



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 8

1595 Wynkoop STREET  
DENVER, CO 80202-1129

Phone 800-227-8917

<http://www.epa.gov/region08>

Ref: 8EPR-ER

ACTION MEMORANDUM

SUBJECT: Request for a Time Critical Removal Approval at the Billings PCE Site, Billings, Montana, Yellowstone County, Montana.

FROM: Kerry Guy, On-Scene Coordinator  
Emergency Response Team

THROUGH: Steven Way, Acting Supervisor  
Emergency Response Unit

TO: David A. Ostrander, Program Director  
Preparedness, Assessment & Emergency Response

Site ID#: 08ME

Category of Removal: Fund Lead, Time Critical

**I. Purpose**

The purpose of this ACTION MEMORANDUM is to request and document approval of the Removal Action described herein for the Billings PCE Site (the Site), located in Billings, Montana (see Figure 1). In addition, this document shall serve as the request and documentation of approval of a 12-month and \$2 million exemption from statutory limits for the proposed Removal Action. The conditions at this Site meet the emergency criteria for exemption from the statutory limits on a Removal Action.

This Removal Action addresses the need to mitigate the threats to the local population and the environment posed by chlorinated solvent contamination at the Site. The chlorinated solvent tetrachloroethylene<sup>1</sup> (PCE) is the main contaminant of concern and is believed to have been released to the environment from historical dry cleaning operations.

---

<sup>1</sup> Synonyms for tetrachloroethylene commonly used include tetrachloroethene, perchloroethylene, perc, and PCE. The most familiar term for tetrachloroethylene is PCE, which will be used hereafter in this document to refer to tetrachloroethylene

Conditions existing at the Site present a threat to public health or welfare or the environment and meet the criteria for initiating a Removal Action under 40 CFR Section 300.415(b)(2) of the National Contingency Plan (NCP).

## **II. Site Conditions and Background**

### **A. Site Description**

The Billings PCE Site consists of a PCE groundwater plume extending from 715 Central Avenue (source area) east-northeast through a residential neighborhood and into downtown Billings (see Figure 1). The source of the groundwater plume is likely the result of historic releases of PCE from a dry cleaning operation at 715 Central Avenue. The groundwater plume (defined by the 100ug/l PCE isopleth) reaches a width of 1,000 feet and length of 8,000 feet (see Figure 2). There are 298 residential, 8 condominium, and 179 commercial properties overlying the groundwater plume.

### **1. Removal Site Evaluation**

The Montana Department of Environmental Quality (MDEQ) completed a Preliminary assessment (PA) of the Site from 1992-1993. The Preliminary Assessment (PA) findings were "no further action" based on lack of drinking water usage of the affected aquifer". Subsequent field investigations were conducted by the MDEQ in 1994. MDEQ conducted a CERCLA Site Investigation (SI) in 1999 and 2001. The MDEQ SI revealed an east-northeast trending groundwater contaminant plume and potential indoor air contamination associated with the groundwater contamination.

From July 2006 to present, EPA Region 8 Emergency Response has been conducting a removal site assessment to evaluate the health risks posed by vapor intrusion into indoor air pathway from contaminated groundwater (subsurface vapor intrusion to overlying structures) at the Site. To develop the study area potentially impacted by PCE vapors and evaluate potential remedial actions, the Billings PCE Site groundwater plume and source area were characterized. Results of the removal site assessment up to June 2007 are provided in the Summary Sample Results Report, Billings PCE Site, dated August 29, 2007.

The EPA groundwater investigation included the installation of 60 new groundwater monitoring wells by the START3 contractor with the EPA Geoprobe, the installation of 5 groundwater monitoring wells by a subcontractor, and the identification of 30 existing wells in the site area which could be sampled.

Analytical results from the above groundwater monitoring wells were used to map the contaminant plume and determine the plume boundaries. Core samples were also

collected during the well installations to examine the lithologies. The wells were also used to measure groundwater levels for preparation of water table contours. Figure 2 shows the groundwater plume boundary as defined by the 100ug/l PCE isopleth. The aerial extent of the plume within the 100ug/l isopleth is approximately 140 acres. The highest concentrations of PCE were measured in samples collected from wells down gradient and adjacent to Big Sky Linen. Wells up gradient of Big Sky Linen only had trace concentrations or were non-detect for PCE.

Figure 3 shows the source area investigation conducted along a drain pipe (which services the northeast floor drain in 715 Central) between 715 Central Avenue and 711 Central Avenue and along the city storm drain in front of 711 Central Avenue. The source area investigation utilized several methods to identify PCE sources in the unsaturated and saturated zone and included core samples, groundwater well installations, a membrane interface probe investigation (MIP), and a soil gas investigation.

A membrane interface probe (MIP) investigation was conducted by Columbia Technologies in July 2007 (MIP). The MIP probes uses a heater element on the probe to volatilize and mobilize contaminants, which then pass through the probe's membrane and into a carrier gas for analyses on the surface. The MIP system is used for real-time collection and monitoring of soil gas to identify zones and depth intervals of VOC contamination in the subsurface. The MIP survey was conducted east of and adjacent to 715 Central Avenue, and adjacent to the storm sewer located under Central Avenue (see Figure 3). A total of 24 locations were sampled with the MIP probe, with most MIP pushes going to bedrock.

Data collected during the MIP investigation revealed that the highest VOC contamination is under and adjacent to the drain pipe that connects the northeast floor drain in 715 Central Avenue to the city storm sewer. A liquid sample collected from underneath the pipe had a PCE concentration of 316 ppm, indicating the presence of free-product. The contaminated interval is from approximately six feet bgs (below the drain pipe) to 16 feet bgs (at the fine grained sand/gravel contact). The contamination appears to diminish below the gravel contact where it is apparently dispersed due to the high groundwater velocity. The approximate 15 to 16 foot contaminated interval is below the water table in the fine grained sand. The data also indicated that the PCE released from the pipe primarily migrated down and did not migrate far from the pipe laterally.

A soil gas survey was also conducted in July 2007. The survey was conducted along the city storm sewer and in the same general location as the MIP survey (see Figure 3). The soil gas survey was conducted by START3 with the Geoprobe. The Hapsite field portable GC/MS was used to analyze the samples. The soil gas survey along Central Avenue revealed that the highest PCE concentrations were near the junction

of the 715 Central Avenue drain pile and the city storm sewer. The concentrations decreased downstream (east) of the junction.

To assess the vapor intrusion to indoor air pathway from groundwater, four rounds of sampling for VOCs in and under indoor spaces were conducted: Summer 2006, Fall 2006, Winter 2006-2007, and Spring 2007. Figure 4 presents the locations and results of the indoor air investigation. Table 1 provides sub-slab and indoor air sample results for the sampled properties. These samples were primarily taken within the delineated area of groundwater contamination ( $> 100\text{ug/l}$ ), though a few samples were collected adjacent to the plume. Of the over 400 buildings (including residences and commercial) overlying the plume, approximately 45 (or 10%) have been sampled. Elevated levels of VOCs were found in both sub-slab samples and indoor air samples. Concentrations of PCE in indoor air range from below detection ( $1\text{ug/m}^3$ ) to  $170\text{ug/m}^3$ . Of the residences sampled, approximately 10% (four residences: 620 St. Johns Ave., 632 St. Johns Ave., 311 Howard Ave., and 342 Miles Ave.) have measured indoor air concentrations that exceed EPA's target indoor air concentration of  $41\text{ug/m}^3$  for PCE in residential settings. The other residences sampled have PCE concentrations substantially below EPA's target level. The commercial building at 711 Central Avenue has measured PCE indoor air concentrations ranging from 42 to  $130\text{ug/m}^3$ , but these values do not exceed EPA's target level of  $208\text{ug/m}^3$  for commercial settings.

Analyses of the relationship between indoor air and sub-slab or groundwater concentrations were used to estimate the area likely to be impacted by vapor intrusion. These analyses suggest that groundwater concentrations above  $100\text{ug/L}$ , especially where sands and gravels underlie the buildings, and sub-slab concentrations above  $10,000\text{ug/m}^3$  may lead to indoor air concentrations above EPA's target level of  $41\text{ug/m}^3$  for PCE in residences. There are 298 residential, 8 condominium, and 179 commercial properties overlying groundwater concentrations above  $100\text{ug/L}$ .

The EPA/Emergency Response Team (ERT) and Response Engineering and Analytical Contract (REAC) developed a flow and contaminant transport model of the site to simulate various groundwater remediation alternatives. The software MODFLOW\_rev 4.2 was used to construct the flow model and the software package MT3D was used to construct the contaminant transport model. The groundwater flow model simulates steady-state flow in 50,600 acres of the Billings Basin, and encompasses the 140-acre groundwater plume.

Groundwater flow and contaminant transport simulations were completed for ambient conditions. Model results show that if contamination from the source area is stopped through removal actions (i.e. excavation/treatment/containment), then plume concentrations of less than  $100\text{ug/l}$  could be reached within 5 years. Model results show that addition of a treatment zone in the plume (for example a zero valent iron or

bioremediation treatment zone) approximately 4,000 feet from the source, would reduce downgradient concentrations of PCE to under 100ug/l within half this time (Note: the predicted time frames by the model are estimates, and are based on the input parameters of the model to simulate aquifer conditions).

## **2. Physical Location**

Figure 1 depicts the Billings PCE Site in Billings, Montana. The Site includes the PCE source areas, groundwater plume, and overlying properties potentially impacted by vapor intrusion. The Site consists of an identified PCE source area located approximately on and adjacent to the 715 Central Avenue property (see Figure 3), possibly extending onto the 711 Central Avenue property to the east; a groundwater plume to the east-northeast encompassing 140 acres, currently defined by the 100ug/l isopleths and having a width of 1,000 feet and length of 8,000 feet (see Figure 2).

## **3. Site Characteristics**

The map unit that underlies the Site is specified by the Montana Bureau of Mines and Geology (MBMG) as Alluvial Terrace Gravel 2, referring to its location on the second terrace in the Yellowstone River valley. The surficial aquifer is primarily comprised of Pleistocene alluvial material that was observed to be about 28 to 32 feet thick during the investigation. The aquifer overlies shale bedrock that is reported by the MBMG to be greater than 250 feet thick. Core samples collected during the investigation revealed nine to sixteen feet of finer-grained silt, sand, and clay overlying sandy gravel and silty-sandy gravel. The depth to groundwater is approximately 12 to 14 feet. Groundwater flows east-northeast in the site area.

The observed PCE source area contamination lies below a 6 inch drain pipe on the east side of the 715 Central Avenue connecting to the city storm sewer line along Central Avenue (see Figure 3). The drain pipe exits from the northeast section of the 715 Central Avenue building, extends past the building 15 feet, then runs south 50 feet to a manhole. The manhole is drained by another 6 inch line continuing south 80 feet through the drive/ally to the city storm drain. The pipeline lies approximately 5 feet below ground surface. The PCE contamination is within silt and clays below the drain pipe, spreading laterally outward several feet and to depths of 16 to 20 feet. Additional PCE contamination may exist under the 715 Central Avenue building floor slab in the vicinity of the floor drain and drain pipe.

The primary contaminant at the site is PCE. Daughter products of PCE are also present at the site, but in relatively low concentrations. The highest reported TCE concentration of 243ug/l was at well BPGP33B, compared to a PCE concentration of 23,100ug/l. Other than TCE, there were no concentrations of daughter products

above 5ug/l. The gravel composition of the aquifer indicates that it has high hydraulic conductivity and a fast flow rate.

As of June 2006, indoor air samples were collected from thirty six single dwelling residences, one two-family dwelling, one motel (with long-term residents), two apartment buildings, a school, and a commercial office building at 711 Central Avenue. The 711 Central Avenue office building is the closest structure downgradient of the site and had the highest indoor air PCE concentration of 130ug/m<sup>3</sup>. The highest PCE concentrations at residential properties were 120ug/m<sup>3</sup> and 100ug/l. Sub-slab or crawlspace samples were also collected from most of the properties from which indoor air samples were collected. The highest sub-slab PCE concentration was 1,800,000ug/m<sup>3</sup> at 711 Central Avenue adjacent to the source area. The highest residential sub-slab sample concentration was 160,000ug/m<sup>3</sup>. Sub-slab results in the study area to the northwest of the 100ug/l PCE groundwater isopleth indicate some residential structures peripheral to the 100ug/l isopleth are also impacted by vapor intrusion.

#### **4. Release or threatened release into the environment of a hazardous substance or pollutant or contaminant.**

PCE and its daughter products, TCE, DCE, and vinyl chloride, are chlorinated ethylenes and are all hazardous substances as defined by 104(14) of CERCLA. Chlorinated ethylenes are dense non-aqueous phase liquids (DNAPLs), which have low solubility and are denser than water. When released into the subsurface, these chemicals can migrate downwards below the groundwater table. In the saturated zone, chlorinated ethylenes may exist in the subsurface environment as a DNAPL in dissolved phase or sorbed phase. Due to the slow dissolution rate of DNAPL, areas in the subsurface containing DNAPL serve as lasting sources of groundwater contamination. The area containing sorbed, residual, and mobile DNAPL is the DNAPL source area. Groundwater flowing through the DNAPL source area becomes contaminated, forming a plume of dissolved-phase contamination downgradient from the source.

PCE contamination released into fine-grained soils below the drain pipe on the east side of 715 Central Avenue created a source area that has resulted in the development of a significant PCE groundwater plume. The PCE contaminated groundwater releases the PCE (a volatile organic chemical) into soil gas where it diffuses upward through pores in the soil. When the soil gas approaches the surface at a location near a building, the contaminated soil gas can be drawn into the building and potentially pose a risk to human health. The concentration in the building will depend on the soil gas concentrations and the rate the soil gas is drawn into the building relative to the natural ventilation rate of the building. Building ventilation rates tend to be higher in the summer, when doors and windows are open, compared to the winter, when the

building openings are kept closed. Thus, indoor VOC concentrations tend to be higher in the winter and lower in the summer.

#### **5. NPL status**

The Site is not on the National Priorities List (NPL).

### **B. Other Actions to Date**

#### **1. Previous actions**

There have been no previous Removal Actions at this Site.

#### **2. Current Actions**

Other than the removal assessment and associated sampling activities discussed in this document there is no current Removal Action at this Site. EPA has requested technical assistance from ATSDR.

### **C. State & Local Authorities' Role**

Montana DEQ has requested EPA assistance at this Site. Neither the State nor local agencies have the resources to conduct the needed site investigation or clean-up independently. EPA has kept State and local agencies apprised of the sampling events and results.

## **III. Threats to Public Health or Welfare or the Environment**

### **A. Threats to Public Health or Welfare**

The conditions at the Site present an imminent and substantial threat to human health and the environment and meet the criteria for initiating a Removal Action under Section 300.415(b)(2) of the NCP. The conditions at the Site have been evaluated against the seven evaluation criteria for initiating a Removal Action under Section 300.415(b)(2) of the NCP. Site conditions meet evaluation criteria ii, iv, and vii and are discussed below.

(ii) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, or pollutants or contaminants;

The PCE groundwater plume encompasses an urban area southwest of downtown Billings of 140 acres. There are approximately 298 residential, 8 condominium, and 179 commercial properties overlying the plume. Four rounds of sampling for VOCs in and under indoor spaces have been conducted: Summer 2006, Fall 2006, Winter

2006-2007, Spring 2007. These samples were primarily taken within the delineated area of groundwater contamination (> 100ug/l), though a few samples were collected adjacent to the plume. Of the over 400 buildings (including residences and commercial) overlying the plume, approximately 45 (or 10%) have been sampled. Elevated levels of VOCs were found in both sub-slab samples and indoor air samples. Concentrations of PCE in indoor air range from below detection (1ug/m<sup>3</sup>) to 170ug/m<sup>3</sup>. Of the residences sampled, approximately 10% (four residences: 620 St. Johns Ave., 632 St. Johns Ave., 311 Howard Ave., and 342 Miles Ave.) have measured indoor air concentrations that exceed EPA's target indoor air concentration of 41ug/m<sup>3</sup> for PCE in residential settings. One commercial building also showed an exceedence of EPA's indoor air target concentration. Sub-slab soil gas concentrations for structures tested within the plume ranged from less than 1ug/m<sup>3</sup> to 1,800,000ug/m<sup>3</sup>. Approximately 85 percent of sub-slab soil gas concentrations were greater than 1,000ug/m<sup>3</sup>, 45 percent greater than 10,000ug/m<sup>3</sup>, and 10 percent greater than 100,000ug/m<sup>3</sup>.

Many of the residents within the groundwater plume have irrigation wells and use the shallow aquifer water for watering lawns and gardens. Although all residents are reported to be on municipal water and have been warned about drinking the water from the wells by both the Montana DEQ and EPA, an assessment of health risks (Attachment 1), shows, especially for young children, there is the potential for increased health risks due to incidental exposure through recreational use of the groundwater.

*(iv) High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate;*

PCE migrating from the PCE source area adjacent to 715 Central Avenue has resulted in a downgradient groundwater plume encompassing 140 acres. Unabated, PCE will continue to migrate from the PCE source area, sustaining the groundwater plume for many decades and or centuries. As a result, PCE vapors will continue to diffuse upward through pores in the soil and into overlying structures.

*(vii) The availability of other appropriate federal or state mechanisms to respond to the release;* No other Local, State, or Federal agency is in the position, or has the resources, to independently implement an effective response action to address the ongoing threats presented at the Site.

## **B. Threats to the Environment**

No specific threats to wildlife and plants have been identified. The primary purpose for conducting the Removal Action is to remove the significant threat to human health posed by the release.

#### IV. Endangerment Determination

An assessment of health risks at the Billings PCE Site (see Attachment 1) describes three current exposure pathways that are complete and potentially significant: (1) inhalation of indoor air, (2) incidental ingestion, inhalation and dermal exposures while using well water for non-drinking water purposes (e.g. wading pools) and (3) ingestion of produce watered by groundwater. The risk assessment indicates four volatile organic compounds (VOCs) to be above risk-based screening levels and considered to be contaminants of concern. These are PCE, 1,2-dichloroethane, benzene, and chloroform. The risk assessment found 8 indoor air sampling locations to be above the  $10^{-4}$  cancer risk with the remaining properties sampled exceeding a  $10^{-5}$  risk.

In the higher contaminated areas closer to the source area, the risk assessment found a potential cumulative cancer risk of  $2.0E-03$  (using conservative assumptions) and a non-cancer hazard index of 1.55 (for children) if well water is used for recreational purposes. This recreational risk scenario is based on a child immersed in a recently filled pool for 1.5 hours/day for 50 days out of the year, where incidental ingestion of water, inhalation of water vapors, and dermal exposure can occur. Further out in the plume where contaminant concentrations are less, the risk assessment found a cumulative cancer risk of  $2.6E-04$ , with a non-cancer hazard index of 0.2 for children under the recreational scenario.

The potential for noncancer health effects is evaluated by comparing the intake of a chemical with the reference dose. The resulting ratio is the Hazard Quotient. When the daily intake of a chemical exceeds the reference dose (i.e.,  $HQ > 1$ ), there is a potential for adverse noncancer health effects to occur. A Hazard Index (HI) is the summation of relevant HQ values and is used to determine if an exposed individual is at risk of developing adverse health effects resulting from simultaneous exposure to all selected chemicals by all complete exposure pathways.

Potential health risk associated with carcinogens is estimated by calculating the increased probability of an individual developing cancer during his or her lifetime as a result of exposure to a carcinogenic compound. EPA has established a target cancer risk range of  $10^{-6}$  to  $10^{-4}$ . This means that an individual who is exposed to the maximum amount of contaminated media reasonably expected has an increased probability of 0.000001 or 0.0001 of coming down with cancer, in addition to the background rate of cancer in the U.S. which is 0.5 for males and 0.3 for females.

The risk assessment found it unlikely that garden produce irrigated with groundwater containing VOCs posed any significant health concerns.

## V. EXEMPTION FROM STATUTORY LIMITS

The Removal Action cost ceiling calculated for this Site exceeds \$2 million dollars. In addition, the Removal Action may exceed 12 months. The conditions at this Site meet the criteria set forth in CERCLA Section 104(c)(1)(A) to be exempt from these limits.

### A. There is an immediate risk to public health or welfare or the environment.

There is an immediate risk to public health at the Site from vapor intrusion as well as potential risks from recreational use (i.e. playing in or filling baby pools) of groundwater from irrigation wells. Significantly elevated sub-slab gasses exist under most structures (residential and commercial) at the Site. Of the residences sampled over the groundwater plume, 10% have indoor PCE concentrations greater than EPA's target indoor air concentration of  $41\text{ug}/\text{m}^3$  for PCE in residential settings ( $10^{-4}$  incremental increased cancer risk). Although residents have been informed on proper use of irrigation water for watering lawns and gardens (public meeting Oct 4, 2006, and EPA fact sheet distributed week of June 19<sup>th</sup>), there exists a potential threat to public health from the use of contaminated groundwater wells at the Site.

### B. Continued response actions are immediately required to prevent, limit, or mitigate an emergency.

Immediate implementation of source containment, followed by source removal and groundwater remediation is required to address the health risks posed by the existing conditions. If the exemption is not granted and no cleanup takes place, residents within the Billings Groundwater Plume will continue to experience health risks from the vapor intrusion pathway and from incidental exposures from use of irrigation wells.

### C. Assistance will not otherwise be provided on a timely basis.

Assistance from other government agencies is not anticipated because neither the State nor the City has the response capabilities to take any actions at the Site. The Montana DEQ requested EPA assistance at this Site. Consequently, the timely completion of this Removal Action can only be accomplished if this combined 12-month and \$2 million exemption request is approved.

## VI. PROPOSED ACTIONS AND ESTIMATED COSTS

### A. Proposed Actions

#### 1. Proposed action description

The objective of a removal action at the Billings PCE site is to address risks to human health from the PCE groundwater plume. The risks posed by the groundwater plume are from two pathways: (1) inhalation of indoor air (vapor intrusion), and (2) incidental ingestion, inhalation and dermal exposures while using or recreating in groundwater from contaminated irrigation wells. The goal of the removal action is to remediate the PCE source area and groundwater plume within a relatively short period of time (3-5 years). Based on analyses of the data from the site, it is estimated that a groundwater concentration of 100ug/l or less will reduce the vapor intrusion threat to an incremental cancer risk of  $10^{-6}$ . This concentration will also be sufficiently protective for the second pathway described above, incidental ingestion and dermal exposures while recreating in the groundwater.

The proposed removal action will consist of several components to remediate groundwater plume concentrations to below 100ug/l within 3-5 years. The first component consists of immediate implementation of source area containment (in the vicinity of 7<sup>th</sup> Street West) by injection of zero valent iron to provide a treatment and containment zone just below the source area (see Figure 5). This phase will be followed by two additional components: PCE source clean-up; and (3) remediation of the groundwater plume. Groundwater plume remediation will include injection of up to three treatment zones (final locations to be determined by ERT modeling) to accelerate attenuation of the plume. These treatment zones will be established with zero valent iron or bioremediation, depending upon results of ongoing modeling and treatability studies. PCE source clean-up will be conducted through excavation of PCE source in the unsaturated zone and into the saturated zone to the extent field conditions allow. Excavated soils will be hauled to an off-site facility for appropriate disposal. Remaining PCE source in the saturated zone will be treated with in-situ oxidation. A fourth component, soil vacuum extraction, will be evaluated and implemented if necessary to remove any source zone contamination in the unsaturated zone discovered under the 715 and 711 Central Avenue buildings. Venting<sup>2</sup> of residential structures will be conducted on residential properties where indoor air test data have shown a  $10^{-4}$  cumulative cancer risk attributed to groundwater and where interim mitigation measures taken by the resident have been unsuccessful. During Characterization of the Site will be conducted as necessary to assess source area and groundwater contamination,

---

<sup>2</sup> Indoor venting: Sub-slab depressurization systems (basements) and or sub-membrane depressurization systems (crawl space).

indoor air vapor intrusion, and removal action effectiveness. Other technologies may be utilized as appropriate to meet the clean-up objective.

A variety of ancillary activities will be required to initiate and complete the removal action. They include but are not limited to:

- Site preparation, e.g., asphalt removal, traffic control, electricity hook-ups.
- Vapor and odor control during excavation of soils.
- Fencing of the source area during soil removal; and site security during the removal.
- Transportation and off-site disposal of contaminated soils generated, as well as used carbon from any vapor treatment.
- Monitoring sampling of soil and groundwater at various times to assess remediation progress.
- Site restoration, e.g., repairs to streets, buildings, sidewalks, and utilities; and landscaping.
- Installation of building/home ventilation systems

## **2. Contribution to remedial performance**

This Removal Action is intended to address health risks associated with vapor intrusion and recreational use of groundwater at the Site. No additional action is anticipated following implementation of the removal actions described herein.

## **3. EE/CA**

This is a Time-Critical Removal Action; thus, an EE/CA is not required.

## **4. Applicable or relevant and appropriate requirements**

As this Action is being conducted as a time critical removal action, all Federal and State ARARs may not have been identified at this time. The ARARs identified to date are provided as Attachment 2. In accordance with the NCP, all ARARs for the Site will be attained to the extent practicable, given the scope of the project and the urgency of the situation as they are identified.

## **5. Project Schedule**

Sub-slab venting of from 1 to 4 residents will be initiated in the November-December 2007 time frame. Containment of the source area will be conducted as early as February 2007 and completed by April 2007. This will be followed with excavation of source area soils adjacent to 715 Central Avenue and plume remediation in Spring/Summer 2008. The first application of In-situ Chemical

Oxidation of the source area will be conducted in Summer/Fall 2008, with up to three additional follow up applications spaced 4 to 6 months apart thereafter.

**B. Estimated Costs**

The following cost estimate assumes the following: (1) containment of the source area with zero valent iron treatment zone; (2) the PCE source zone removal: including excavation of up to 2,000 cubic yard in the unsaturated zone and off-site disposal; (3) PCE source zone treatment of the unsaturated zone with in-situ chemical oxidation (ISCO); (4) groundwater plume remediation with two zero valent iron or bioremediation treatment zones; and (5) soil vapor extraction of source areas in the unsaturated zone below the 715 and 711 Central Avenue buildings.

**Extramural Costs**

**ERRS**

|   |             |
|---|-------------|
| Source containment, excavation, treatment | \$2,200,000 |
| Groundwater plume remediation             | \$750,000   |
| Soil Vapor Extraction                     | \$210,000   |

**START**

|   |             |
|---|-------------|
| Groundwater Monitoring  | \$385,000   |
| Indoor Air Sampling/Venting                                   | \$370,000   |
| Field Support, Field Sampling, Data Reports,<br>Project Plans | \$250,000   |
| Subtotal Extramural Costs                                     | \$4,165,000 |

|                   |                  |
|-------------------|------------------|
| Contingency (20%) | <u>\$833,000</u> |
|-------------------|------------------|

|                                      |                    |
|--------------------------------------|--------------------|
| <b>TOTAL REMOVAL PROJECT CEILING</b> | <b>\$4,998,000</b> |
|--------------------------------------|--------------------|

The total EPA costs for this removal action based on full-cost accounting practices that will be eligible for cost recovery are estimated at:

|                                     |                    |
|-------------------------------------|--------------------|
| Total Removal Ceiling               | \$4,998,000        |
| EPA's Direct Intramural Costs       | <u>\$ 175,000</u>  |
| Subtotal                            | \$5,173,000        |
| Regional Indirect Cost (35%)        | \$1,810,550        |
| <b>ESTIMATED TOTAL PROJECT COST</b> | <b>\$6,983,550</b> |

The total EPA costs for this removal action based on full-cost accounting practices that will be eligible for cost recovery are estimated to be \$6,983,550. Direct costs include direct extramural costs and direct intramural costs. Indirect costs are calculated based on an estimated indirect cost rate expressed as a percentage of site-specific direct costs, consistent with the full cost accounting methodology effective October 2, 2000. These estimates do not include pre-judgment interest, do not take into account other enforcement costs, including Department of Justice costs, and may be adjusted during the course of a removal action. The estimates are for illustrative purposes only and their use is not intended to create any rights for responsible parties. Neither the lack of a total cost estimate nor deviation of actual total costs from this estimate will affect the United States right to cost recovery.

#### **VI. Expected Change in Situation if Action Delayed or Not Taken**

Delayed action will increase public health risks posed by PCE and daughter products in groundwater.

#### **VII. Outstanding Policy Issues**

This removal does not set a precedent; vapor intrusion has been dealt with under the removal program before. The issue of vapor intrusion is, however, a nationally significant issue.

#### **VIII. Enforcement**

A potentially responsible party may be identified at this Site. Attachment 3 is a confidential Enforcement Addendum which sets forth EPA's enforcement strategy for this Site.

**IX. Recommendation**

This decision document represents the selected Removal Action for the Billings PCE in Billing, Montana, developed in accordance with CERCLA as amended, and not inconsistent with the NCP. This decision is based on the Administrative Record for the Site.

Conditions at the Site meet the NCP Section 300.415(b)(2) criteria for a Removal, and I recommend your approval of the proposed Removal Action. The total project ceiling will be \$4,998,000, of this amount, an estimated \$4,998,000 will come from the Regional removal allowance.

Approve: David A. Ostrander Date: 10/12/07  
David A. Ostrander, Program Director  
Preparedness, Assessment and Emergency Response

Disapprove: \_\_\_\_\_ Date: \_\_\_\_\_  
David A. Ostrander, Director  
Preparedness, Assessment and Emergency Response

**Attachments:**

- Attachment 1-Risk Assessment
- Attachment 2-Applicable or Relevant and Appropriate Requirements
- Attachment 3-Confidential Enforcement Addendum

- Figure 1-Site Location Map
- Figure 2-PCE Groundwater Plume Map
- Figure 3-PCE Source Area
- Figure 4-Sub-slab/Indoor Air test locations/results
- Figure 5-Removal Action components

Table 1-Sub-slab/Indoor Air test results

## SUPPLEMENTAL DOCUMENTS

Support/reference documents which may be helpful to the reader and/or have been cited in the report may be found in the Administrative Record Files for the Billings PCE Site at the Superfund Records Center for Region VIII EPA, 1595 Wynkoop Street, Denver, Colorado 80202-1129. An additional copy of the Administrative Record File will be placed at a repository near the Site, the location of which is to be determined.