology uses two additional 6-inch-diameter extraction wells, conveyance piping, and site improvements. Contaminant concentrations at this location are relatively low. The total extraction from the five wells is 420 gpm. The treatment system including the treatment skid, process pumps, and appurtenances is sized for a design flow of 500 gpm.

### **Alternative GW-6: Focused Pump and Treat with Hydraulic Containment, MNA and ICs**

Estimated Capital Cost: \$2,985,000  
Estimated Present Worth O&M Cost: \$13,610,000  
Estimated Total Present Worth Cost: \$16,595,000

Alternative GW-6 applies the components described for alternative GW-5 (without ERD), including ICs, mass removal by groundwater extraction and ex situ treatment, and plume containment by groundwater extraction. The groundwater extraction for treatment is focused on the highest concentrations in the groundwater plumes as determined during the RI. These are shown conceptually as inside the 50 µg/L contours in Figure 6. With focused extraction, three extraction wells are installed in the

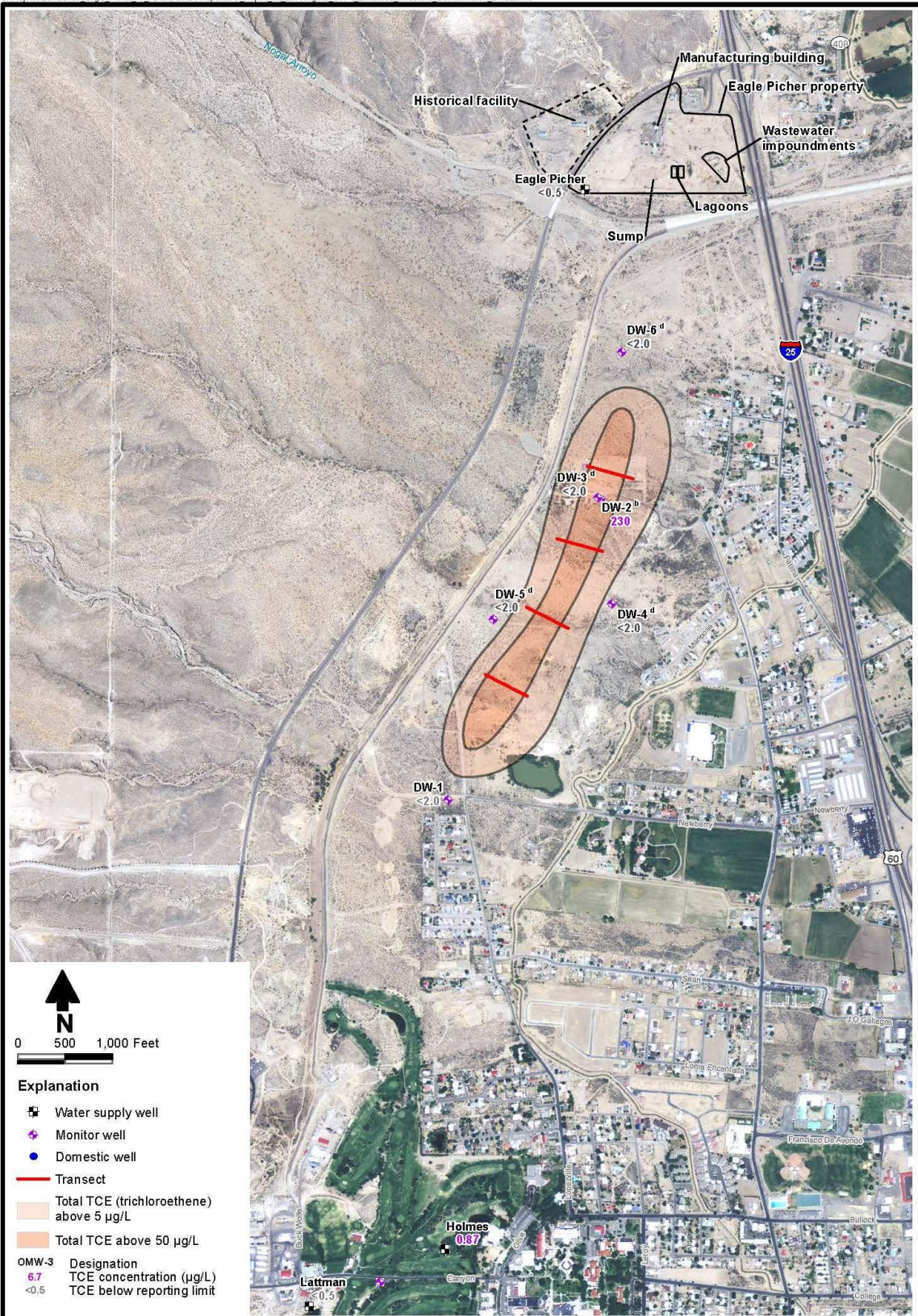
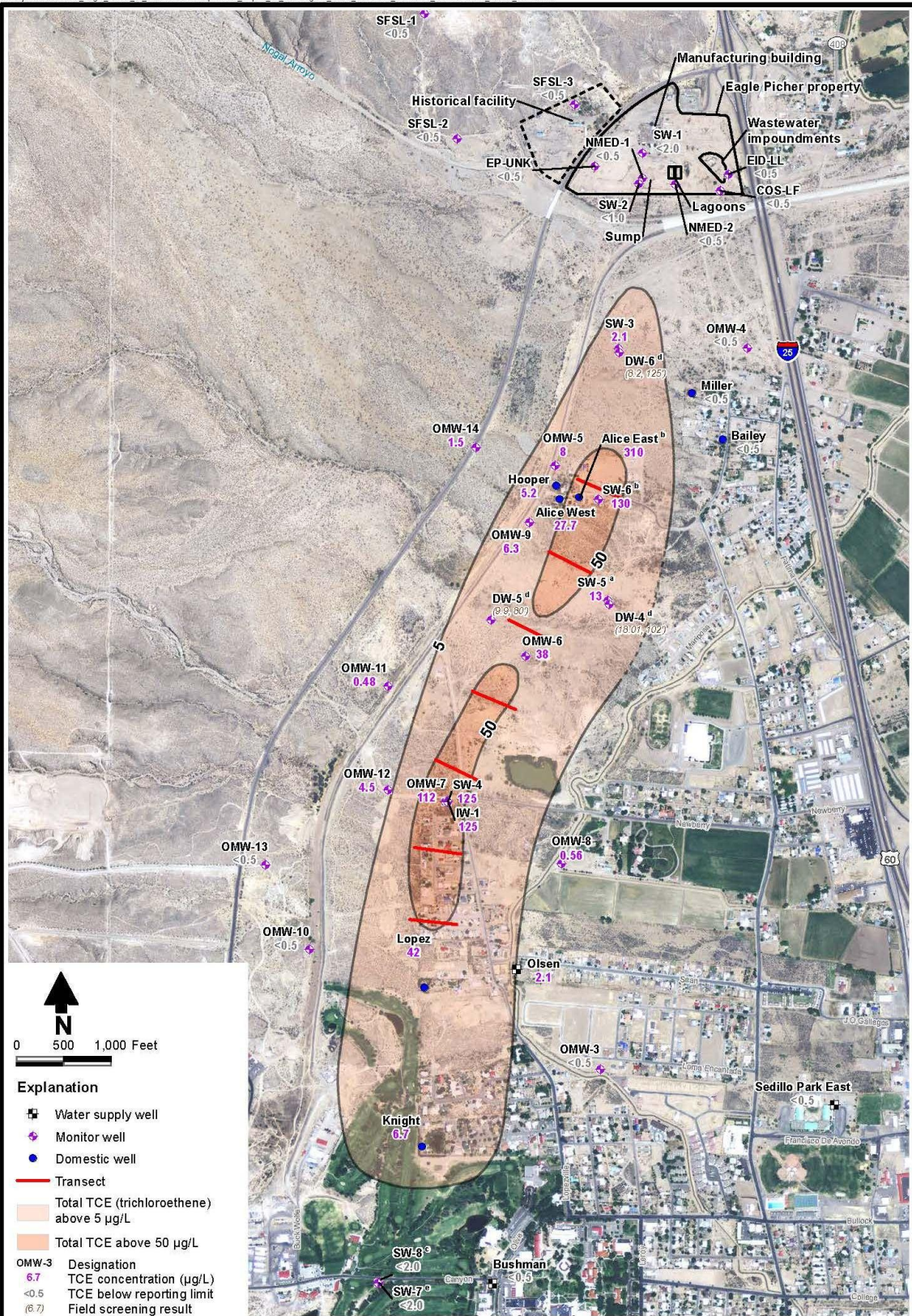


Figure 4a



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EAGLE PICHER CAREFREE  
BATTERIES SUPERFUND SITE  
SOCORRO, NEW MEXICO  
GW-4 Enhanced Reductive Dechlorination, DWBZ



**Explanation**

- Water supply well
- Monitor well
- Domestic well
- Transect
- Total TCE (trichloroethene) above 5  $\mu\text{g/L}$
- Total TCE above 50  $\mu\text{g/L}$

OMW-3	Designation
6.7	TCE concentration ( $\mu\text{g/L}$ )
<math><0.5</math>	TCE below reporting limit
(6.7)	Field screening result

**Notes:** (7) 500' ERD injection transverse, 815' apart (5 years travel time),  
 2" injection wells spaced 25' apart,  
 110' total depth, and screen intervals 60"-110"

Base Map Source: Aerial photograph provided by NAIP, 2011

**EAGLE PICHER CAREFREE  
 BATTERIES SUPERFUND SITE  
 SOCORRO, NEW MEXICO**

**GW-4 Enhanced Reductive Dechlorination, SWBZ and IWBZ**

Figure 4b

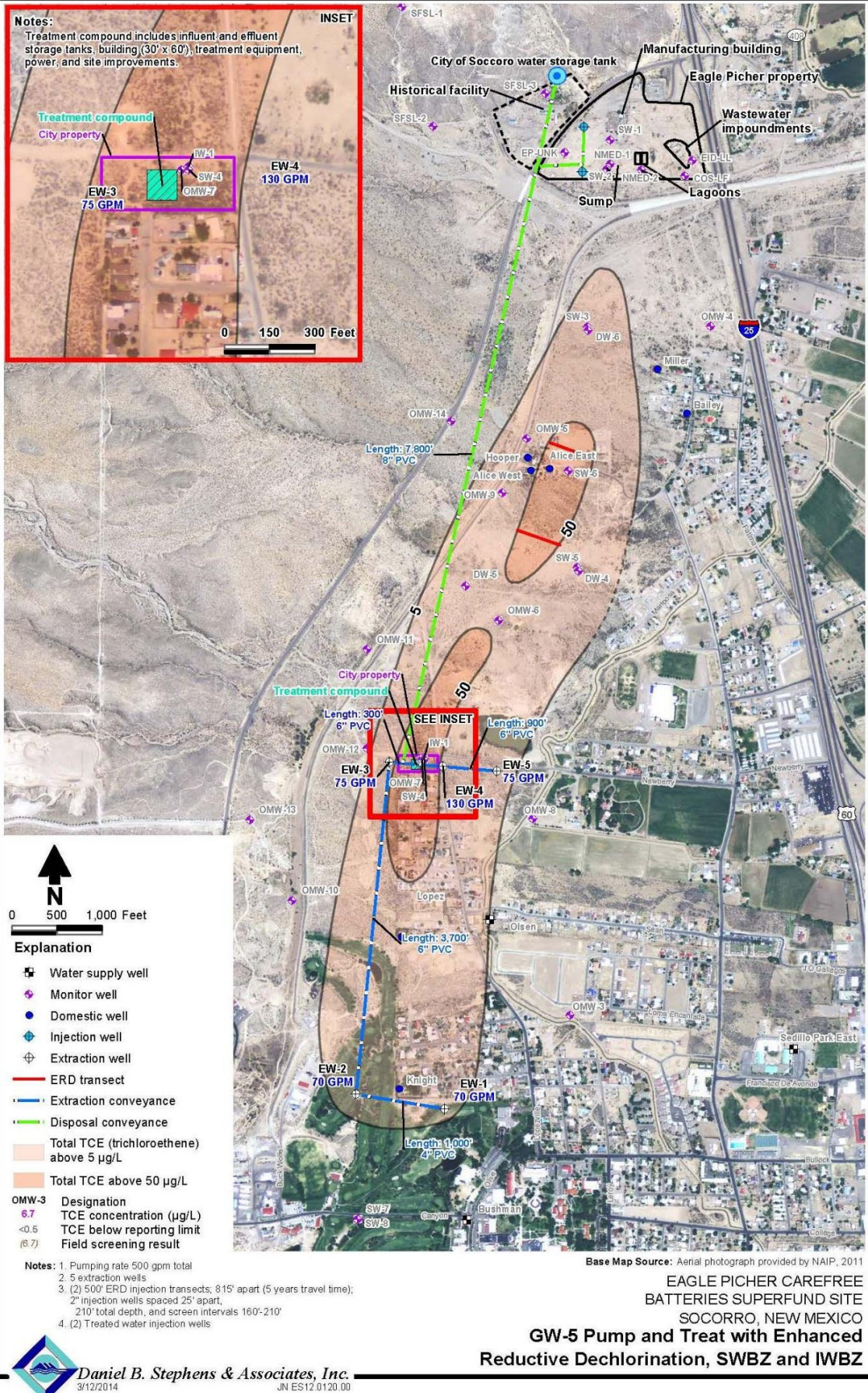


Figure 5



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shallow zones and two extraction wells are installed in the deep zone. The wells in both zones would be installed 2,400 apart along the flow paths. As in Alternative GW-5, the extracted groundwater is conveyed back to a centrally located treatment compound for treatment and disposition. The pipelines are sized as 4-inch and 6-inch PVC pipes installed 4 feet deep. Two shallow wells would be installed at the golf course approximately 1,000 feet apart in the low concentration (5 to 50 µg/L) area of the plume to hydraulically contain the plume front. This water would be conveyed back to the treatment compound for treatment and disposal.

Plume containment will also be included and again uses groundwater extraction near the leading edge of the groundwater plume. Application at this location would limit plume migration. This technology uses two additional 6-inch-diameter extraction wells, conveyance piping, and site improvements. Contaminant concentrations at this location are relatively low.

The total extraction from the seven wells is 350 gpm. The treatment system including the treatment skid, process pumps, and appurtenances is sized for a design flow of 500 gpm.

#### **Alternative GW-6A: Phased Focused Pump and Treat with Hydraulic Containment, MNA and ICs**

Estimated Capital Cost: \$2,284,000

Estimated Present Worth O&M Cost: \$12,618,458

Estimated Total Present Worth Cost: \$16,490,000

Alternative GW-6A is a phased implementation of alternative GW-6 in response to plume response to the remedial action (See Figure 7). While the complete Alternative GW-6 addresses both the core of the plume as well as the plume front (defined as the southern edge of the 5 µg/L contour), alternative GW-6A delays the installation of the following components until the first five-year review:

- Plume front wells (shown as EWS-01 and EWS-02)
- Installation of 2,500 feet of 6-inch and 700 feet of four-inch conveyance line
- Installation of one 250 gallon per minute (gpm) air stripper

Initially, there will be five extraction wells, three shallow and two deep, operating during the first 5 years with a total capacity of 240 gpm. During the initial construction, a building large enough to house two air strippers will be built, but only one 250-gpm air stripper will be installed. The remedy performance will be evaluated on an annual basis and if conditions warrant the additional extraction wells will be installed prior to the first five-year review.

#### **Modification of Remedial Alternatives for 1,4-dioxane**

Estimated Capital Cost: \$976,000

Estimated Present Worth O&M Cost: \$ 2,700,034

Estimated Total Present Worth Cost: \$4,040,000

1,4-dioxane, an emerging contaminant commonly used as a stabilizer for chlorinated solvents, was detected in groundwater subsequent to the completion of the FS. All detections to date are well below current health advisory levels (which range from 1 to 0.2 milligrams per liter [mg/L]). Additional sampling is needed to define the vertical and areal extent of the 1,4-dioxane. Based on the final extent determination, additional groundwater treatment may be required. 1,4-dioxane is not amenable to the treatment train that has been proposed. The best available technology for removal of 1,4-dioxane at low concentrations is advanced oxidation. If required an advanced oxidation process (AOP) system will be incorporated in to the existing treatment system. Several key assumptions are used to develop the present worth estimate:

- The existing remedial measure has already been installed and will continue to operate pumping and conveyance infrastructure.
- The additional treatment skid would be installed in year 6.
- The original building installed to house treatment equipment is sized to accommodate the later installation of the AOP treatment skid (no new buildings/electrical work required).
- The AOP system is operated for 24 years after installation.

#### **Evaluation of Alternatives**

The EPA uses nine criteria to evaluate remedial alternatives for the cleanup of a release. These nine criteria are categorized into three groups: threshold, balancing, and modifying. The threshold criteria must be met in order for an alternative to be eligible for selection. The threshold criteria are overall protection of human health and the environment and compliance with Applicable, Relevant and Appropriate Requirements (ARARs). The balancing criteria are used to weigh major tradeoffs among alternatives. The five balancing criteria are long-term effectiveness and permanence; reduction of toxicity, mobility or volume through treatment; short-term effectiveness; implementability; and cost. The modifying criteria are state acceptance and community acceptance, which are evaluated once the Proposed Plan public comment period is complete. Based on the information and the analysis presented in the FS, EPA has identified the following

#### **Preferred Alternative:**

**Soil:** Alternative S-3 – Excavate and Off-Site Disposal

**Construction Debris:** Alternative CD-2 - Demolition and Disposal

**Groundwater:** Alternative GW-6A – Phased Focused Pump and Treat with Hydraulic Containment, MNA and ICs

The EPA may modify its position regarding site remediation based upon its assessment of community acceptance and state acceptance, the final two criteria, which will be described in the ROD after comments are received.

## **Comparative Analysis of Remedial Technologies Relative to Impacted Media**

The comparative analysis of technologies, or technology combinations, for each media relative to the nine evaluation criteria is presented below.

### **1. Overall Protection of Human Health and the Environment**

This criterion assesses whether each alternative provides adequate protection of human health and the environment. The overall assessment of protection considers the alternative's long-term effectiveness, permanence, short-term effectiveness, and compliance with ARARs. The evaluation of protection focuses on the reduction or elimination of site risks by the proposed remedial alternative. For the purpose of this evaluation, an alternative is either protective or not protective.

#### **Soil**

Three technical approaches were identified pertaining to contaminated soil. These technical approaches included either No Action, Consolidation and Capping in Place or Excavate and Off-Site Disposal.

Alternative S-1 - The No Action approach does not protect human health and the environment because COCs will remain in soils on site.

Alternative S-2 - Alternative S-2 is considered protective. The contaminated materials remain in place, and with proper monitoring and maintenance will be isolated from contact with the environment. Stabilization with cement during placement will contribute to the overall stability of the consolidated waste. Proper grading and armoring of the capped area and site grading will be necessary to mitigate impacts from surface water both on and passing through the site.

Alternative S-3 is highly protective, as the contaminated materials are completely removed from the site.

#### **Construction Debris**

Alternative CD-1 - The No Action approach does not protect human health and the environment because COCs will remain in soils on site.

Alternative CD-2 is considered protective because the contaminated material would be removed from the site and sent to a disposal facility.

#### **Groundwater**

Alternative GW-1 provides no protection from contaminants in groundwater, and is not considered protective of human health or the environment. Contaminants will continue to migrate with groundwater and will likely eventually impact drinking water wells.

Alternatives GW-2 and GW-3 have been rejected owing to the long time-frame required for cleanup.

Alternative GW-4 is considered protective. This alternative uses in situ treatment of groundwater in combination with MNA and ICs with a focus on the remediation of the most contaminated portions of the plume.

Alternative GW-5 is considered protective, as pump and treat with ex situ treatment is a proven remedial technology. However, pump and treat of large plumes can result in long time frames to reach remedial goals. Large-scale pump and treat also requires removal, treatment, and disposal or reuse of large volumes of groundwater. Using pump and treat in combination with ERD, MNA, and ICs would allow for both in situ and ex situ treatment, and thereby likely speed the time to completion.

Alternatives GW-6 is protective and similar to GW-5 but uses Focused pump and treat. Focused pump and treat can provide significant mass removal and effective treatment while extracting smaller volumes of water.

Alternative GW-6A is protective and similar to Alternative GW-6 but the extraction wells are phased in the front end of the plume where contaminant concentration are low based on the remedy performance.

### **2. Compliance with ARARs**

This criterion is used to evaluate whether each alternative will meet all of the federal and state ARARs identified or whether there is justification for waiving one or more ARARs. For the purpose of this evaluation, an alternative either complies with ARARs or does not comply with ARARs.

#### **Soil**

With the exception of the Alternative S-1 - No Action the other two Alternatives S-2 and S-3 will comply with ARARs.

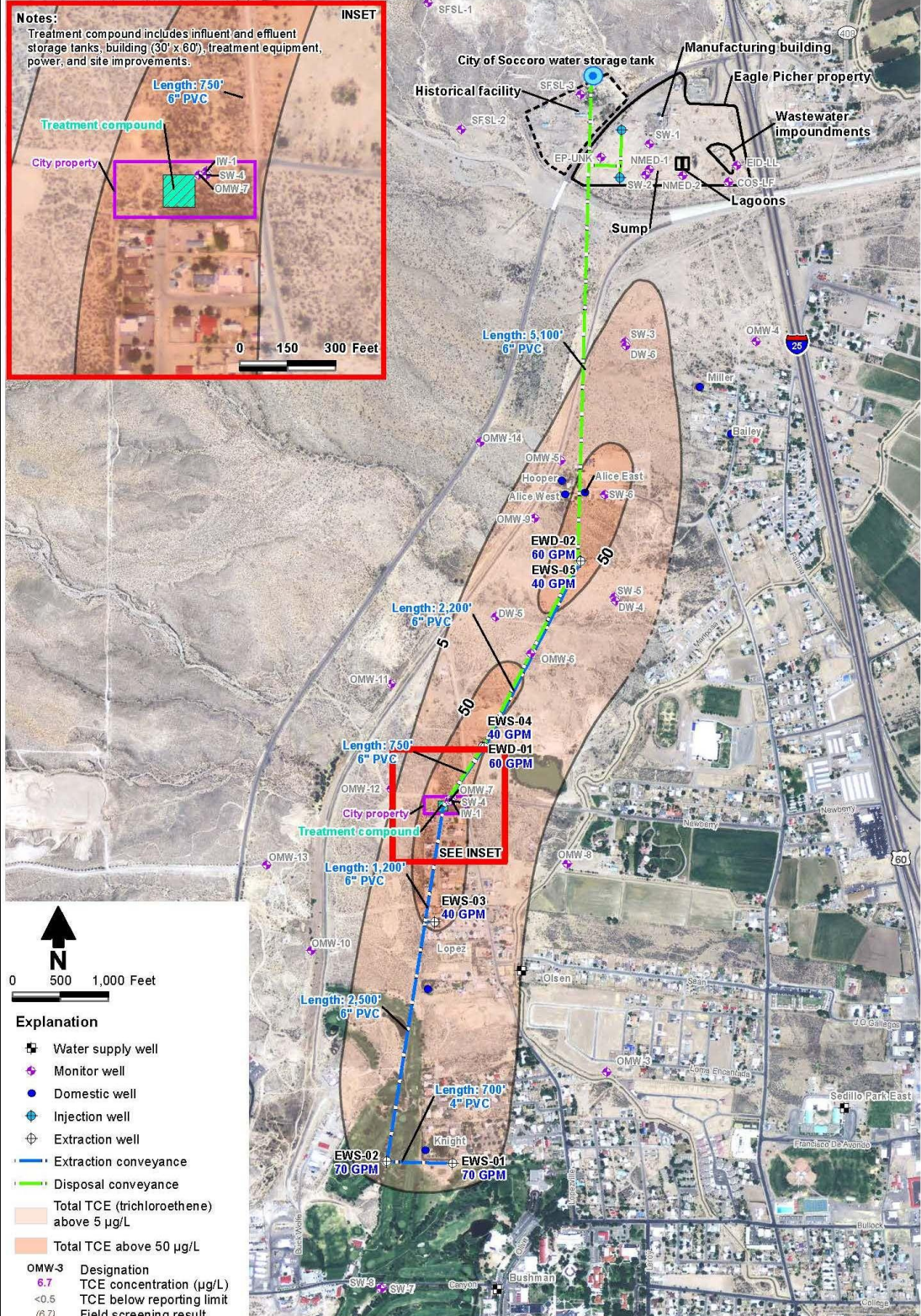
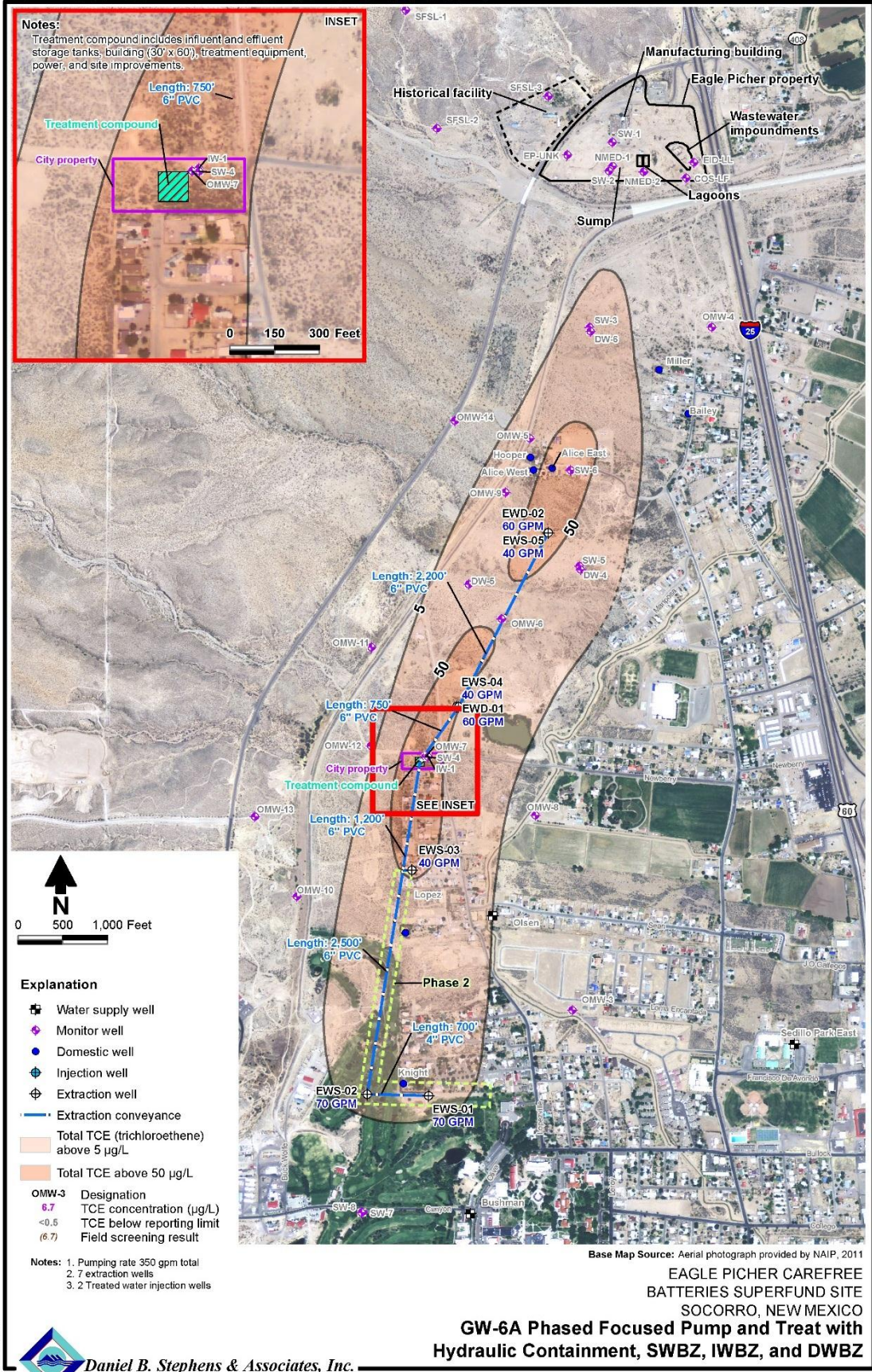


Figure 6

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 3/12/2014 JN ES12.0120.00

Base Map Source: Aerial photograph provided by NAIP, 2011  
**EAGLE PICHER CAREFREE BATTERIES SUPERFUND SITE**  
 SOCORRO, NEW MEXICO  
**GW-6 Focused Pump and Treat with Hydraulic Containment, SWBZ, IWBZ, and DWBZ**



**Notes:**  
 Treatment compound includes influent and effluent storage tanks, building (30' x 60'), treatment equipment, power, and site improvements.

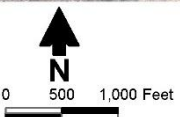
Length: 750'  
 6" PVC

Treatment compound

City property

SW-1  
 SW-3  
 OMW-7

0 150 300 Feet



- Explanation**
- ⊕ Water supply well
  - ⊕ Monitor well
  - ⊕ Domestic well
  - ⊕ Injection well
  - ⊕ Extraction well
  - Extraction conveyance
  - Total TCE (trichloroethene) above 5 µg/L
  - Total TCE above 50 µg/L
- OMW-3 Designation**
- 6.7 TCE concentration (µg/L)
  - <0.5 TCE below reporting limit
  - (6.7) Field screening result
- Notes:**
1. Pumping rate 350 gpm total
  2. 7 extraction wells
  3. 2 Treated water injection wells

Base Map Source: Aerial photograph provided by NAIP, 2011

**EAGLE PICHER CAREFREE  
 BATTERIES SUPERFUND SITE  
 SOCORRO, NEW MEXICO  
 GW-6A Phased Focused Pump and Treat with  
 Hydraulic Containment, SWBZ, IWBZ, and DWBZ**

Figure 7

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 5/30/2014 JN ES12.0120.00

## Construction Debris

Alternative CD-1 does not comply with the ARARs, however, Alternative CD-2 complies with the ARARs.

## Groundwater

Alternative GW-1 does not comply with ARARs as no action is taken. Alternatives GW-2 and GW-3 are rejected. Alternatives GW-4, GW-5 and GW-6 will comply with ARARs as they all have an active remedial component.

### 3. Long-Term Effectiveness and Permanence

Each alternative is evaluated in terms of risk that remains at the site after the RAOs have been met. The primary focus of this evaluation is the extent and effectiveness of controls used to manage the risk posed by treatment residuals or untreated wastes. Long-term effectiveness is one of the balancing criteria. The following factors are considered in evaluating this criterion:

- Adequacy of remedial controls
- Reliability of remedial controls
- Magnitude of the residual risk

For the purpose of this evaluation long-term effectiveness is deemed low, moderate, or high. Low means that the remedy will not be effective. Moderate means that most of the residuals or untreated waste will not pose a risk. High means that all risks will be mitigated.

## Soil

Alternative S-1 does not achieve RAOs, and offers no mechanisms to control exposure or contact with contaminated soil. Long-term effectiveness is considered low.

Long-term effectiveness for Alternative S-2 is moderate, as the cap will require long-term maintenance and monitoring to ensure compliance with the RAOs.

Long-term effectiveness for Alternative S-3 is high, as once the materials are removed there is no further contaminated material on-site.

## Construction Debris

Alternative CD-1 will not meet long-term effectiveness and permanence as ACBM and LBP material will remain on-site. Alternative CD-2 will meet long-term effectiveness and permanence.

## Groundwater

Alternative GW-1 will not meet long-term effectiveness and permanence as No Action is taken. Alternatives GW-2 and GW-3 are rejected. Long-term effectiveness is moderate for Alternatives GW-4, GW-5, GW-6 and GW-6A.

### 4. Reduction of Toxicity, Mobility and Volume (TMV) of Contaminants Through Treatment

This evaluation criterion addresses the CERCLA statutory preference for treatment options that permanently and sig-

nificantly reduce the toxicity, mobility, or volume of the contaminants. The preference is satisfied when treatment reduces the principal threats through the following:

- Destruction of toxic contaminants
- Reduction in contaminant mobility
- Reduction in the total mass of toxic contaminants
- Reduction in the total volume of contaminated media

Although CERCLA includes a statutory preference for treatment, this criterion is not a threshold that must be met. For the purpose of this evaluation, an alternative may be considered to have (1) no reduction on toxicity mobility or volume, (2) moderate reduction on toxicity mobility or volume over time, or (3) complete reduction on toxicity mobility or volume over time.

## Soil

Alternative S-1 will not reduce toxicity, mobility, or volume, as no treatment is undertaken.

Alternative S-2 will not reduce contaminant toxicity through treatment, but will prevent potential exposure through capping. Mobility of contaminated materials will be eliminated once they are capped. The overall volume of materials will be reduced somewhat during consolidation due to screening of the soil material.

Alternative S-3 provides no treatment, but provides an immediate reduction in volume once materials are off-site. There is no further potential for mobility or exposure.

## Construction Debris

Alternative CD-1 does not result in reduction of Toxicity, Mobility and Volume of Contaminants as No Action is taken. Alternative CD-2 will result in reduction of Toxicity, Mobility and Volume of contaminants as materials will be removed from site.

## Groundwater

Alternatives GW-1 will not result in reduction of Toxicity, Mobility and Volume of contaminants. Alternatives GW-2 and GW-3 are rejected. Alternatives GW-4 will be moderately effective and Alternatives GW-5, GW-6 and GW-6A will be highly effective in achieving reduction in Toxicity, Mobility and Volume of contaminants.

### 5. Short-Term Effectiveness

This evaluation criterion addresses the effects of the alternative during the construction and implementation phase until the RAO is met. Under this criterion, alternatives are evaluated for their effects on human health and the environment during implementation of the remedial action. The following factors will be considered:

- Exposure of the community during implementation
- Exposure of workers during construction

- Environmental impacts
- Time to achieve RAOs

For the purpose of this evaluation, short-term effectiveness is deemed low, moderate, or high. Low means that the remedy will not mitigate exposure risks. Moderate means that there is an initial exposure risk, although it is limited to initial implementation. High means that exposure risks are mitigated.

### Soil

Alternative S-1 does not achieve RAOs, and offers no mechanisms to control exposure or contact with contaminated soil.

Alternative S-2 is moderately effective, as it immediately meets RAOs and reduces the risk to human health and the environment through containment. There will be potential risk in the short term to site workers during the consolidation and capping process.

Alternative S-3 meets RAOs and reduces the risk to human health and the environment through disposal. Short-term effectiveness is considered moderate, as there will be potential exposure risk to site workers during the excavation and preparation for hauling. There is a small potential for worker exposure during excavation activities, which is mitigated through proper activity planning, use of personal protective equipment (PPE), and site controls. There is also a moderate increase in the environmental impact due to the hauling distance to the disposal site.

### Construction Debris

Alternative CD-1 will not meet Short-Term Effectiveness as No Action is taken. Alternative CD-2 will fully meet Short-Term Effectiveness as material will be removed from site.

### Groundwater

Alternative GW-1 will not meet Short-Term Effectiveness. Alternatives GW-2 and GW-3 are rejected. Alternatives GW-4, GW-5, GW-6 and GW-6A will have moderate Short-Term Effectiveness.

## 6. Implementability

This criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials that may be required during its implementation. The following factors were considered:

- Ability to construct the technology
- Monitoring requirements
- Availability of equipment and specialists

For the purpose of this evaluation, an alternative either may be implemented or may not be implemented.

### Soil

All Alternatives are technically and administratively easily implementable.

### Construction Debris

All Alternatives are technically and administratively implementable.

### Groundwater

All Alternatives are technically and administratively implementable.

## 7. Cost

Cost includes estimated capital and operation and maintenance costs as well as present worth costs. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.

The total cost for the Preferred Remedy for the site is \$18.4 million.

### Soil:

There is no cost for Alternative S-1. Alternative S-3 is the most expensive. Alternative S-2 is approximately one third of the cost for Alternative S-3.

### Construction Debris:

There is no cost for Alternative CD-1. Alternative CD-2 is approximately \$ 120,000.

### Groundwater:

There is no cost for Alternative GW-1. Alternatives GW-2 and GW-3 are rejected. GW-4 and GW-5 are on the higher end. Alternative GW-6 and GW-6A is in the middle of the pack.

## 8. State Acceptance

NMED agrees with EPA's recommendations of the Preferred Remedy.

## 9. Community Acceptance

Community acceptance of the Preferred Alternative will be evaluated after the public comment period ends and will be described in the Record of Decision for the site.

## Summary of EPA's Preferred Alternative

The following is the EPA's preferred alternative for the various impacted media:

### Soil: Alternative S-3 - Excavation and Off-Site Disposal

The EPA chose the Off-Site Disposal over the other alternatives because this alternative best meets the cleanup objectives by removing contaminated materials from the site. This alternative reduces mobility and toxicity at the site by removing the source materials. This alternative is expected to be completed in relatively short period. Implementation of this alternative will have minimum impact on the com-

munity. The cost for implementation of this remedy is more than other active alternative.

### **Construction Debris: Alternative CD-2 – Demolition and Disposal**

The EPA chose the Demolition and Disposal over the other alternatives because this alternative best meets the cleanup objectives by removing contaminated materials from the site. This alternative reduces mobility and toxicity at the site by removing the source materials. This alternative is expected to be completed in relatively short period. Implementation of this alternative will have minimum impact on the community. The cost for implementation of this remedy is relatively small.

### **Groundwater: GW-6A –Phased Focused Pump and Treat with Hydraulic Containment, MNA and ICs**

The EPA chose Alternative GW-6A because it is effective in removing contaminants in the plume while balancing and meeting all other criteria. Among all other active alternatives considered for the site Alternative GW-6A costs are in the middle range of costs and effective in meeting the RAOs. EPA and the NMED believe the preferred alternative would be protective of human health and the environment, would comply with ARARs, would be cost-effective, and would utilize permanent solutions to the maximum extent practicable.

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[www.epa.gov/region6](http://www.epa.gov/region6)

#### **U.S. EPA Region 6 Superfund**

[www.epa.gov/region6/superfund](http://www.epa.gov/region6/superfund)

## Glossary

**Applicable, Relevant and Appropriate Requirements (ARARs)** – Generally, any Federal, State, or local requirements or regulations that would apply to a remedial action if it were not being conducted under CERCLA, or that while not strictly applicable, are relevant in the sense that they regulate similar situations or actions and are appropriate to be followed in implementing a particular remedial action.

**Baseline Human Health Risk Assessment** – A formal risk assessment conducted as part of the RI according to EPA-prescribed procedures. The need for remedial action at a site is established in part on the results of the baseline risk assessment.

**Chlorinated Solvents** – An organic hydrocarbon in which chlorine atoms substitute for one or more hydrogen atoms in the compound's structure, for example, methylene chloride and 1,1,1-trichloromethane. Commonly used in aerosol spray containers, in highway paint, for grease removal in manufacturing, dry cleaning, and other operations. The substituted chlorine makes the compound less flammable than the non-substituted equivalent, but more toxic.

**Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)** – Also known as Superfund. CERCLA is a federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act. The Acts created a special tax that goes into a Trust Fund, commonly known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste sites. Under the program, U.S. EPA can either: 1. Pay for site cleanup when parties responsible for the contamination cannot be located or are unwilling or unable to perform the work; or 2. Take legal action to force parties responsible for site contamination to clean up the site or pay back the federal government for the cost of the cleanup.

**Enhanced Reductive Dechlorination (ERD)** – Enhanced Reductive Dechlorination is a process that uses a carbon source amendment such as molasses, cheese, whey, or vegetable oil in conjunction with native organisms in groundwater to remove chlorine from the primary structure of the contaminating organic chemical. The substance is reduced in the process.

**Hazard index** – In the baseline risk assessment, the ration of the dose calculated for a receptor divided by the reference dose. When the HI exceeds 1.0 (i.e., the expected dose exceeds EPA's reference dose), a health risk is assumed to exist.

**Hazard quotient** – The ratio of exposure to toxicity for non-cancer endpoints. The HQ is calculated by dividing the estimated daily intake of a chemical by the non-cancer reference dose for that chemical. When the HQ exceeds 1.0, a possible health risk is assumed to exist.

**Maximum Containment Levels (MCLs)** – Set under the Safe Drinking Water Act, a contaminant level that may not be exceeded in a drinking water source.

**National Contingency Plan (NCP)** – The National Oil and Hazardous Substances Pollution Contingency Plan is composed of the federal regulations that guide the Superfund program.

**National Priorities List (NPL)** – EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial response where money from the Trust Fund may be used. The list is based, primarily, on the score a site receives on the Hazard Ranking System (HRS). U.S. EPA is required to update the NPL at least once a year.

**Preliminary Remediation Goals (PRGs)** – Concentration levels set for individual chemicals that, for carcinogens corresponds to a specific cancer risk level of 1 in 1 million and for non-carcinogens corresponds to a Hazard Quotient of 1.

**Reasonable Maximum Exposure (RME)** – The maximum exposure reasonably expected to occur in a population.

**Reference Dose (RfD)** – An estimate (with uncertainty spanning perhaps an order of magnitude or greater) of a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a lifetime.

**Remedial Action Objectives (RAOs)** – Objectives established for a CERCLA remedial action that define the extent to which sites require cleanup to meet the objective of protecting human health and the environment.