United States Environmental Protection Agency
Region VIII
POLLUTION REPORT

Date: Monday, July 6, 2009
From: Kerry Guy

Subject: Removal Action
Billings PCE
715 Central Avenue (origin), Billings, MT
Latitude: 45.7700000
Longitude: -108.5333000

POLREP No.:	4	**Site #:**	08-ME
Reporting Period:		**D.O. #:**	
Start Date:	10/12/2007	**Response Authority:**	CERCLA
Mob Date:	10/2/2007	**Response Type:**	Time-Critical
Demob Date:		**NPL Status:**	Non NPL
Completion Date:		**Incident Category:**	Removal Action
CERCLIS ID #:		**Contract #**	
RCRIS ID #:			

Current Activities

Vapor Mitigation Systems
Three vapor mitigation systems have been installed at properties within the study area. Three additional properties have been designated for vapor mitigation systems.

Insitu Chemical Oxidation (conducted week of June 16th and October 27th 2008)
Modified Fenton's reagent is hydrogen peroxide with an iron catalyst that is used to destroy chlorinated compounds via in situ chemical oxidation. The Fenton's reagent was injected to treat the contaminated soil just above and below the water table. The Fenton's reagent was injected into the BSL alley and along a section of Central Avenue. The Fenton's reagent was not injected along the section of Central Avenue where the thick interval of highly contaminated silt and clay were present. The Fenton's reagent was injected prior to soil excavation, was added to open injection pits, and was injected after soil excavation and backfilling.

Installation Sheet Pile Containment Cell Central Avenue (conducted July through September 2008)
A sheet piling enclosure was permanently installed to enclose, isolate and allow excavation of the thick sequence of highly contaminated fine-grained soil under Central Avenue. The enclosed area had unique characteristics (including the presence of DNAPL below the water table) that eliminated other remediation alternatives from consideration. The low permeable fine-grained soil was not conducive to contaminant extraction via pumping. The fine-grained material also prevented the use of treatment technologies that required injection. The DNAPL below the water table could not be safely excavated without the protection provided by the enclosure and the capability to dewater the enclosure.

Approximately 330 linear feet of sheet piling was driven approximately 30 feet bgs into bedrock. A joint sealant was used to improve the water-tightness of the sheet piling enclosure. The sheet piling was also braced and functioned as shoring for deep excavation within the enclosure. The enclosure was successfully dewatered for the excavation. The extracted water was processed through an on-site carbon treatment system and discharged into the sanitary sewer with the approval of the City of Billings.

Contaminated Soil Excavation (conducted from July through September 2008)
The soil excavation in the BSL alley and under Central Avenue (outside of the sheet piling enclosure) generally addressed the contaminated soil above and just below the water table. Data used to draw the preliminary excavation boundaries and planned depths was obtained from borehole samples. A high sample densely was necessary due to the discontinuous and isolated nature of contamination.
The pre-removal sampling program in the alley allowed an accurate definition of excavation boundaries to be drawn. The pre-defined excavation boundaries were used to plan engineering controls (i.e. building foundation support), maximize effectiveness, and minimize the excavation footprint. The excavation was advanced and cleanup was confirmed using analytical data of samples collected from pit sidewalls and

bottoms.

Contaminated Soils Management (contaminated soils were managed in the soil stockpile area from July through November 2008)
The excavated soil was segregated based on the relative PCE concentration and stockpiled in an on-site staging area. The stockpiles was sampled and analyzed with the on-site GC/MS. The stockpiles with a PCE concentration greater than 500 mg/kg were shipped to a RCRA Subtitle C hazardous waste landfill for incineration. Approximately 500 cubic yards of soil was shipped for incineration. Soil stockpiles with PCE concentrations less than 14 mg/kg were not a RCRA hazardous waste and were shipped directly to the local RCRA Subtile D municipal landfill. Approximately 3,000 cubic yards of contaminated soil with PCE concentrations between 14 mg/kg and 500 mg/kg remained in the staging area. TCLP analysis of samples collected from the many of the remaining stockpiles revealed that the PCE was highly leachable. TCLP PCE concentrations of many of the samples exceeded the .7 mg/l threshold for RCRA hazardous waste.

On-site Treatment of Contaminated Soils (Conducted from October through November 2008)
As a cost-saving alternative to soil transport and disposal at a RCRA Subtitle C hazardous waste landfill, on-site soil treatment options were pursued. A treatment study was conducted with different chemical oxidants. Soil treatment using sodium permanganate was selected based on favorable treatment study results. The treatment procedure involved pre-sampling and analysis of 12 and 15 cubic yard stockpiles. The sample results were used to determine the quantity of sodium permanganate for each stockpile. A pre-measured quantity of sodium permanganate and water were mixed with the soil in an on-site treatment vat. After mixing, the soil was staged while the sodium permanganate reacted with the PCE. Progress was indicated by a color change from purple to the soil's original color. The soil was sampled and analyzed on-site. A PCE result less than 14 mg/kg was required for disposal of the soil at the local RCRA Subtitle D landfill as nonhazardous waste. All remaining soil was successfully treated on-site resulting in a significant cost savings.

Restoration Activities conducted from mid September through December 2008)
The restoration activities included;

- Backfilling the excavation with engineered fill that was compacted to required specifications,
- Cutting the sheet piling below grade,
- Installing new water, storm sewer, sanitary sewer, gas and electric lines, and new manholes,
- Paving Central Avenue, installing new curb/gutter and sidewalk,
- Grading and filling the stockpile area with a gravel cover.

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